Integrating Transportation Demand Management into the Development Process: A Dialogue with Chula Vista

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Prepared for: CITY OF CHULA VISTA

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Introduction and Overview

The City of Chula Vista, in partnership with the San Diego Association of Governments (SANDAG), initiated a series of two workshops to discuss approaches to integrating Transportation Demand Management (TDM) through the development process. City staff and developers attended the workshops to learn about a wide range of TDM strategies and to offer ideas, share concerns, and provide input on possible approaches to implementing and sustaining the City of Chula Vista’s existing TDM-related plans and policies. The workshops also built upon the SANDAG technical assistance guidebook, *Integrating TDM into the Planning and Development Process: A Reference for Cities* (May 2012).

This report provides an overview of both workshops and summarizes the comments received during each session by presenting trends and themes that characterize the major discussion topics.

Purpose and Objectives of Workshops

Supporting local jurisdictions in efforts to expand their TDM policies and programs is a strategy in the 2050 Regional Transportation Plan and Sustainable Communities Strategy (2050 RTP/SCS). As a first step, SANDAG staff developed a guidebook for local jurisdictions on integrating TDM into the planning and development process. This guidebook was the basis for the workshop series.

The City of Chula Vista has incorporated TDM elements into existing planning documents:

- The General Plan includes a policy to reduce traffic demand through the increased use of transit, bicycles, walking, and other trip reduction measures.
- Similarly, the Chula Vista CO2 Reduction Plan lists several action measures that can be classified as TDM, such as enhanced pedestrian and cycling facilities, increased housing and employment density near transit, and reduced commercial parking requirements.
- The Chula Vista Climate Action Plan recommends that the City facilitate smart growth development around trolley stations, a provision that aligns with the General Plan.
- The Eastern Urban Center Sectional Planning Area Plan recognizes the importance of engaging large employers to develop programs that promote off-peak hour commuting and reduced parking demand.
- The Otay Ranch Village 8 West and Village 9 Sectional Planning Area Plan cites TDM strategies such as designing multimodal streets and flexible parking standards to achieve reduced traffic congestion and improved air quality and livability.
- The City of Chula Vista Clean Transportation Energy Roadmap includes ways the City can expand upon its employee commuter benefit program.

The City of Chula Vista has implemented successful TDM programs in the last 20 years. Two telecenters operated in the mid-1990’s to encourage telework on the part of Chula Vista residents. Then, two Chula Vista Xpress bus routes connected Eastern Chula Vista residents to downtown San Diego or the H Street Trolley station between 2005 and 2007. Riders were paid to participate in the Xpress bus program until funding was exhausted.
Given this history, the workshops were intended to increase awareness of the benefits of TDM and to solicit feedback on the opportunities for formalizing TDM as part of the development review process in the City of Chula Vista. Specific objectives of the workshops included:

- Increasing the awareness of TDM measures and their direct and indirect benefits
- Identifying Chula Vista’s existing TDM-related policies and programs
- Exploring a range of TDM strategies that could be integrated into Chula Vista's planning and development process
- Identifying opportunities and challenges associated with integrating TDM into Chula Vista’s planning and development process
- Reviewing case studies, best practices, lessons learned, and data from other cities on TDM strategies that have been integrated into the planning and development process
- Identifying sample policies, model ordinances, developer agreement examples, transferable programs, and other resources

The workshops were not intended to design a new TDM program for the City of Chula Vista; rather, they were intended to gather preferences regarding the program’s approach, goals, and potential measures.

Workshop #1

Workshop #1 was held on March 10, 2014, at the City of Chula Vista Civic Center. This workshop, entitled "Bending the Trend: Integrating TDM into the Development Process," included a presentation and interactive small group exercises. Thirty-six participants from various divisions within the City of Chula Vista’s Development Services Department and local developers were in attendance. The presentation provided workshop participants with an overview of TDM principles, strategies, and implementation mechanisms and shared different ways that peer cities have incorporated TDM into the development process. The benefits of TDM were also highlighted during the presentation, including how TDM can help achieve LEED certification.

Following the introduction to TDM, two case studies were presented that demonstrated examples of developments that incorporated TDM strategies as part of their approval process; each one was followed by a small group discussion. Contra Costa Transit Village, a mixed-use development featuring retail, office, and multi-family housing along a regional rail line in Contra Costa County, CA, was the first case study presented. The history, context, and development scenario were provided to the workshop attendees. Working in groups, attendees were asked to select from a list of TDM strategies to develop a formal TDM program for the project. Each strategy on the list was assigned a relative cost and effectiveness value for reducing vehicle miles traveled that was developed by Contra Costa County and included in their 2009 “TDM Ordinance Guide.” Each group was asked to achieve a target level of effectiveness within a given budget.
The second case study featured a large commercial/office development in Arlington, VA. The site’s development history, context, and approved TDM program were reviewed including details of a TDM policy established in 1990. Workshop attendees were presented with a comprehensive list of strategies that comprised a part of Arlington’s TDM program. In small groups, attendees were asked to prioritize the menu of strategies used in Arlington and identify those strategies that might be applicable to Chula Vista. Participants were also asked to identify whether the City or the developer should be responsible for strategy implementation.

Workshop #2

Also held at the City of Chula Vista Civic Center, Workshop #2 took place on April 3, 2014, with 25 participants in attendance. The goal of this workshop entitled, “Focus on Chula Vista: Integrating TDM into the Development Process” was focused on implementing and sustaining TDM programs. The workshop included a presentation that provided a review of discussion topics from Workshop #1, highlighted past TDM efforts in Chula Vista, reviewed TDM implementation mechanisms, and discussed sustainment strategies. During the presentation, two local developers were given the opportunity to discuss projects in Chula Vista that have considered TDM measures as part of their approval. An Otay Land Company representative stressed the importance of mixed uses, including neighborhood-serving retail and other services, and pedestrian-friendly design as a way to reduce vehicular traffic in and around a development. A representative of Corky McMillin Companies spoke about the Millenia development in southeast Chula Vista and the challenges associated with implementing shared parking on a site upon which specific uses/tenants have not yet been identified. If a particular development is not yet a destination, parking availability is necessary to attract tenants.

Following the presentation, workshop attendees engaged in an interactive exercise that highlighted three different geographic areas of Chula Vista with varied development characteristics. Participants worked in small groups to design TDM programs and implementation strategies for three different development sites in Chula Vista. The sites reflected varying contexts and assumed development programs ranging from intensive urban redevelopment, to green-field master plans, to an individual infill project in differing transportation settings. This allowed participants to better understand how potential TDM programs and strategies might vary across the City.

Discussion Trends and Themes

The following discussion summarizes the topics, ideas, and comments shared by workshop participants. They were developed based on a review of workshop meeting minutes, discussion notes, comments from the workshops, and survey responses. They are organized by overall considerations, challenges, and favorable strategies identified in both group discussion and individual tabletop discussions in Workshops 1 and 2.
Overall Considerations

- The TDM application and implementation processes should be consistent and predictable, especially from the perspective of the developers. The incorporation of TDM requirements should be a known, quantifiable process so as to minimize risk and cost. It should be clear where/how TDM requirements will overlap with existing (non-TDM) requirements so the entire entitlement process is coordinated up-front.

- Any proposed TDM program should be flexible and responsive to the development’s context. A menu of TDM options for developers allows strategies to be tailored to a specific development. TDM measures could be implemented and monitored through a membership organization, such as a Transportation Management Association, providing a single purpose and being member-driven.

- In order for a formal TDM program to be successful there needs to be a consistent method for managing and sustaining it. However, the program should also be adaptable and respond to changing needs over time.

- The City of Chula Vista and developers are already incorporating elements of TDM. Any future program should recognize and build upon what’s already being done.

- At the regional level, SANDAG provides a wide range of TDM programs and support services that both the City and developers can leverage rather than starting from scratch.

Challenges

- Success of any TDM program/ordinance will require an educational component to help change the culture/mindset away from driving alone.

- Convenient transportation alternatives that are competitive with the single occupant vehicle need to be available for TDM to succeed.

- Cost is the biggest variable for all aspects of a TDM program, from program creation to sustainment/verification. The level of cost, and who is assigned to pay certain costs, will greatly influence how programs should be structured.

- Any program/ordinance will need to address the various players involved at the different stages over the life of a project, from master developer, to builder, to tenant/occupant. Additional detail related to who is involved/responsible at all stages of the project will need to be defined.

- TDM requirements will need to be responsive to market conditions. For large projects, phasing of TDM requirements is more feasible, but harder to ensure all measures are incorporated/executed.

- The City will need to identify staffing resources to monitor the implementation of TDM strategies, especially the programmatic strategies.

Most Appealing Strategies

The small working groups expressed a variety of opinions as to which combination of TDM strategies would be most effective for reducing vehicle trips and increasing the use of transportation alternatives. While all tables were in favor of including strategies with no or minimal associated cost, they did not limit their choices to the least expensive options altogether. Although the remainder of selections varied, the tables gravitated to four areas: 1) physical improvements, such as bicycle and pedestrian amenities and improving access to transit; 2) direct transit incentives, such as the federal tax benefit; 3) parking management solutions; and 4) alternative work
arrangements, such as telework or compressed workweeks. The selection of these types of strategies for a hypothetical TDM program could be attributable to the participants’ familiarity with these strategies; all four currently exist in the San Diego region in one form or another. Furthermore, the alternative work schedules and physical improvements were seen as being highly effective in Chula Vista, specifically.

There was widespread discussion about physical improvements being the most quantifiable and predictable strategies to implement. This was appealing to developers who want to minimize risk. Physical improvements also were appealing to City staff who viewed these strategies as permanent and requiring little to no monitoring.

Transit/tax incentive strategies were selected because they built upon existing systems. These strategies were seen as reinforcing existing behavior for current transit riders and potentially enticing current drivers to consider transit. Both were attractive because they provided immediate tangible benefits through direct cost savings to the user.

There was wide consensus that effective transportation management must include parking management. Both developers and City staff understood the relationship between transportation behavior and the cost and supply of parking. Nuances of certain parking strategies emerged once the element of context was introduced. The developers, in particular, understood that parking reductions and/or parking charges were only feasible in areas where demand was already high. In outlying areas of the City, ample (and even, surplus) parking was seen as necessary to attract sufficient business/residents.
Lastly, participants indicated that alternative work schedules are both effective and applicable to the Chula Vista context. The popularity of alternative work schedules was a combination of their (perceived) low implementation cost as well as their suitability for Chula Vista. Some forms of this strategy, such as compressed work weeks and telework, can indeed be implemented with little to no cost, but are only viable for specific types of businesses.

Next Steps and Recommendations

The workshops initiated a dialogue about TDM in the City of Chula Vista. However, follow-up actions are needed for the City to implement TDM in a comprehensive and strategic manner. Recommendations are provided for the City to consider when developing a standardized TDM program.

1. Develop a Reference Matrix to Guide Future Discussions

The City should develop a reference matrix to distill information about existing TDM programs in other cities. This should also incorporate programs that the City of Chula Vista can leverage to help implement TDM. Some of this information was presented during the workshops and additional information is included in the references section of this report. Developing a reference matrix will help the City define objectives and outcomes of the TDM program and guide the discussion of a “Stakeholder Advisory Group.” The reference matrix should be prepared to highlight different solutions that are appropriate for the different contexts in Chula Vista.

2. Establish a Stakeholder Advisory Group to Inform the Development of a Formal TDM Program

A “Stakeholder Advisory Group” should be created to serve as a forum for discussing key questions about how a TDM program can be structured in Chula Vista. The City of Chula Vista could leverage the existing Development Services Oversight Committee. This group primarily consists of members of the development community who have advised the City of policy in the past. The group could be expanded to include additional stakeholders (e.g. business owners of varying size and type, transportation-related interest groups and agencies) with different perspectives and interest in how TDM can be implemented in the City. Industry leaders from the San Diego Metropolitan Transit System and SANDAG also should be included to provide input on best practices and regional programs. Incorporating representatives from different City departments should also be considered to draw on the experiences and knowledge about existing City programs and policies.

The role of the “Stakeholder Advisory Group” should be clearly defined and the City should carefully consider a strategy on how to efficiently and effectively get input from this group within a set timeframe. Defining the problems to be solved by the group and the opportunities that can be leveraged will help structure the dialogue. Some questions to consider include:

- Should a TDM program apply to the entire City, or focused areas?
- What voluntary or required elements might be required? Can incentives be provided for participation?
- Are all projects subject to the same standards? Are there differences based on scale or use?
- What City departments will manage and monitor TDM? How will the performance of TDM be measured and sustained?
3. **Develop an Implementation Framework**

An implementation framework will help determine the scope and structure of the TDM program that is appropriate for the context and needs of Chula Vista. A standardized TDM program would provide the City with an effective set of tools that are predictable for developers. Standardizing a TDM program is important to ensure that implementation is equitable and consistent, but it must also be sensitive to varied scales of development (e.g., Sectional Planning Area plans versus individual development projects). The framework should leverage the existing TDM policy foundation and current practices. As an outcome of the implementation framework, the effects of *not* implementing a TDM program should also be considered and quantified, if possible.

4. **Execute the Implementation Framework**

The recommendations of the implementation framework should provide specific direction and a schedule for moving forward with execution. The implementation framework should include education programs for City staff, developers, and the public. Recommendations should describe the existing policies or practices that will need to be updated or streamlined and/or new policies needed to support implementation. The framework should take advantage of regional TDM programs and services that are currently available to employers and commuters through SANDAG.

**Resources & References**

- Annotated Bibliography
- TDM Background Research and Materials
- Case Study Materials
- Other materials such as: Covenants, Conditions and Restrictions (CC&Rs), Developer Agreements, traffic studies, TDM plans or other information that could be consulted in the future for use by Chula Vista
Workshop Case Study Materials: Contra Costa Transit Village - Contra Costa County, CA


Institute of Transportation Engineers. Case Study: Contra Costa Centre Transit Village, Contra Costa County, California, n.d.


Workshop Case Study Materials: NRECA Phase II - Arlington, VA


Arlington County Commuter Services. Transportation Demand Management Benefits SP #249 NRECA Phase 1 Office 4301 Wilson Boulevard.


Duffy, Robert J. 40 Years of Smart Growth: Arlington County’s Experience with Transit Oriented Development in the Rosslyn-Ballston Metro Corridor. Arlington, VA, n.d.

Alameda County, CA


Alexandria, VA


Cambridge, MA


Elk Grove, CA


Fairfax County, VA


Strategic Transportation Initiatives Inc. Proposed Plan Transportation Demand Management MetroWest. Submitted on behalf of Pulte Homes.

Tysons Land Use Task Force: Transportation Demand Management (TDM) Subcommittee. Fairfax County.


Montgomery County, MD


Pasadena, CA

Masuda, Judi. City of Pasadena Trip Reduction Ordinance. SCAG Compass Blueprint. City of Pasadena, Department of Transportation.


Richmond, CA


Sunnyvale, CA

Fehr & Peers. Transportation Demand Management (TDM) Plan, 580 N. Mary Avenue, Sunnyvale, California, December 2, 2011.


Evaluation and Survey of TDM Programs


**TDM Research Reports**


Other


Contra Costa Centre Transit Village
Contra Costa Centre Transit Village, a 125-acre district surrounding the Pleasant Hill/Contra Costa Centre BART station

Contra Costa Centre Transit Village hosts 7,000 residents, 6,000 employees, and 6,000 BART customers a day.
Contra Costa Centre Transit Village

Recognized by BART Board of Directors to change the BART station name in 2008 to Pleasant Hill/Contra Costa Centre.
Contra Costa Centre Transit Village

- Public and private partnerships encourage private responsibility, and mobilize private resources for public good
- Contra Costa Centre Transit Village is located in Contra Costa County
Contra Costa Centre Transit Village

- Contra Costa Centre Association was incorporated in 1985 as a nonprofit mutual benefit corporation
  - Coordinate planning and services of mutual interest including landscaping, child care, marketing, transportation demand management programs and security
  - The 14 project owners incorporated to voluntarily work together as a single entity
Transportation Demand Management is a critical piece. Provide planning designed to promote efficient transportation services.

Primary example of how jobs and housing near transit can work and get people out of their cars. Over 30% of the employees have taken a commute alternative for over 20 years.

In 1989, 14 project owners comprising of CCCA contributed over 1.5 million dollars to be used for TDM.

In 2002, project owners voted to approve a $200,000 annual tax assessment for TDM with the creation of CSA M-31 District.
Contra Costa Centre Transit Village

- Funding for projects available through local or national grants

- Over the history of the Contra Costa Centre Transit Village, Contra Costa Centre has received over $500,000 in grants for TDM programs including vanpool vans, BART tickets, shuttle bus and bike lockers.

- In 2011, Department of Energy awarded Contra Costa Centre Transit Village a grant for 14 electric vehicle charging station equipment. EV charging station grants were worth $90,000.
# TMD Ordinance Guide

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Introduction

The Transportation Demand Management (TDM) Ordinance Guide is provided to developers to encourage the use of creative and effective ways to reduce motor vehicle trips and their associated impacts created by new development projects, pursuant to the County’s TDM Ordinance.

County staff will review development projects with the applicant based on this guide and determine if a combination of acceptable options/measures will reduce the net number of trips that the project is anticipated to generate. This document contains recommended TDM measures and guidance based on the County’s TDM Ordinance.

The County faces the inevitability of a growing population, in conjunction with an expanding job market. The County’s TDM Ordinance Guide will help property owners and developers reduce traffic congestion through measures designed to encourage the use of alternatives to the driving alone by car.
1.0 Intent and Purpose

This is a guide to help property owners and developers comply with the requirements of the County’s Transportation Demand Management (TDM) Ordinance. Text in italic font is taken directly from the ordinance.

(a) The intent of this chapter is to further the transportation goals of the County General Plan, the Measure C Growth Management Program, Contra Costa County’s Congestion Management Program, and the Bay Area Clean Air Plan.
(b) The purpose of this chapter is to implement the provisions of the general plan to promote a more balanced transportation system that takes advantage of all modes of transportation by:
   (1) Incorporating pedestrian, bicycle, and transit access into improvements proposed in development applications;
   (2) Incorporating the overall intent and purpose of this chapter into the land use review and planning process;
   (3) Allowing requests for reductions in the off-street parking requirements for residential or nonresidential projects that have a conceptual TDM Program;
   (4) Providing information to residents on opportunities for walking, bicycling, ridesharing and transit.¹

Pursuant to the County’s zoning ordinance or possibly under a project’s conditions of approval, County staff has the authority to require the submittal and approval of a TDM program prior to the issuance of a building permit for a project. TDM programs associated with development projects typically aim at achieving the following general outcomes:

- Reduce the frequency and distance of auto trip making;
- Spread peak-hour trip making to off-peak time periods;
- Shift trips towards the use of environmentally friendly and non-motorized modes of transportation; and
- Provide technological solutions to reduce the environmental impacts of vehicular traffic, such as provision of charging stations to encourage the use of electric/hybrid vehicles, and provision of real-time or interactive information on bus services.

There is no single TDM measure that can effectively reduce a project’s traffic impacts. Relative effectiveness of each TDM measure within a program; and the effectiveness of the overall program can be evaluated by how well the aforementioned outcomes are achieved. The following sections of this guide provide information on the different TDM measures that can be deployed by different types of developments, as well as means for their implementation and, if applicable, monitoring their effectiveness.

There should also be a reference to a significant community resource, namely 511 Contra Costa, which can be of great use for employers and developers pursuing the deployment of TDM

¹ Ch. 82-32.004
strategies. The www.511contracosta.org web site has information on the different transit services and regional connections (e.g. ACE commuter rail, AC Transit, BART, County Connection, and others). The web site also has information on park & ride lots, taxicab services, clean fuel vehicles and infrastructure, bicycle programs, racks and lockers as well as different commuter and employer services. Subject to current programs and availability of resources, 511 Contra Costa could supply free transit and bicycle maps, transit and vanpool vouchers with tax benefits for employers and employees, free taxi rides as part of the Guaranteed Ride Home Program, and free gas cards and transit passes to encourage employees to try a commute alternative. The 511 Contra Costa staff could also assist by providing presentations on the transportation options, alternative work schedules, telework, as well as assist in conducting and analyzing employee transportation surveys, developing parking management programs, providing a specialized rideshare or parking management program at the worksite, and other TDM initiatives.

It should be noted that development projects are also subject to the potential requirement of Traffic Impact Analysis (TIA), which may include mitigations to individual and cumulative project impacts at study intersections, roadway segments, and/or freeways as well as on-site and site access improvements. Such analysis and mitigation requirements are not addressed in this guide.

2.0 Definitions

The TDM Ordinance defines important terms to clarify the type of projects subject to its requirements.

(a) "Residential Project" means any residential development application containing thirteen or more dwelling units that must be approved through a public hearing process and has not received final approval.

(b) "Non-Residential Project" means any non-residential or, mixed-use development application that must be approved through a public hearing process and has not received final approval. Non-residential project also includes an application to expand an existing office or industrial structure that has at least five thousand square feet of gross floor area, by twenty-five percent or more of the structure’s gross floor area.²

3.0 Application for Off-Street Parking Reductions

The requirements of this chapter shall apply to all development projects, residential or nonresidential.³

(a) A project may qualify for reductions in off-street parking requirements pursuant to this section. A sponsor requesting parking reductions shall submit a conceptual TDM program to the community development department concurrently with the application for the project. If the tenant is known, the project sponsor and tenant shall jointly submit the conceptual TDM program.⁴

² Ch. 82-32.002
³ Ch. 82-32.006
⁴ Ch. 82-32.006
The two main benefits to project sponsors associated with a reduced off-street parking requirement are: (1) Significant savings in construction and maintenance costs for off-street parking; and, (2) The availability of space/land that otherwise would be used for parking. Such space could be utilized to provide on-site amenities, landscaping, or increased project density subject to County approval.

A mixed-use development application can have characteristics that could qualify for a reduction in off-street parking required by the zoning code. Different uses can vary in their peak parking demands in a day, week and/or season which could support the concept of shared parking. For example, parking associated with a general office use on a weekday takes place at 10:00 a.m., while parking of a movie theatre peaks at 8:00 p.m. and 10:00 p.m. The Institute of Transportation Engineers (ITE) Parking Generation Manual is a professional source for obtaining information on the variations in parking demands during a weekday and weekend day, as well as variations in the different months and seasons during a year. Currently, the 3rd Edition of the ITE Parking Generation Manual is in use with expected future updates. Also currently in use is the 2nd Edition of the “Shared Parking” report produced by the Urban Land Institute, which can be utilized to obtain parking rates for mixed-use developments. Different combinations of uses would result in different overall peak parking demands. Such analysis also typically relies on surveys of similar projects established in similar communities.

3.1 Required Information for Development Permit Application

3.1.1 Conceptual TDM Program

*The conceptual TDM program shall identify TDM measures that can be demonstrated to attain the trip reduction necessary to qualify for the requested parking reductions. The department shall review the project’s conceptual TDM program and make a recommendation to the division of the planning agency hearing the project application*.5

TDM measures potentially suitable for consideration in a residential project’s Conceptual TDM Program can be found in Appendix A, with cost and implementation comparisons in Appendix D of this guide.

TDM measures potentially suitable for consideration in a non-residential or mixed-use project’s Conceptual TDM Program can be found in Appendix B of this guide, with cost and implementation comparisons in Appendix D of this guide.

All Conceptual TDM Programs shall contain a monitoring, evaluation and enforcement component.

Monitoring: Monitoring a TDM program can be accomplished by periodically surveying occupants or residents to determine the success or failure of the TDM measures individually or in combination. A commute survey typically gathers quantitative data (e.g., % use of the various modes of transportation) and qualitative data (e.g., respondents’ perception of the alternative transportation programs). The survey data can then be used to decide on any needed adjustments to the TDM measures. They can also be used to focus future marketing initiatives. 511 Contra Costa

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5 Ch. 32-32.008(a).
staff can assist with the preparation of the survey questionnaire, collection of the data and analysis
in the form of survey reports. Some survey tips are provided at the end of this section of the TDM
Ordinance Guide.

Allowing completion of the survey on-line can help reduce the time and effort spent on circulating
and administering the survey. When possible, conducting a baseline survey before starting the
TDM program can later assist in evaluating the program’s effectiveness (Before and after
comparative analysis). In addition, comparing results of the survey to previous surveys can assist in
evaluating the program’s progress and potential modifications. It is possible to add survey questions
to assess such new improvements.

Evaluation: TDM programs are not static, but must change as the needs of commuters change or as
transportation services available to a project change. The effectiveness of TDM measures should be
monitored and evaluated to determine if changes are needed. Effectiveness is typically based on a
cost/benefit analysis of the individual TDM measure. For example, is the cost of providing a shuttle
service to a BART station justified by the number of shuttle users? Such cost/benefit analysis can
assist in identifying measures that the participants’ needs at the least cost. TDM Program costs
typically include the capital and operating costs, such as the cost of bike lockers, shuttle fleet, cost
of training and educational materials, TDM staff hours and rates, cost of office equipments provided
to telecommuters, etc.

Enforcement: To ensure the success of the TDM program, it is important that the project sponsor
establish mechanisms that guarantee the perpetuity of the program. Examples of such mechanisms
are described below:

- Incorporate the TDM program requirements into the Covenants, Conditions & Restrictions
  (CC&Rs) of the property to ensure that the TDM program runs with the land. Wording of
  the CC&Rs has to ensure that the property, as well as every owner and occupant shall be
  subject to, abide with, and satisfy each and all of the provisions and obligations contained in
  the TDM program. This includes any obligation to provide funding and resources to
  implement the TDM program and comply with all requirements of associated conditions of
  approval imposed by the County. It is important to clarify that the TDM program
  requirements apply equitably to all portions of the property. They also apply to all owners
  and tenants, as well as their successors in case the property is transferred, sold or leased.
  Should the County apply a penalty fee system for lack of compliance with the set
  percentages of trip reduction, this also must be stated in the CC&Rs to avoid any surprises.

- Incorporate the TDM program requirements into the tenant lease agreement to ensure that
  occupants of the project site cooperate with the property owner/sponsor, property manager
  and/or the County in meeting all requirements. The wording of the lease agreement may
  also specify that a person shall be designated to act as a liaison with the landlord, the
  County, etc.
3.1.2 Proposed Improvements

The sponsor shall include in the tentative map, land use permit, or development plan application, any improvements that will provide access to public transit, ridesharing opportunities and nonmotorized forms of travel.\(^6\)

Typical on-site improvements include internal paths, bicycle parking, pedestrian/cyclist connections to off-site facilities, pedestrian signage and lighting, etc. The site plan should also acknowledge access to bicycle lanes/routes, sidewalks/paths or transit stops adjacent to the project site.

A more detailed description of proposed improvements potentially suitable for reducing a residential project’s off-street parking needs can be found in Section IV of this guide.

Proposed improvements potentially suitable for reducing the off-street parking needs of a non-residential or mixed-use project can be found in Section V of this guide.

If the project lies within a transit service area identified in the circulation element of the General Plan, the sponsor shall consult with the transit service provider on the need to provide infrastructure to connect the project with the transit services. Evidence of compliance with this requirement may include correspondence from the local transit provider(s) regarding the potential need for installing bus turnouts, shelters or bus stops at the site.\(^7\)

Transit facilities may be needed for existing transit service or to allow the project to be served by new transit routes in the future. The transit service areas are shown in Figure 5-3 of the General Plan. The 511contracosta.org website has the contact information and route schedules and maps for all San Francisco Bay Area transit providers, including those that serve Contra Costa. A listing of the transit service providers for these areas follows:

- AC Transit serves El Cerrito, Richmond, San Pablo and neighboring unincorporated areas.
- West CAT serves Pinole, Hercules, Rodeo and Crockett.
- County Connection serves Lamorinda, Martinez, Concord, Clayton, Walnut Creek, Pleasant Hill, Danville, San Ramon, and neighboring unincorporated areas.
- Tri Delta serves Antioch, Brentwood, Pittsburg, Oakley, and unincorporated communities in eastern Contra Costa.

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\(^6\) Ch. 82-32.008(c)
\(^7\) Ch. 84-32.008(d)
3.1.3 Final TMD Program

Final TMD Program. The design and implementation of the final TMD program shall be a condition of a project’s approval. The sponsor and all subsequent owners of the project shall provide deed notification of mandatory participation in the final TMD program to all subsequent purchasers and owners of the project.  

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8 Ch. 84-32.008(e)
The County’s approval of a TDM program for a reduction in off-street parking is discretionary. County staff will review the Conceptual TDM Program, in consultation with the applicant, and determine its potential to achieve the off-street parking reduction requested in the development application. A recommendation for a Final TDM Program will be made to the approving body. Approval may be conditional and include performance standards which, if not met, would require reconsideration of the Final TDM Program. If the TDM Program is not approved, there will be no reduction in off-street parking requirements.

Following the County’s review and approval process, the Final TDM program will be set as a condition of approval on the project. The project sponsor and all subsequent owners of the project shall provide deed notification of mandatory participation in the Final TDM program to all subsequent purchasers, owners and tenants of the project.

4.0 TDM Requirement for Residential Projects

4.1 TDM Program Content

A sponsor of a residential project containing thirteen or more dwelling units shall prepare and implement a TDM program that includes at least the following:

(1) Owner-Occupied Units. Upon a residential dwelling being sold or offered for sale, the sponsor shall notify and offer to the buyer or prospective buyer, as soon as it may be done, materials describing public transit, ridesharing, and nonmotorized commuting opportunities available in the vicinity of the project. Such information shall be transmitted no later than the close of escrow;

(2) Rental Units. Upon a residential dwelling being rented or offered for rent, the sponsor shall notify and offer to the tenant or prospective tenant, materials describing public transit, ridesharing, and nonmotorized commuting opportunities in the vicinity of the development. The materials shall be approved by the Department of Conservation and Development. The materials shall be provided no later than the time the rental agreement is executed.

The sponsor and all subsequent owners of the project shall provide deed notification of mandatory participation in the TDM program to all subsequent purchasers and owners of the project.9

The TDM Program for a residential project should be understood as a disclosure document to the occupants of the residential project. It discloses the transportation facilities and services located on-site and off-site that are available to the occupants. It should be of a format and size that can be easily incorporated into other disclosure documents prepared for the project. A format adaptable to a letter-size 3-ring binder is typically used.

The TDM Program must be approved prior to issuance of the first building permit for the project, unless the conditions of approval indicate otherwise. The applicant must submit an initial submittal to County staff for review. County staff will review this submittal and identify any revisions needed, in consultation with the application, to receive approval. County staff’s primary concern is

9 Ch. 82-32.010
that the TDM program be accurate regarding the on-site and off-site transportation services available for project residents and that it be easily understood by residents.

4.2 Proposed Improvements

(b) A sponsor shall include in the tentative map or development plan application, all improvements that will provide access to public transit, ridesharing opportunities and nonmotorized forms of travel.

(c) A sponsor whose project lies within a local transit service area identified in the circulation element of the general plan shall consult with the local transit service provider on the need to provide infrastructure to connect the project with transit services. Evidence of compliance with this requirement may include correspondence from the local transit provider(s) regarding the potential need for installing bus turnouts, shelters or bus stops at the site.10

Proposed improvements are a primary feature of a TDM Program for residential projects. The Program will incorporate a copy of the project’s site plan showing the internal paths, bicycle parking, pedestrian/cyclist connections to off-site facilities pedestrian signage and lighting, etc. It will also require including a plan/map showing bicycle lanes/routes, sidewalks/paths in the area around the project site. If the project lies within a transit service area identified in the Circulation Element of the General Plan, a map showing the transit services and the stops closest to the project site is also required. The aforementioned information and supportive maps and graphs should be submitted in a three-ring binder. For further guidance on complying with the above requirements, see Section 3.1.2.

5.0 TDM Requirement for Non-Residential Projects

(a) A sponsor shall include in the tentative map or development plan application, all improvements that will provide access to public transit, ridesharing opportunities and nonmotorized forms of travel.

(b) A sponsor whose project lies within a local transit service area identified in the circulation element of the general plan shall consult with the local transit service provider on the need to provide infrastructure to connect the project with transit services. Evidence of compliance with this requirement may include correspondence from the local transit provider(s) regarding the potential need for installing bus turnouts, shelters or bus stops at the site.11

The guidance previously provided for the TDM requirement for residential projects in section 4.2 also applies to non-residential projects.

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10 Ch. 82-32.010
11 Ch. 82-32.012
APPENDIX A

POTENTIAL TDM MEASURES FOR RESIDENTIAL PROJECTS

TDM measures that can be deployed by project sponsors of residential projects are described in this section. These measures can be physical improvements incorporated into the project’s design, or operational programs implemented once the project is occupied.

Project Design

On-Site Amenities
There are on-site amenities that can be provided within residential developments to help reduce the need for vehicular trip making to external facilities. Example on-site amenities are listed below. The on-site amenities will need to be customized depending on the size and density of the residential development.

- fitness center;
- Tennis court, basketball court, and/or game court area;
- swimming pool with adjacent deck and lawn area;
- children’s play apparatus area;
- Family picnic area;
- Turf playfield;
- childcare room;
- Information kiosks including cycling maps, transit routes and schedules, shuttle services, etc.
- Bicycle racks, secure bicycle lockers, bicycle cages
- On-site transit pass sales; and,
- Mail drop and supplies.

On-Site Vehicular Parking
There are several parking design techniques that can potentially manage and/or reduce vehicular traffic demands. Example of these design techniques are listed below.

1. Locate a park and ride lot within or adjacent to your project. A park and ride lot provides a safe and convenient location for long-distance commuters on their way to work to leave their personal cars and transfer to a carpool, vanpool, or express bus route to complete their journey. Preferred locations for these lots include parcels that have convenient access to major thoroughfares or freeways, or at a bus stop serving one or more express bus routes.

2. On-site parking location and design should not interfere with pedestrian and bicycle circulation (e.g. paths, bike routes, etc.). Parking location and design should not obstruct or make less convenient pedestrian access from sidewalks and transit stops to building entrances. Parking should generally be located on the side and/or back of buildings; not in front of the buildings to avoid increasing the distance between sidewalks and building entrances.
Cycling Facilities
A TDM strategy is shifting short distance trips made by automobiles to the use of bicycles, and thereby reduce congestion, air pollution and parking demand. Effective cycling initiatives take advantage of the positive aspects of cycling, and offer solutions to the negative aspects when possible. Example advantages associated with bicycle use include a low cost and environmentally friendly means of travel, and a convenient way to incorporate exercising into one’s commute. On the other hand cyclists are more susceptible to serious injuries in collisions, exposure to adverse weather, poor pavement conditions and are restricted by age and health conditions. Design solutions to some of the negative aspects of bicycling include the following:

1. Provide adequate bicycle parking both for residents and guests. Residents parking needs to be long-term such as bicycle lockers, or secured bicycle racks within a garage. Bicycle parking for guests would typically be in the form of racks placed at convenient locations throughout the project site. Special attention needs to be given when placing bicycle parking. For example, near building entrances, in well lit areas, sheltered when possible, secured (some bicycle types are expensive and may be equipped with electric motors), and on the ground level unless elevators are provided in the buildings.

2. Ensure safe and convenient access and movements of cyclists within residential projects. Design elements to be considered include the provision of an interconnected web of shaded paths and crosswalks, traffic calming for auto traffic, adequate lighting, signage, and easily accessible bicycle parking.

Pedestrian Facilities
Walking is an effective mode of transportation for short distance trips, and can be undertaken by a wider range of population relative to cycling. There are different design elements that can be considered when developing project sites. Example design elements are described below.

1. Minimize walking distances within project sites, and provide direct connections to the public streets including transit stops. Provide pedestrian pass-throughs in soundwalls bordering arterials.

2. Give a priority to establishing and maintaining pedestrian facilities such as sidewalks, marked crosswalks and stop bars, in-pavement lighted crossing, bulbouts and other traffic calming devices, pedestrian-scale lighting, signage, sheltered seating areas, and landscaping.

3. Other design considerations that are safety related include the provision of adequate sight triangles at project driveways and internal intersections, as well as preventing parking encroachment within pedestrian sidewalks and walkways.

Transit Facilities
Project site design can play a key role in supporting the use of public transit. A few examples of such design elements are listed below.

1. Provide pedestrians and cyclists with safe and direct paths to public roads where transit services can be provided.
2. Provide an on-site information kiosk where current transit information is offered along with transit maps, schedules, etc.

3. Provide necessary transit facility in the vicinity of the project site based on consultation with the transit agencies and the County. Possible improvements can be a bus shelter, bus turnout, concrete pad/road surface, seating at transit stop, and lighting.

Project Occupancy/Operation

On-Site Parking Operation
Limit the time periods at designated visitor parking to discourage residents from using such spaces for long-term parking of their second and third vehicles.

Cycling Initiatives
Provide educational information that encourage cycling as a healthy living lifestyle and environment friendly mode of transportation in homeowners association or tenant newsletters/bulletins. Include information on bicycle commuting events and services offered by 511 Contra Costa (e.g. Bike to Work Day).

Walking Initiatives
There are operational means that can be practiced by homeowner associations and building managers to encourage walking to/from neighborhoods.

1. Provide annual and seasonal events that promote walking as a healthy way of living and as an environment friendly mode of transportation. Prizes and other incentives can be offered to encourage participation at the events.

2. As will later be explained under the Monitoring and Evaluation section of this guide, the survey data can be used to identify residents who are interested in walking and the approximate locations of their frequent destinations. Such information can help the formation of a walking buddy system to encourage participants to walk to/from work, shopping facilities, school, etc.

Public Transit Initiatives
Transit plays a particularly important role in serving peak period travel demands associated with commute trips to work and school. Transit also provides basic mobility for people who do not have an alternative. For many commuters, transit is the preferred choice of travel during the peak periods since it can be faster in HOV lanes or a dedicated rail line. Commuters can utilize the trip time for reading, or another activity that benefits them.

1. Depending on the project size, consult with relevant transit agency to seek changes to bus routes and/or routes capacity to better support transit ridership projected for the project.

2. Encourage the use of public transit through promotional and educational materials. Also, if possible, allow for the purchase of transit passes on site to facilitate transit use. Supporting
the use of public transit can benefit the environment, transportation system, and social equity.

Rideshare Initiatives

1. Encourage and facilitate a car cooperative program using a car sharing service. (e.g. City Carshare or Zipcar Carshare). Deploying such a cooperative program could potentially minimize the need for owning a car.

2. Carpooling to schools, daycares, work and other destinations. Carpooling can be deployed in a formal fashion through services provided by 511 Contra Costa, or through informal communications among the residents.

TDM Coordinator

A TDM Coordinator is typically responsible for developing, marketing, implementing and evaluating the TDM programs. The TDM Coordinator can be a designated on-site resident, a community association representative, or a property management representative. The Coordinator’s responsibilities can also be contracted out with a commute company. It should be noted that one of the most effective TDM measures is by having an on-site transportation coordinator. Example functions of a TDM Coordinator are listed below:

1. Distribute pertinent information to all residents regarding the facilities, programs and services available at the project site. Also regularly update any information kiosks and information boards at the project site for displaying TDM information. The regular information update makes it useful and interesting for users.

2. Obtain and circulate educational and promotional information from BART, bus operators, 511 Contra Costa and other transportation service providers.

3. Act as a liaison to all appropriate transit agencies. This includes distribution of appropriate transit information and maps, transit passes, and any other responsibilities related to the utilization of transit services or car sharing.

4. Distribute carpool/vanpool, school pool matching applications to all new residents upon occupancy, as well as on an annual basis.

5. Develop and implement promotional programs such as on-site transportation fairs and promotional events. Also coordinate with regional promotional programs such as Bike to Work Day and Spare the Air Days.

6. Conduct the annual commute survey, evaluate survey results and potential need for improvements, and update the program elements accordingly. Develop the annual status report and submit it to the County for projects conditioned to achieve a certain trip reduction rate.
Home-Based Work
Supporting home-based businesses is an effective TDM strategy and has co-benefits for economic development. Properly developed and advertised information on small business support groups, by-laws and guidelines, key information on home-based businesses and possible means for starting a business type, tax information, land use permits, etc. can assist in increasing home-based businesses. Such information can be obtained from a number of governmental and reliable private agencies. Also having common access to key office equipment, such as photocopy machines, can also support the formation and ongoing operation of home-based businesses.
APPENDIX B

POTENTIAL TDM MEASURES FOR NON-RESIDENTIAL OR MIXED-USE PROJECTS

TDM measures that can be deployed by project sponsors of non-residential or mixed use projects are described in this section. These measures can be physical improvements incorporated into the project’s design, or operational programs implemented once the project is occupied.

Project Design

On-Site Amenities

On-site amenities provide services at the development site to minimize vehicular traffic, especially mid-day trips. Such on-site amenities can include the following:

- Clothes lockers and showers;
- fitness center;
- On-site cafeteria preferably with hot food service;
- Lunchroom with microwave and refrigerator;
- Vending machines;
- Automatic teller machine;
- dry cleaner;
- childcare service;
- Mail, copying and shipping services;
- On-site transit pass sales;
- Car rental or car share service;
- Convenient and/or gift stores;
- Dental services; and,
- Shoe repair.

The on-site amenities would be customized depending on the size and type of proposed development. It would also depend on the types of services already available in the area surrounding a project site. The example on-site amenities listed above can be of use at employment centers, hotels, mixed-use developments, and others.

On-Site Vehicular Parking:

1. Establishing user fees for on-site parking; combined with a strong TDM program can help shift drivers behavior to the use of alternative modes of transportation and higher occupancy vehicles.
2. Designate premium parking spaces for carpools and vanpools. Such parking stalls have to be clearly marked with signing and pavement marking. Number of the designated stalls depends on the desired strength of deployed TDM program. In general, the designated carpool/vanpool spaces should not be less than 5% of the total number of parking spaces for large projects and 10% for smaller scale projects. This parking design technique is especially effective at project sites with limited on- and off-site parking supply.
3. Place the on-site parking on the side and/or back of buildings to avoid creating a physical separation between the buildings and abutting public streets, which could discourage pedestrians and cyclists access. Limit the on-site conflict locations between vehicular parking and pedestrian/cyclists movements, and clearly identify walking paths and crossing locations with appropriate pavement markings and signing according to the 2006 California Manual on Uniform Traffic Control Devices (MUTCD), or future document updates.

**Cycling Facilities:**
The design measures listed below need to be established by the project sponsor and approved as part of the development application review process.

1. Provide secure short- and long-term bicycle parking (i.e. bicycle racks and lockers, respectively) at prime locations of the development sites. Such prime locations need to be visible, accessible, on a flat area, and in close proximity to building entrances. It is also advisable to provide the bicycle parking at sheltered locations free of mud, dust and debris. When placing bicycle parking on upper building floors, elevator access needs to be provided. Wherever bicycle parking is located, sufficient clearances for accessing and maneuvering the bicycles need to be provided. Adequate protection needs to be ensured when placing bicycle parking near car parking or traffic lanes. In general, some of the bicycle racks need to be made available for short-term parking by guests, couriers, shoppers, etc. The individual bike lockers or locked bike room are typically reserved for longer-term parking by tenant employees and residents. Bicycle parking needs to be distributed to serve main entrances of all buildings on a project site. Preferably within view of security personnel or a security camera.

2. Provide showers, change facilities, and clothes lockers at convenient locations within business buildings in order to encourage cycling for longer distances. Such facilities need to be available free of charge to increase its potential use, and need to be placed in close proximity to the on-site bicycle parking.

3. Ensure safe and convenient access and movements of cyclists within development sites. Design elements to be considered include the provision of an interconnected web of paths, signage and crosswalks (preferably protected with traffic control devices) on the internal street system. Also the provision of adequate lighting, sheltered bicycle parking, and shaded paths.
Pedestrian Facilities:
Walking can be regularly practiced by a wide range of the population. To encourage walking, safe and convenient pedestrian access and movement need to ensure as part of the project site design. Example design elements are described below.

1. Minimize walking distances along the internal street/path network to provide convenient connections between the different buildings, services, etc. Also provide direct and convenient connections to the public streets including transit stops.

2. Design gathering areas where enhanced landscaping, adequate lighting, signage, and street furniture are provided. Undertaking such an action can help in providing good quality of life by facilitating enjoyment of the outdoors, as well as encouraging community interactions along with associated development of sense of security. Walking can be naturally encouraged with the provision of such design elements.

3. Establish traffic calming devices where feasible on the internal street system. Example of traffic calming designs can be through the provision of traffic circles, speed tables at pedestrian crossing locations, textured and/or colored street surface, staggered parking arrangements, and corner bulbouts. These design elements can assist in reducing vehicular traffic speeds, enhance good safety conditions, increase visibility of pedestrians, reduce pedestrians crossing distances and exposure to vehicular traffic, and improve overall street aesthetics,
4. Other design considerations that are safety related include the provision of adequate sight triangles at project driveways and internal intersections, as well as preventing parking encroachment within pedestrian sidewalks and walkways.

5. Give a priority to establishing and maintaining pedestrian facilities such as sidewalks, marked crosswalks and stop bars, in-pavement lighted crossing, bulbouts and other traffic calming devices, street and pedestrian lighting, sheltered seating areas, and landscaping.

**Transit Facilities:**

1. Provide safe and direct site access to the public streets where transit services are provided.
2. Provide necessary transit facilities in the vicinity of project site (such as bus shelter, bus turnout, concrete pad, seating, lighting, etc.), in order to support transit use. Private land dedication may be needed to provide for future transit facilities such as a bus turnout.
3. Establish an on-site information kiosk where information on transit routes, schedules, and fares can be provided.
4. Intersection geometry and road structure should be capable of supporting the length and weight of buses, including internal project circulation roads if bus or shuttle service is anticipated to enter the project site.

**Rideshare Facilities:**

1. Designate a number of on-site parking spaces at prime locations (i.e., close to buildings access, well lit, etc.) for carpools and vanpools privately operated by tenants. Also designate
prime parking stalls for company operated high occupancy/shuttle vehicles. Short-term parking spaces or passenger loading areas are also needed for taxi and outside shuttle services. Establishing carpool/vanpool initiatives can reduce the overall demand for on-site parking.

2. Provide on-site internet connections to facilitate access to agencies that provide ride-matching services such as 511 Contra Costa, Enterprise Rideshare and others.

3. Establish on-site car rental or carshare services so that tenants do not need to rely on personal cars for work-related purposes.

Project Occupancy/Operations:

On-Site Parking Operation:

1. Charge for on-site parking. The provision of free on-site parking encourages the use of private automobiles. Drivers tend to be more aware and sensitive to direct out-of-pocket charges. For example, drivers tend to be more aware of their regular expenses on gas, parking, and bridge tolls rather than the costs associated with the depreciation of their vehicles. Charging for on-site parking needs to be coordinated with adjacent properties to discourage spillover of parking demand to other properties.

2. In the event that a site has paid parking, provide free or reduced fee parking for carpools and vanpools.

3. In the event that a site has paid parking, the Federal Commuter Choice Benefits Package (Transportation Efficiency Act-21) allows employers to establish a parking cash-out program. Such program provides the employees with the opportunity to forego parking and receive instead a taxable cash value of the parking, or receive a tax-free transit or eligible vanpool benefit for up-to $230 per month (the value of this benefit is typically increased every year). This compensation also allows employees to finance other commuting means not currently qualified as fringe benefits, such as walking, bicycling and carpooling.

4. Limit the time periods at designated visitor parking to discourage employees from using such spaces for their long-term parking. When feasible, consider establishing shared parking between the different uses at mixed-use development sites.

5. When designating preferential parking spaces for carpools or vanpools it is important to register participants. Registration information needs to at least include the name and telephone number of participants, as well as the make, model and license plate number of their vehicles. The registration information needs to be updated on a regular basis to ensure that participants are still active and vehicles data is current. In addition, participants need to be provided with placards to be displayed inside their vehicles at a visible location (such as placed on the dashboard, hung on the front mirror, etc.). Taking these actions facilitates monitoring and enforcement of the preferential parking by on-site security, TDM coordinator, or other authorized person. It should also be noted that there should be a project-wide parking policy outlining rules dictating on-site parking including preferential parking, and procedures for handling parking misuse and violations.

Cycling Initiatives:

1. Employers can provide travel allowance per round-trip to employees using their bicycles for commute and/or work related trips. To avoid considerable increase in travel times and delays, the use of bicycles for work related trips can be restricted to short distances or a
series of stop-and-start visits. Employers can also provide insurance that covers bicycle usage except for losses or damages caused by negligent or deliberate actions.

2. Employers, especially of large businesses, can purchase and maintain a fleet of bicycles and safety devices (i.e., lights, helmets, etc.) for the use of employees traveling on work related trips. To facilitate use, bicycles can possibly be accessed by an identification card from a storage room or other form of secured parking.

3. Offering free or reasonably priced cycling seminars and training courses in order to promote cycling, available cycling facilities, and transit access. Training information can cover cycling skills, appropriate clothing and bicycle maintenance.

4. Organize cycling tours to recreational and shopping facilities where cyclists can benefit from each others’ experience. Food and drinks, for example, can be offered to encourage participation.

5. Provide other TDM initiatives that complement the use of bicycles, such as establishing a Guaranteed Ride Home program in case of emergencies (511 Contra Costa provides a free GRH program for all employees who take a commute alternative in Contra Costa).

Walking Initiatives:
Walking is practiced by the vast majority of people, yet a relatively small percentage walk to their destinations such as work and shopping. For example, establishing mixed-use developments where services are provided within walking distances can help build the habit of walking at least within the neighborhood. Adequate selection of the types of supportive services (such as a local convenient store, a dry cleaner, a restaurant, a coffee shop, etc.) can further support walking and assist in eliminating vehicular trips. There are also operational means that can be practiced by developers, property management, or tenants in order to encourage employees and residents within a project to walk to/from their destinations as follows.

1. Provide annual and seasonal events that promote walking for health and environmental reasons. Offer food, drinks, prizes and other incentives to encourage participation at the events.

2. TDM Coordinator or other community organizer can also identify residents and employees who are interested in walking and the approximate locations of their frequent destinations. Such information can help the formation of a walking buddy system to encourage participants to walk to/from work, shopping facilities, schools and daycares, etc.

Public Transit Initiatives:
An increase in transit use is fundamental to the overall reduction of automobile use. In general, people associate utilities with each mode of transportation (such as safety, reliability, comfort, accessibility, speed, cost, travel time, etc.), and their mode choice is based on the relative costs associated with one versus another mode. The two characteristics of travel modes most likely to influence mode choice are monetary cost and travel time. Some of the measures that can potentially increase public transit rideshare are:

1. Establish an employer based subsidized transit pass program. This can be achieved by providing commuter checks/vouchers to subsidize transit passes/fares. It can also be accomplished if the employer purchase the passes and offer them to the employees at
reduced prices. It should be noted that employers are allowed to provide monthly tax-free
transit subsidy.

2. Employee programs can allow employees to use pre-tax income to pay for commute
expenses, which can reduce the cost of transit and vanpooling and thereby encourage their
use. Employers can establish eligible pre-tax spending account for employees pursuant to
Section 125 of the Internal Revenue code. The money an employee allocates to a spending
account for commute expenses is not subject to federal, state, Social Security or Medicare
taxes. Employees can allocate up to $1,380 annually to such spending accounts. Employers
can establish this account in-house or through a vendor (e.g. Commuter Choice Program).

3. Allow the purchase of transit passes on site to facilitate transit use. This can be achieved,
for example, by contacting the local transit agency to set-up an on-site transit pass outlet.

4. Participate in the Regional Transit Connection (RTC). The RTC is the transit ticket
clearinghouse serving Bay Area employers. By delivering transit tickets to the work site,
RTC enables employers to provide employees with tickets from eight Bay Area transit
systems (AC Transit, Alameda-Oakland Ferry, BART, Caltrain, County Connection, Golden
gate Transit, MUNI, and SamTrans). Employers decide the type and quantity of tickets to
purchase based on a monthly order. Employers then can choose to either sell them to their
employees or offer them as part of a transit subsidy benefit. Each month, employers pay
RTC only for the tickets that get sold or distributed to employees.

5. Through direct communication with relevant transit agency, seek changes to bus routes
and/or routes capacity to better support transit ridership projected for the project.

6. Provide shuttle service(s) to main transit stations during the morning and afternoon
commute periods. In addition, shuttle programs that run during the mid-day can reduce the
need for automobile driving for work related travel and lunchtime trips.

7. Promote the use of public transit as part of the solution to environmental and transportation
issues, such as global warming, air pollution and traffic congestion. Beside the promotional
materials, educational information can be provided in company’s newsletter, monthly TDM
e-mail messages, etc.

Rideshare Initiatives:

1. The developer, tenant, or TDM Coordinator can facilitate the formation of carpooling. A
carpool is four to six people sharing a ride in an automobile. Carpool can be as simple as a
husband and wife, neighbors, or co-workers carpooling together. The two most common
approaches for carpooling are for participants to rotate automobile use with no exchange of
money, or to use one car and share the commute expenses. Carpooling reduces the cost of
commuting and provides a stress-free ride for non-drivers. It can also save travel time and
expense by using the HOV lanes and exempted from freeway/bridge tolls during commute
periods. Carpools can provide door-to-door directness and a convenience level of flexibility
that is almost like a single occupant vehicle. The biggest challenges to carpooling is
committing to a common work schedule due to interruptions to work schedules, family
needs, etc. Often such problems can be addressed through schedule planning, part-time
carpooling, and the provision of a back-up service such as a Guaranteed Ride Home
(currently available through 511 Contra Costa).

2. A project sponsor can implement a vanpool program by subsidizing the cost of vanpooling
through a third party lease arrangement; an owner operated vanpool, or by providing
facility/company sponsored vanpools. A third-party lease can be carried out with an auto
dealership, van leasing company, transit agency, or a non-profit organization. Vans are generally leased on a 30-day basis and their lease rates are based on cost of the vehicle, as well as insurance, maintenance, mileage, and fuel costs. Owner-operated vanpool puts more responsibility on the owner to organize all financial, maintenance and insurance requirements. Depending on the size of the company, expected level of employee participation and areas of employees’ residences, companies can invest in purchasing, maintaining and insuring the vans which can be used for commute and other work related trips. Vanpools are comprised of 7 to 15 riders, and operate like a mini-transit service with an organized route, schedule and passenger fare charges. Fares depend on the commute distance, the total number of participants, the type of van, and company provided equipment and/or subsidies. Vanpooling can simply save time, money, energy consumption, and noise and air pollution.

3. 511 Contra Costa has a Guaranteed Ride Home Program that enables rideshare participants to get home in case of an emergency, and current provisions allows for up-to 16 free taxi rides per year. Employers, for example, can also establish their own Guaranteed Ride Home Program using company vehicles or a taxi service.

4. 511 Contra Costa provides rideshare rewards program. Current rewards include gift and gas cards to eligible carpoolers of up-to $100 over a three-month period with a yearend drawing for $600 in gift cards.

5. With regard to vanpooling, 511 Contra Costa currently offers vanpool reward $300 to $900 in gas cards to new vans that meet all eligibility requirements and successfully complete three to nine consecutive months of operation. The gas cards are offered on a first-come, first-served basis until the funds are exhausted. The 511 Contra Costa Program also offers a vanpool seat subsidy in the form of gas cards. The seat subsidy provides $100 per month for up-to three months per program year to help cover the fare of a lost vanpool participant. Again the gas cards are offered on a first-come, first-served basis until the funds are exhausted.

6. Commuters can travel toll free by carpooling, vanpooling or taking transit over one of the Bay Area’s eight bridges during peak commute hours. Specific Bay Area bridge toll information can be found at 511ContraCosta.org.

7. Promote ridesharing initiatives through communication mediums (newsletters, employee memos, e-mails, meetings, etc.), specialized events and marketing pieces. 511 Contra Costa can help with free services to help companies promote commute alternatives including a regional carpool/vanpool matching database.

8. Periodic contacts with employees interested in carpooling/vanpooling to ensure that they indeed achieve long-term switch in their modes of transportation. In addition, one of the measures suggested for monitoring TDM programs is by conducting an annual commute survey. Such survey results can be utilized in customizing new carpools and/or vanpools. The survey results can also be used for identifying design and operational measures that can support and increase participation in carpooling/vanpooling.

Flexible Work Schedules:

1. These TDM initiatives are appropriate for business type developments, such as office and research and development land uses. Flexible Work Schedule programs established by employers govern the time period in which employees travel to and from work. Such programs influence employees’ propensity to consider using transit, carpooling, and other
alternatives to driving alone to work. Employees tend to view these programs as a highly desirable benefit. Employers can use such programs as an attractive employee recruitment tool that enables employees to work around childcare, school schedules and other family responsibilities. A typical FWH system uses two types of time: (a) Core period of time when all employees are required to be on the job; and, (b) Flex-time which contains pre-established limits (e.g., 7:00 to 9:30 a.m. and 3:00 to 5:30 p.m.) from which employees can select their arrival and departure times. Similarly this strategy can encourage participants to avoid most congested times, and coordinate arrivals and departures to rideshare with other employees.

It should be noted that management still retains a significant degree of control over the allowable work schedule arrangements. Consequently, some work units within an organization may offer flexible work schedules and others may not.

**Telecommuting:**
Telecommuting exists in several forms, such as working at home, working at a satellite center with shorter commuting distance, and working at neighboring work centers that can be leased to several employees and where office equipment are provided. Telecommuting is a better fit for jobs that are computer oriented, do not require frequent on-site support, and do not require frequent face-to-face interactions with customers or other workers.

Allowing employees to telecommute can eliminate some commuting trips. This in turn helps in relieving congestion, reducing energy consumption and improving air quality. Experience has also shown that telecommuting assists in increasing productivity, decreasing absenteeism, improving employee morale, and eliminating the need for constant oversight. In addition, employees tend to consider telecommuting as a job benefit which could increase the employers’ competitiveness when recruiting for new employees, as well as reduce turnover of current employees along with associated recruitment and training expenses. It should also be noted that telecommuting from home or less costly office space can help decrease the employers’ overhead expenses associated office space and on-site parking.

The key to the success of telecommuting is “voluntary” as it requires both management approval and employees willingness. It also involves regulatory and legal parameters, which in some agencies could include unions’ regulations. Some of the administrative arrangements that need to be considered include establishing a telecommuting schedule, determining equipment needs and who will pay for the initial costs and monthly expenses, establishing realistic expectations of work that can be completed in 8-hour work days, and identifying work monitoring procedures.

**TDM Coordinator:**
A TDM Coordinator is typically responsible for developing, marketing, implementing and evaluating the TDM programs. The TDM Coordinator can be a designated on-site staff person (half- to full-time) with specific TDM responsibilities and authority. The Coordinator’s responsibilities can also be contracted out with a commute company. It should be noted that one of the most effective TDM measures is by having an on-site transportation coordinator. Example functions of a TDM Coordinator are listed below:
1. Distribute pertinent information to all tenants/employees regarding the facilities, programs and services available at the project site. Also regularly update any information kiosks and information boards at the project site for displaying TDM information. The regular information update makes it useful and interesting for users.

2. Contract with and/or act as a liaison with 511 Contra Costa and other transportation service providers. It should be noted that the 511 system offers one-stop shopping for traffic, transit, rideshare and bicycle information in the region.

3. Contract with and/or act as a liaison to all appropriate transit agencies. This includes distribution of appropriate transit information and maps, transit passes, commuter checks, administering contract for carsharing or car rental services, and any other responsibilities related to the utilization of transit services.

4. Distribute carpool/vanpool matching applications to all new tenants upon occupancy and/or new employees upon hire, as well as on an annual basis at Transportation Fair, Wellness or Benefits events, etc. The transportation coordinator can also research ZIP code data or work and residence locations and offer to match ridesharing. When using carpool/vanpool ridematching software, it typically provides individuals with a computerized list of other commuters near their employment or residential ZIP code along with the closest cross street, phone number, and hours they are available to commute to and from work.

5. Develop and implement promotional programs such as on-site transportation fairs and promotional events. Also coordinate with regional promotional programs relating to TDM. Example regional programs include the Bike to Work Day and Spare the Air Days and possibly free transit. 511 Contra Costa sponsors events and activities for these campaigns.

6. Conduct the annual commute survey, evaluate survey results and potential need for improvements, and update the program elements accordingly. 511 Contra Costa can assist with the survey development and analysis. Develop the annual status report and submit it to the County for projects conditioned to achieve a certain trip reduction rate.

7. Provide TDM training especially at the start-up of the program, and possibly on a regular basis. Inviting other agencies, for example 511 Contra Costa, can enhance such training.
APPENDIX C

IMPLEMENTATION MECHANISMS

A project condition of approval may require the project sponsor to implement a Transportation Demand Management (TDM) program.

Educational and Outreach Activities

There are educational and promotional means that can assist in launching, and achieving a long-term success of the TDM program. Examples of these educational and promotional means are listed below.

1. Promotional activities are usually needed to launch a TDM program. Upon 50% to 75% occupancy (depending on the type of development) of the new development, the project sponsor (through the help of a TDM coordinator if assigned) should coordinate and host a commute alternative kick-off event. Transportation service providers such as 511 Contra Costa, Enterprise Rideshare, ACE, BART, etc. can be invited to set-up information booths/tables. To encourage participation in the event, the project sponsor can provide give-a-ways, refreshments, etc. Such event needs to be advertised at least two weeks in advance via e-mail, flyers, on-site posters and/or other means.

2. Regular, possibly annual, commute event or fair is also advisable to encourage continued participation and to approach new tenants/owners. Similarly, proper event notification is needed. It is also advisable to invite participation of transportation service providers and to provide some give-a-ways.

3. Promote and encourage participation in events sponsored by other agencies such as Bike to Work Day (in May of each year), potential free transit on Spare the Air days, etc.

4. It is advisable that the project sponsor register with the Bay Area Air Quality Management District (BAAQMD) for the Spare the Air program so as to receive regional air quality forecast bulletins about poor and unhealthy air quality days. These e-mail updates can then be forwarded to all tenants. The 511contracosta.org website also has up to the minute Spare the Air alerts and air quality status.

Monitoring and Evaluation

Monitoring a TDM program can be accomplished by periodically conducting a commute survey to determine the success or failure of the TDM measures individually or as a combination. A commute survey typically gathers quantitative data (e.g., % use of the various modes of transportation) and qualitative data (e.g., respondents’ perception of the alternative transportation programs). The survey data can then be used to decide on any needed adjustments to the TDM initiatives. They can also be used to focus the marketing initiatives and efforts of the TDM Coordinator. It should be noted that 511 Contra Costa can typically assist with the preparation of the survey questionnaire. Some survey tips are provided at the end of this section of the TDM Guidelines.
Allowing completion of the survey on-line can help reduce the time and effort spent on circulating and administering the survey. When possible, conducting a baseline survey before starting the TDM program can later assist in evaluating the program’s effectiveness (Before and after comparative analysis). In addition, comparing results of the annual survey to previous years can assist in evaluating the program’s progress and potential modifications. It is possible to add survey questions to assess such new improvements.

Cost effectiveness of TDM measures should be monitored and evaluated. The cost effectiveness is typically based on a cost/benefit analysis of the individual TDM measures (for example, the cost of providing a shuttle service to the main transit stations relative to the number of shuttle users along with peak occupancy periods). Such cost/benefit analysis can assist in identifying the measures to better fit the participants’ needs at the least cost. TDM Program costs typically include the capital and operating costs, such as the cost of bike lockers and/or fleet, cost of training and educational materials, cost of awards and commute events, cost of shuttle vehicles, TDM staff hours and rates, cost of office equipments provided to telecommuters, etc. In larger developments, both residential and office/commercial, the developer should consider establishing a Transportation Management Association (TMA) to provide the mechanism for ongoing financial support of TDM elements, including monitoring and evaluation over a period of years. An example of a TMA is the Contra Costa Centre Association. (www.contracostacentre.com)

Typically within six months following the granting of a certificate of occupancy of the new development site, the project will submit to the Director of the Department of Conservation and Development a TDM notice that confirms the installation of facilities and site amenities, as well as implementation of commute program features and events (if required). A development project that receives a reduction in off-site parking requirement in return for implementing an approved TDM Program will be subject to penalties if the TDM Program is not implemented. Project sponsors must seek renewal of TDM Program for time periods specified by the County. Renewal of TDM Programs may require additional TDM measures if agreed-upon trip reduction targets are not achieved. If project sponsors fail to seek renewal of TDM Programs, the penalty typically involves reducing permitted occupancy to a level that matches the on-site parking supply (to be specified in the Development Permit).

**Commute Survey Tips**

The statistical reliability of a survey depends in part upon the response rate, which is the number of correctly completed surveys compared to the total number of distributed surveys. Thus, it is important to maximize the survey response rate. Some of the means that can be used to maximize the response rate are listed below:

- Attach a cover memorandum to the questionnaire, describing the purpose of the survey and requesting cooperation.
- Inform recipients of the duration it takes to respond to the questionnaire, and note that their responses are strictly confidential.
- Offer prizes to respondents preferably based on a drawing to ensure un-biases. Offer rewards to tenants, departments, etc. with the highest response rate.
• Offer a contact person and phone number to respond to any questions that survey recipients may have.
• Offer an hour of administrative leave, or other incentives, to recipients who complete the survey.
• Facilitate access to the survey questionnaire by posting it on a web-page. As an alternative, deliver the questionnaire and pick-up responses of the different tenants.
• Send one or more reminders (e-mail, flyer, etc.) requesting to complete the survey by the due date.

Survey questions at a minimum need to cover the type and frequency of modes of transportation used in a typical week (e.g., walk, cycle, drive alone, carpool, vanpool, use public transit, etc.), reasons behind driving alone (e.g., availability of free parking, needing privacy, flexibility to assist family members, etc.), means that would encourage drive alone respondents to use alternative modes of transportation (e.g., a guaranteed ride home program, subsidized transit passes, reliable rideshare matching services, etc.), whether or not they participate in telecommuting and/or flex work hour arrangements. It is also important to collect information regarding work addresses or residence ZIP codes.
APPENDIX D

COSTS, DEGREE OF DIFFICULTY AND IMPLEMENTING ENTITY

TRANSPORTATION STRATEGIES
There are five categories of strategies listed below which are described in more detail within this document. Three descriptive are listed in the columns to the right. They include:

Effectiveness – is a measurement tool to determine the value of the effort in reducing single occupant vehicle trips at the site. Effectiveness is on a scale of 1-10, with 10 being the most effective and 1 being the least effective. Effectiveness for certain projects may vary.

Cost – indicates the cost relative to the other options listed.
X = no cost
$ = low cost (less than $10/year per employee, or offered by 511 Contra Costa)
$$ = medium cost ($10-$30/year per employee)
$$ = high cost (more than $30/year per employee, or higher infrastructure cost)

Who – identifies who will likely implement this strategy. This may be the developer (D), (property owner) or employer (E), however in some cases, the regional rideshare agency 511 Contra Costa (511 CC) provides these services for free, or for a nominal charge. Your must register your worksite/property at www.511contracosta.org or call (925) 969-0841.

<table>
<thead>
<tr>
<th>Facilities and Design</th>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bicycle Racks/Lockers</td>
<td>3</td>
<td>$</td>
<td>D/E/511 CC</td>
</tr>
<tr>
<td>For residents or employees to secure their bicycles at the employment/residential site.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Bicycle Station</td>
<td>6</td>
<td>$$</td>
<td>D</td>
</tr>
<tr>
<td>A dedicated location that provides secure and covered parking for bikes.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Showers and Clothes Lockers</td>
<td>3</td>
<td>$$$</td>
<td>D/E</td>
</tr>
<tr>
<td>Allows for those who walk or bike to work to freshen up upon arrival.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Walk/Bicycle Corridors</td>
<td>4</td>
<td>$$</td>
<td>D</td>
</tr>
<tr>
<td>Walking/bicycle access which is separate from vehicle parking through separated paths and landscaping.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Onsite Amenities</td>
<td>5</td>
<td>$$</td>
<td>D/E</td>
</tr>
<tr>
<td>Provide retail services to employees onsite (lunch facilities, dry cleaners, mail, copy store, etc.).</td>
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<td></td>
</tr>
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</table>
### 6. Site Design

<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>$$</td>
<td>D</td>
</tr>
</tbody>
</table>

A comprehensive design that features bicycle and pedestrian amenities, covered bus stops and adequate accessibility, benches, passenger loading zones, etc.

### Alternative Work Schedules

<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Compressed Work Week</td>
<td>4</td>
<td>X</td>
</tr>
<tr>
<td>Allows employees to receive a day off each week in exchange for working longer hours on other days each week.</td>
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<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Flexible Work Hours</td>
<td>3</td>
<td>X</td>
</tr>
<tr>
<td>Allows employees to alter arrival and departure times slightly to accommodate commute schedules.</td>
<td></td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Telework Policies</td>
<td>5</td>
<td>X/$</td>
</tr>
<tr>
<td>Develops specific personnel policies that permit and encourage the use of teleworking at least twice per month.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Incentive Strategies

<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Carpool Incentives</td>
<td>5</td>
<td>$$</td>
</tr>
<tr>
<td>Provides incentives to employees who form carpools (incentives can be gift cards, gas cards, money, time off, etc.).</td>
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<td></td>
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<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
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</thead>
<tbody>
<tr>
<td>2. Vanpool Incentives</td>
<td>5</td>
<td>$$</td>
</tr>
<tr>
<td>Provides financial support to vanpool riders who form or join a vanpool.</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
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</thead>
<tbody>
<tr>
<td>3. Vanpool Empty Seat Subsidy</td>
<td>3</td>
<td>$$</td>
</tr>
<tr>
<td>Ensures that as vanpools lose riders over time, the other riders maintain a consistent users fee until the seat can be filled.</td>
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<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
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</thead>
<tbody>
<tr>
<td>4. Transit Incentives</td>
<td>4</td>
<td>$$</td>
</tr>
<tr>
<td>Provides incentives for new transit riders to take transit to commute to work.</td>
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<thead>
<tr>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Guaranteed Ride Home</td>
<td>3</td>
<td>$</td>
</tr>
<tr>
<td>Free taxi voucher or rental car for employees who take a commute alternative and are ill, have an emergency or unscheduled overtime.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program Alternative Program</td>
<td>Cost</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>6.</td>
<td><strong>Commute Alternative Program</strong></td>
<td>$4</td>
</tr>
<tr>
<td></td>
<td>Program similar to airline miles by providing prizes or incentives to commuters who take transport alternatives to driving to work alone.</td>
<td></td>
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<thead>
<tr>
<th></th>
<th>Tax Benefit Programs</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td><strong>Tax Benefit Programs</strong></td>
<td>$5</td>
<td>E/511 CC</td>
</tr>
<tr>
<td></td>
<td>Federal and/or state pre-tax benefits for vanpoolers and transit riders which offer savings for both employers and employees.</td>
<td></td>
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<table>
<thead>
<tr>
<th></th>
<th>Car/Bike Sharing</th>
<th>Cost</th>
<th>Who</th>
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</thead>
<tbody>
<tr>
<td>8.</td>
<td><strong>Car/Bike Sharing</strong></td>
<td>$2</td>
<td>D/E</td>
</tr>
<tr>
<td></td>
<td>Cars/bikes that are available for limited short trips to employees or residents as members of the car/bike sharing program, or for a per-use fee.</td>
<td></td>
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<table>
<thead>
<tr>
<th></th>
<th>Bicycle Loan Program</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td><strong>Bicycle Loan Program</strong></td>
<td>$1</td>
<td>D/E</td>
</tr>
<tr>
<td></td>
<td>Bicycles (to be tracked and maintained by the employer/property manager) for general employee/resident use.</td>
<td></td>
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<table>
<thead>
<tr>
<th></th>
<th>Free Bicycle Accessories</th>
<th>Cost</th>
<th>Who</th>
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</thead>
<tbody>
<tr>
<td>10.</td>
<td><strong>Free Bicycle Accessories</strong></td>
<td>$1</td>
<td>D/E</td>
</tr>
<tr>
<td></td>
<td>Headlamps, helmets and bells can improve the safety of bicyclists and encourage bike commuting. Bike safety classes can also be offered.</td>
<td></td>
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<table>
<thead>
<tr>
<th>Marketing Strategies</th>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Employee Transportation Coordinators</strong></td>
<td>5</td>
<td>$5</td>
<td>D/E</td>
</tr>
<tr>
<td></td>
<td>Someone onsite assigned the responsibility of helping employees with their commute options to and from work (must register with 511 Contra Costa).</td>
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<table>
<thead>
<tr>
<th></th>
<th>Employee Orientation</th>
<th>Cost</th>
<th>Who</th>
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</thead>
<tbody>
<tr>
<td>2.</td>
<td><strong>Employee Orientation</strong></td>
<td>2</td>
<td>D/E</td>
</tr>
<tr>
<td></td>
<td>Orientation meeting provide new employees or residents with a way to learn more about travel to the site.</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Transportation/Health Fairs</th>
<th>Cost</th>
<th>Who</th>
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</thead>
<tbody>
<tr>
<td>3.</td>
<td><strong>Transportation/Health Fairs</strong></td>
<td>3</td>
<td>D/E/511 CC</td>
</tr>
<tr>
<td></td>
<td>Onsite special promotions sponsored by the employer or property manager to encourage the use of transportation options at the site.</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th></th>
<th>Commute Options Brochures</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td><strong>Commute Options Brochures</strong></td>
<td>1</td>
<td>D/E/511 CC</td>
</tr>
<tr>
<td></td>
<td>Provide brochures, maps and other information either individually or at an information rack/display onsite.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. **Bike to Work Day**  
1 X D/E/511 CC

Participate in the regional promotion each May to encourage commuting to work by bicycle. There is also a residential component on Contra Costa for residents to be involved.

6. **Bicycle Riders Guide**  
1 S D/E/511 CC

A guide for your worksite that include bike routes and other information.

7. **Spare the Air**  
1 X D/E/511 CC

Register to get alerts about poor air quality and inform employees upon notification of a Spare the Air Day from the Bay Area Air Quality Management District (BAAQMD).

<table>
<thead>
<tr>
<th>Parking Management Strategies</th>
<th>Effectiveness</th>
<th>Cost</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Preferential Parking</td>
<td>4 S D/E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Designated parking spaced for carpools and vanpools in close proximity to the employee entrance of the building.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2. Parking Management Program</td>
<td>8 $$$ D/E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balances the number of parking spaces relative to the availability of transit and other services. Can include a reduction in parking requirements if resources and subsidies are offered to subsidize transit ridership, carpooling and other modes.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Parking Cash Out</td>
<td>10 $$$ D/E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provides employees with a choice: receive a parking space or receive the cash equivalent of the space and take another commute mode to get to work.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Unbundled Parking Leases</td>
<td>8 X D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spaces are not part of the office lease, with flexibility for the tenant to vary the number of parking spaces rented.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Parking Charges</td>
<td>10 $$ D/E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can be set for cost recovery to the employer or developer or be variable based upon the time of day and length of parking.</td>
<td></td>
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</tbody>
</table>
TECHNICAL MEMORANDUM

DATE March 11, 2009
TO Ira Dietrick
Sufism Reoriented
FROM Bruce Brubaker
RE Updated Transportation Demand Management Plan

I. INTRODUCTION

This technical memorandum contains a conceptual Transportation Demand Management Plan (TDM Plan) for the proposed Sufism Reoriented Sanctuary (Sanctuary) to be located along Boulevard Way in unincorporated Contra Costa County. This TDM Plan has been prepared to meet the requirements of Contra Costa County Code section 82-32.008.

Sufism Reoriented currently has approximately 357 participants in the San Francisco Bay Area. This number of participants has remained fairly constant over the years and is projected to remain stable in the future. Sufism Reoriented has proposed development of a new Sanctuary site in order to consolidate uses that are currently dispersed throughout the Walnut Creek area.

This TDM Plan identifies transportation demand management measures that would reduce the number of automobile trips generated by users of the proposed Sanctuary site. The reduced number of automobile trips would also reduce the demand for parking spaces at the Sanctuary site. This TDM Plan analyzes the existing transportation network, the origin and travel choices of Sanctuary participants, including a description of the Sanctuary’s walking, carpool and shuttle service programs.

II. PROJECT DESCRIPTION

A. Local Setting

The proposed Sanctuary is located in unincorporated Contra Costa County, south of Highway 24 and west of Interstate 680, just over a mile southwest of downtown Walnut
Creek. The 3.1-acre development site occupies seven parcels along Boulevard Way and is less than a block away from the Sanctuary’s current site. A regional context map and a map of the study area are provided in Figures 1 and 2.

As shown in the pictures, Boulevard Way contains a mix of residential and commercial uses, including higher density multi-family units, retail stores, office and industrial uses. The land uses immediately adjacent to the site include single-family and multi-family residential uses.

B. Site Design and Building Program

1. Site Plan

The site is bounded by Boulevard Way on the north and west. Warren Road is immediately south of the site. Private residential parcels border the south and east edges of the project area. The primary ground-level uses of the Sanctuary include the Prayer Hall, an existing residence and surface parking. Subsurface construction includes the Plaza, bookstore, offices and other uses described in more detail in the section on Building Program.

The project includes parking spaces for participants and residents. Vehicular parking for participants is accessed via a driveway on Boulevard Way and bicycle parking spaces are located adjacent to the ground-level entrance to the Sanctuary. Vehicular parking for residents in the parsonage is accessed from Warren Road. The proposed Sanctuary would also make improvements to the public transportation infrastructure, including construction of a sidewalk along the frontage of Boulevard Way, which would improve access to the site and to a County Connection Route 101 bus stop located along Boulevard Way at the project site.

2. Building Program

The principal uses on the proposed Sanctuary site are described in the following section:

a. Prayer Hall

The 5,000 square-foot prayer hall would have a capacity of 400 people. The ground floor of the Prayer Hall includes space for storage of items used in the prayer hall, such as chairs and video equipment. The prayer hall would be used for worship and devotional gatherings, chorus rehearsals and occasional larger celebrations.
LEGEND

Proposed Sufism Reoriented
Sanctuary Site
Parcel Numbers: 184450006,
184450007, 184450012, 184450031,
184450032, 184450033, 184450034

Source: Contra Costa County Mapping
Information Center

STUDY AREA

FIGURE 2
b. Library
The 2,656 square feet of library space includes book, film and audio storage for reference and use in productions. The ground floor library would be used to read transcripts of classes and listen to CDs or watch DVDs of classes.

c. Classroom
The classroom space, 1,065 square feet, would be used for small class meetings.

d. Offices
This 3,095 square-foot area would be used regularly by Sanctuary staff and participants working on craft or computer projects.

e. Murshida
This 1,079 square-foot main office would be used for work and to meet with students and visitors.

f. Plaza
This 9,100 square-foot area would be used for church socials, often including live dramatic and musical skits.

g. Video and Audio Rooms
This area that comprises a total of 2,750 square feet would be used to shoot videos, edit videos, mix recordings and attach sound tracks.

h. Dance and Drama Studio
This 2,200 square-foot area would be used for drama, dance and music rehearsals and classes.

i. Searchlight Bookstore
The 1,450 square-foot bookstore would be open to the public Tuesday nights and Saturday and Sunday during the day.

Please refer to Figure 3 to view the site plan of the proposed Sanctuary site.
III. Sanctuary Travel Patterns

In order to understand demand for parking at the proposed Sanctuary, it is important to first understand how and when people would be accessing the site. The following section describes regular use and peak demand periods at the Sanctuary based on current use.

A. Regular Daytime Use

Regular daytime use of the Sanctuary site would typically involve at most 25 Sanctuary participants at a time. The regular stuff would consist of ten participants working in the administrative office area, the video editing studio, the music studio and at the reception desk. Landscaping and cleaning would also be carried out by Sanctuary participants. There would be 2 to 3 people cleaning on a regular basis. During each weekend day a seven-person crew would work on landscape maintenance. During the week, there would be occasional visitors to the Searchlight Bookstore, typically not more than one or two people each day. Work projects, involving at most 12 people, would take place on weekday evenings and during the day on weekend. A 15-person afternoon class would occur on weekend afternoons.

B. Regular Night Use

The Sanctuary is most active during the months of October through June. At that time, several activities that occur on a weekly basis would be attended by a great number of participants. The full membership (357) would attend Friday night classes, while 200 to 250 participants would attend Sunday night devotional gatherings. On Wednesday nights, a maximum of 70 people would travel to the site for chorus rehearsals. On Thursday nights there would be review classes for 30 to 50 people.

C. Annual or Semi-annual Events

The Sanctuary also holds special annual and semi-annual activities. During the four-day annual celebrations held in March, all members and guests (up to 400 people) would be traveling to the site. Rehearsals for the annual celebrations would bring as many as 100 people to the Sanctuary site. During the semi-annual musical and drama events, called Taverns, held nightly for five days at a time, a maximum of 175 people would be traveling to the site.

Table 1 summarizes the anticipated transportation demand patterns for the proposed Sanctuary site.
### Table 1: Sanctuary Travel Patterns

<table>
<thead>
<tr>
<th>Frequency of Activity</th>
<th>Time of Year</th>
<th>Use/Activity</th>
<th>Days</th>
<th>Time</th>
<th>People Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular</td>
<td>Jan – Dec</td>
<td>Administration, Cleaning, Landscaping, Day Classes, Bookstore</td>
<td>Mondays to Sundays</td>
<td>9 a.m. to 6 p.m.</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Oct – Jun</td>
<td>Chorus Rehearsals</td>
<td>Wednesdays</td>
<td>8 to 9 p.m.</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Oct – Jun</td>
<td>Review Classes</td>
<td>Thursdays</td>
<td>8 to 9 p.m.</td>
<td>30 to 50</td>
</tr>
<tr>
<td></td>
<td>Oct – Jun</td>
<td>Night Classes</td>
<td>Fridays</td>
<td>8 to 9:30 p.m.</td>
<td>357</td>
</tr>
<tr>
<td></td>
<td>Oct – Jun</td>
<td>Devotional Gathering</td>
<td>Sundays</td>
<td>8 to 9 p.m.</td>
<td>200 to 250</td>
</tr>
<tr>
<td>Once a Year</td>
<td>Feb – Mar (1 month)</td>
<td>Rehearsals for Annual Celebration</td>
<td>Saturday and Sunday</td>
<td>9 a.m. to 5 p.m.</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Mar (4 days)</td>
<td>Annual Celebration</td>
<td>Friday</td>
<td>8 to 10 p.m.</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Saturday</td>
<td>8 to 10:30 p.m.</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sunday</td>
<td>2 to 5 p.m.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Monday</td>
<td>8 to 9 p.m.</td>
<td>200</td>
</tr>
<tr>
<td>Twice a Year</td>
<td>Oct – Jun (5 days)</td>
<td>Taverns</td>
<td>Thursday to Monday</td>
<td>6:30 to 10 p.m.</td>
<td>175</td>
</tr>
</tbody>
</table>

### IV. Parking Analysis

**A. Required Parking**

1. **Contra Costa County Code**

   According to interpretation of Section 82-16.018 of the Contra Costa Zoning Code, the Sanctuary site is required to provide 125 parking spaces. Table 2 below summarizes the Zoning Code's parking requirements for each of the uses contained within the Sanctuary site. The Prayer Hall with a capacity of 400 persons and classified as an assembly hall without fixed seats requires 125 spaces. The ancillary uses require a total of 114 parking spaces. The bookstore, classified as a retail use, requires one space for every 250 square feet; and the remaining uses, classified as office use, require one space for every 200 square feet.

   The Sanctuary travel patterns described earlier demonstrate that if the Prayer Hall were in use, none of the other uses would be active and vice versa. Therefore, the maximum parking demand is the greater of the Prayer Hall or ancillary uses demand: 125 spaces.
<table>
<thead>
<tr>
<th>Use</th>
<th>Square Footage</th>
<th>Parking Requirement</th>
<th>Parking Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prayer Hall (400-person)</td>
<td>5,000</td>
<td>1 per 40 sq.ft.</td>
<td>125</td>
</tr>
<tr>
<td>Ancillary Uses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom</td>
<td>1,065</td>
<td>1 per 200 sq.ft.</td>
<td>5</td>
</tr>
<tr>
<td>Library</td>
<td>2,656</td>
<td>1 per 200 sq.ft.</td>
<td>13</td>
</tr>
<tr>
<td>Murshida Office</td>
<td>1,079</td>
<td>1 per 200 sq.ft.</td>
<td>5</td>
</tr>
<tr>
<td>Music, Drama &amp; Dance Studio</td>
<td>2,200</td>
<td>1 per 200 sq.ft.</td>
<td>11</td>
</tr>
<tr>
<td>Video and Audio</td>
<td>2,750</td>
<td>1 per 200 sq.ft.</td>
<td>14</td>
</tr>
<tr>
<td>Office</td>
<td>3,095</td>
<td>1 per 200 sq.ft.</td>
<td>15</td>
</tr>
<tr>
<td>Bookstore</td>
<td>1,450</td>
<td>1 per 250 sq.ft.</td>
<td>6</td>
</tr>
<tr>
<td>Plaza</td>
<td>9,100</td>
<td>1 per 200 sq.ft.</td>
<td>45</td>
</tr>
</tbody>
</table>

2. Institute of Transportation Engineers

According to the 3rd Edition of the Institute of Transportation Engineer’s (ITE’s) *Parking Generation*, uses similar to the Sanctuary site require 48 to 252 parking spaces. According to the report, the parking demand for churches ranges from 0.12 to 0.63 parking spaces per attendee.\(^1\)

B. Proposed Parking

This Plan will demonstrate how the number of required parking spaces can be reduced through the implementation of transportation demand measures, described in detail in Section V.

The project includes 74 parking spaces for motor vehicles. Most of the parking spaces are accessed from Boulevard Way and are located on the western edge of the site, linking them to the Sanctuary's main entrance. The spaces located on the eastern edge of the site are accessed from Warren Road and would be utilized as parking for residents. Three parking spaces are reserved for residents, five spaces are for participants who might need to drive

\(^1\) A church is the land use that most closely resembles the Sanctuary in the ITE report.
their cars, 55 spaces are for carpool cars, two parking spaces are reserved for the Sanctuary shuttle and the nine remaining parking spaces are for guests.

The Sanctuary will also include a bicycle rack for 12 bicycles located adjacent to the Sanctuary’s main entrance, a convenient, visible and secure location. Secure bicycle parking, along with the on-site showers help make bicycling to the Sanctuary a viable option for participants.

V. Transportation Demand Management Strategies

There are several TDM strategies that are well suited to reducing the number of vehicular trips to and from the proposed Sanctuary site for Sufism Reoriented. Probable impacts of TDM strategies for walking, transit, carpooling, and remote shuttling on parking demand are described in this section.

Sufism Reoriented tested the strategies described in this section at the current Sanctuary site during a 17-month implementation period that began in October, 2007 and extended to February, 2009. Implementation procedures and outcomes for the proposed Sanctuary site are expected to reflect outcomes for the current site, since the number and residential location of members is not likely to change. Information gathered during this period is therefore provided in this section as it relates to specific strategies and the overall implementation of the TDM plan.

The TDM strategies implemented at the current site were rooted in the commitment of members to reduce the number of cars accessing the site by walking, carpooling or using the shuttle service to attend regular Friday and Sunday night activities, annual celebrations and taverns under all conditions and all weather. During the initial implementation period, the number of vehicles parking on site did not reach or exceed the number of spaces proposed for the new site (74). A downward trend in the number of cars parking at the Sanctuary for both Friday and Sunday activities was also evident during this implementation period.

A. Walking

1. Existing Conditions

As shown in the picture, a wide variety of people, including mothers with baby strollers, children and joggers, travel by foot along the roads in the vicinity of the proposed

2 Sufism Reoriented continues to implement these strategies at their current site.
Sanctuary site. Although the surrounding residential streets do not all have sidewalks, most of the streets do not have high traffic volumes, making them safe and pleasant places to walk.

The traffic volume along Boulevard Way, the roadway that provides direct access to the Sanctuary, is higher than on surrounding residential streets, but this roadway has sidewalks along much of its right-of-way; and, as described in the project description, the proposed Sanctuary would further enhance the pedestrian environment by constructing an extension of the existing sidewalk along Boulevard Way.

2. Demand Strategies
Walking is an effective mode of transportation for the 224 Sufism Reoriented participants that reside within a ½-mile, a 10- to 15-minute walk, of the site. Figure 4 shows the participants' residences in relation to the proposed Sanctuary site. Most of these participants walk to the current Sanctuary site, which is only several hundred feet away from the proposed site.

Prior to the TDM implementation period at the current site, 167 of the 224 participants that live within walking distance of the proposed Sanctuary site made written commitments to walk to regular Friday and Sunday night activities, annual celebrations and taverns under all conditions and all weather. A list of names and signatures of participants who have made this commitment is attached to this memorandum as Attachment 1. In the event that illness prevented a member from walking, the designated carpool coordinator assigned them to a temporary or permanent carpool.

3. Impact on Parking Demand
It is expected that during the large weekly events 167 to 224 people (approximately half the Sanctuary participants) would reach the site by walking.
LEGEND

- Proposed Sufism Reoriented Sanctuary Site
- Residential Location of Sanctuary Participant

Total Number of Participants Living within 1/4 or 1/2 mile of Sanctuary Site = 224

Source: Contra Costa County Mapping Information Center, Sufism Reoriented

Note: Each dot represents one participant. If two participants reside at the same address, this is illustrated by mapping two dots next to each other.
B. Transit

1. Existing Conditions
The site is currently served by County Connection Route 101. Route 101 has bus service weekdays and Saturdays. On weekdays, the first southbound bus stops at Boulevard Way and Kinney Drive, across the street from the proposed Sanctuary site, at 6:20 a.m.; the last bus passes at 7:33 p.m. The first northbound bus stops at Boulevard Way at Iris Lane in front of the Sanctuary site at 6:35 a.m.; the last bus stops at 6:49 p.m. Figure 5 shows the service area for County Connection Route 101. According to the Central Contra Costa County Transportation Authority's Short Range Transit Plan and the countywide Comprehensive Transportation Plan, there are no changes in service or alignment planned for County Connection Route 101.

As required by Contra Costa County Code section 82-32.00, representatives of Sufism Reoriented contacted the County Connection transit agency and they have approved the bus stop location proposed in their land use plan.

2. Demand Strategies
Although the County Connection Route 101 directly serves the project site, its hours of service do not include Friday or Sunday evenings, when the Sanctuary has its more highly attended events and when demand for parking would be highest. Staff members and participants who are at the Sanctuary during the week and in daytime hours may be able to use the County Connection service.

3. Impact on Parking Demand
The fact that County Connection Route 101 does not provide service during the Sanctuary's peak demand period will severely limit effectiveness of bus transit as a transportation demand measure for this project. Daytime staff may use the Route 101 service to access the site, but no reduction in parking demand is assumed based on this availability of service.

C. Bicycling

1. Existing Conditions
The surrounding streets do not have high traffic volumes and the terrain is relatively flat, making the bicycle a viable mode of transportation on the streets in the vicinity of the Sanctuary site.
2. Demand Strategies
As described earlier, the project would provide secure bicycle parking on site. In addition, the Sanctuary would have amenities, such as showers and changing rooms for all participants, including those who arrive by bicycle. This could encourage participants to arrive at the site by bicycle.

3. Impact on Parking Demand
It is expected that 1 to 5 people might arrive to the Sanctuary site by bicycle. However, because this number is so small, bicycling is not considered to have an impact on transportation demand for purposes of this Plan.

D. Carpool

1. Existing Conditions
One hundred and sixty-six (166) members participated in the carpool program during the TDM initial implementation period at the current site. This section summarizes carpool activities, monitoring procedures, and overall impact on the number of cars parking at the current site during this period.

2. Demand Strategies
Members who live near each other are grouped together to ride in one vehicle to the Sanctuary’s Friday and Sunday events and during the annual event held in March. The location and number of people within each of the carpools is included as Attachment 2. Each carpool has been assigned a number and only cars showing the carpool numbers are allowed to park on site. Members are advised to park only on site or at the Meher School during the Sanctuary’s Friday and Sunday night events. As described earlier, the proposed Sanctuary site would include reserved parking spaces for carpool vehicles.

In order to ensure the effectiveness of the carpool program, the Sanctuary has assigned staff to manage and monitor its implementation. A carpool coordinator is responsible for making changes to carpool assignments when necessary, monitoring the program, making periodic reports and issuing reminders to participants when necessary. A carpool monitoring team is responsible for monitoring and recording carpool activity. Since full implementation began in October 2007, two members of the TDM carpool monitoring team were stationed in the parking areas with lists of approved carpools and permit card numbers at Friday and Sunday night activities, annual celebrations and taverns. Monitors check parking permit cards for each carpool as they enter the parking lot and provide a final count of cars parking on the site for each event. All cars at the site, including shuttle cars and cars belonging to residents, members and guests, are included in the counts.
If parking permit cards are left at home, carpool drivers give their parking card number to the monitor who checks it against the names on the monitoring list. If a carpool arrives before the monitors are in place, it will be checked by monitors upon their arrival. If a permit is not displayed, monitors leave a reminder form on the windshield and still include the car in the final count.

3. Impact on Parking Demand
The Sanctuary's carpool program will reduce the number of single-occupancy vehicles arriving to the site. Currently, a total of 166 participants have formed carpools that occupy 55 parking spaces. These numbers are expected to be the same for the proposed Sanctuary site, since the number and residential location of members is not likely to change.

E. Remote Lot Shuttle Service

1. Existing Conditions
The proposed Sanctuary site has the potential to increase its parking capacity by utilizing the parking facilities of Meher School, located at 999 Leland Drive in Lafayette, less than 1 mile away from the proposed Sanctuary site. Figure 2 illustrates the location of the Meher School in relation to the proposed Sanctuary site. Meher School, an educational institution associated with Sufism Reoriented, has a total of 40 parking spaces. The Meher School's parking spaces are occupied during school hours and are available for use during the Sanctuary's large night-time events.

2. Demand Strategies
In order to capitalize on the additional parking capacity, Sufism Reoriented, while located at its current Center, provides 2 to 3 cars as shuttle service. Once the new building is completed Sufism Reoriented will purchase a large van to serve as the shuttle service for a limited number of participants who park at the Meher School. Participants who live far away (in cities beyond the Lafayette-Walnut Creek area) and those who must arrive early or late and cannot be part of a carpool will participate in the shuttle service. As with the carpool program, the Sanctuary staff will monitor and ensure the effectiveness of the shuttle service.

3. Impact on Parking Demand
The shuttle service would allow the Sanctuary to utilize existing off-site parking spaces to increase parking capacity. Most of the participants who would regularly utilize the shuttle service would otherwise reach the site by single-occupancy vehicle. Therefore, implementation of the shuttle service would reduce the number of single-occupancy
vehicles arriving at the Sanctuary and the demand for on-site parking space. Twelve to 24 participants currently use the shuttle service.

F. Results of TDM Implementation at the Current Sanctuary Site

The TDM strategies implemented and fully monitored by Sufism Reoriented at the current site from October, 2007 to February, 2009 were highly effective. Figure 6 shows the number of cars parked on site for Friday nights (7:15 - 9:30 pm) when the full membership attends classes, Sunday evenings (7:15 - 9:00 pm) when more than half the membership attends devotional gatherings, and for annual celebrations during the Christmas/New Year Holiday period and during mid-March that involves all the membership and some outside guests. Highlights of the TDM implementation at the current site include the following:

- The number of cars parked on-site never reached the parking capacity of the proposed Sanctuary site plan (74).
- The average number of car parked on-site on Friday nights was 59 vehicles, which would result in 15 unused spaces at the proposed Sanctuary site.
- The average for Sunday night devotional gatherings was 49 vehicles, which would result in 25 unused parking spaces at the proposed Sanctuary site.
- During the six special events that occurred during the implementation period, the number of parked cars ranged between 39 and 57. These events potentially have the largest number of attendees.
- Parking trends for Friday and Sunday evenings indicate a decline in the number parked cars during the TDM implementation period.
G. Conclusions

1. Implementation of Transportation Demand Management Strategies

Table 3 summarizes the types of activities that would take place at the proposed Sanctuary and the number of people participating in those activities. The table also identifies the transportation management strategies that would be implemented in order to reduce the demand for parking.

<table>
<thead>
<tr>
<th>Type of Demand</th>
<th>Use/Activity</th>
<th>People Per Day</th>
<th>Demand Management Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Weekdays</td>
<td>Administration, Cleaning,</td>
<td>25</td>
<td>Not necessary*</td>
</tr>
<tr>
<td></td>
<td>Landscaping, Day Classes,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bookstore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review Classes</td>
<td>30 to 50</td>
<td></td>
<td>Not necessary*</td>
</tr>
<tr>
<td>Chorus Rehearsal</td>
<td>70</td>
<td></td>
<td>Not necessary*</td>
</tr>
<tr>
<td>Regular Nights</td>
<td>Night Classes</td>
<td>357</td>
<td>Walking Program</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Carpool Program</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Shuttle Service</td>
</tr>
<tr>
<td>Devotional Gathering</td>
<td>200 to 250</td>
<td></td>
<td>Walking Program</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Carpool Program</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Shuttle Service</td>
</tr>
<tr>
<td>Once a Year</td>
<td>March Celebration</td>
<td>400</td>
<td>Walking Program</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Carpool Program</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Shuttle Service</td>
</tr>
<tr>
<td></td>
<td>Rehearsals for March</td>
<td>100</td>
<td>Walking Program</td>
</tr>
<tr>
<td></td>
<td>Celebration</td>
<td></td>
<td>Carpool Program</td>
</tr>
<tr>
<td>Twice a Year</td>
<td>Musical/Drama Tavens</td>
<td>150 to 175</td>
<td>Walking Program</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Carpool Program</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Shuttle Service</td>
</tr>
</tbody>
</table>

*Demand management strategies not necessary for daily use of the Sanctuary, since, even if every person arrived in a single-occupancy vehicle, the 74 parking spaces would not be filled.

As described earlier, the Sanctuary would have a dedicated staff person to monitor travel patterns, parking demand and the smooth operation of the walking, carpool and shuttle service programs. The staff person will monitor the schedule of events at the Sanctuary and if a combination of scheduled events will require exercise of the transportation demand management plan it will be implemented.
2. **Summary of Impact on Parking Demand**

Table 4 calculates the parking demand at the proposed Sanctuary based on how people would be expected to arrive at the site.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Participants</th>
<th>Parking Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking Program</td>
<td>167 to 224</td>
<td>0</td>
</tr>
<tr>
<td>Carpool Program</td>
<td>166</td>
<td>55</td>
</tr>
<tr>
<td>Shuttle Service</td>
<td>12 to 24</td>
<td>1a</td>
</tr>
<tr>
<td>Single-Occupancy Vehicle</td>
<td>9 to 13</td>
<td>9 to 13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>357 to 400</strong></td>
<td><strong>65 to 69</strong></td>
</tr>
</tbody>
</table>

*aAs discussed earlier, the Meher School site, located at 999 Leland Drive, would supply an additional 14 to 24 (up to 40) parking spaces for participants who utilize the shuttle service.*

The TDM strategies implemented at the current site have more than achieved the parking demand target of 65 to 69 identified in Table 4.

**VI.  LOOKING TO THE FUTURE**

The success of TDM implementation at the current site has led Sufism Reoriented to set parking demand targets that would reduce the average number of vehicles parked on the proposed Sanctuary site an additional ten percent from the numbers recorded during the TDM implementation period at the current site. These targets for Sufism Reoriented for 53 or fewer vehicles parked on site for Friday class nights and 44 or fewer vehicles for Sunday night devotional gatherings will further reduce vehicular use and traffic associated with the Sanctuary. Sufism Reoriented fully expects that these targets will be reached at the proposed Sanctuary site for the following reasons:

- Members have tended toward living as close as possible to the Sanctuary, as evidenced by the fact that more than half currently live within a ½-mile. The vast majority of these members are part of the walking program. The number of members living close to the Sanctuary who walk to activities is expected to grow, especially once the new Sanctuary is constructed.
- There is additional capacity within current carpools that can accommodate members who move closer to the Sanctuary, but for whom walking is not possible.
Central principles of Sufism Reoriented are to protect the environment and to put their core values and ideals into practice in everyday life. Reducing automobile traffic, with the resulting reduction in air pollution and the use of scarce natural resources, is seen by the membership as a natural extension of their view of the sacredness of the earth and their responsibilities as stewards.
# ATTACHMENT I:
WALKING PROGRAM PARTICIPANTS

<table>
<thead>
<tr>
<th>Name</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sara Adams</td>
<td></td>
</tr>
<tr>
<td>2. Anton Allen</td>
<td></td>
</tr>
<tr>
<td>3. Jacquie Allen</td>
<td></td>
</tr>
<tr>
<td>4. Ann Barnhart</td>
<td></td>
</tr>
<tr>
<td>5. Tim Barnhart</td>
<td></td>
</tr>
<tr>
<td>6. Kirsten Black</td>
<td></td>
</tr>
<tr>
<td>7. Karin Bodman</td>
<td></td>
</tr>
<tr>
<td>8. Kate Boisvert</td>
<td></td>
</tr>
<tr>
<td>9. Nick Boisvert</td>
<td></td>
</tr>
<tr>
<td>10. Barbara Boyan</td>
<td></td>
</tr>
<tr>
<td>11. Craig Boyan</td>
<td></td>
</tr>
<tr>
<td>12. Ivy Boyan</td>
<td></td>
</tr>
<tr>
<td>13. Fred Brunswig</td>
<td></td>
</tr>
<tr>
<td>14. Kathy Brunswig</td>
<td></td>
</tr>
<tr>
<td>15. Nancy Burgess</td>
<td></td>
</tr>
<tr>
<td>16. Kathleen Carroll</td>
<td></td>
</tr>
<tr>
<td>17. Gabby Cavagnaro</td>
<td></td>
</tr>
<tr>
<td>18. Briane Chavanne</td>
<td></td>
</tr>
<tr>
<td>19. Diane Cobb</td>
<td></td>
</tr>
<tr>
<td>20. Patti Cochran</td>
<td></td>
</tr>
</tbody>
</table>

**Barbara Constantine**
<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.</td>
<td>John Cole</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Robineve Cole</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Jan Colt</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Scott Colt</td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>Anna Cook</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Bill Cook</td>
<td></td>
</tr>
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Institute of Transportation Engineers. Case Study: Contra Costa Centre Transit Village, Contra Costa County, California, n.d.
Introduction
A successful application of the principles of context sensitive solutions (CSS) is, by its nature, a subjective point of view. This case study documents the gradual creation of a transit-oriented district in a most challenging development area that continuously failed to gain approval of development proposals until the introduction of an innovative CSS planning process. Ultimately, a successful application of CSS, whether used in the planning and design of a transportation facility or in the entitlement of a land development, is measured by the stakeholders and the community who participated in the project's planning and took an active role in the decision-making process. Those outside of the process may not always view the results as “successful”—as they might feel that too many compromises were made or that more could have been achieved.

This case study illustrates how the principles of CSS integrated with a new planning process achieved a near unanimous consensus on a transit-oriented development (TOD) where traditional processes resulted in a long string of failed attempts. The case study also illustrates how tradeoffs in the design of walkable thoroughfares can be used strategically to secure larger benefits for the community. Even though some of the specific design solutions highlighted in this case study do not adhere to standard CSS design, the overall solution worked well for this community.

Overview
The Contra Costa Centre Transit Village is a transit-oriented-development district surrounding the Pleasant Hill Bay Area Rapid Transit System (BART) station. The station is located approximately 30 miles northeast of San Francisco, California, USA in a pocket of unincorporated Contra Costa County at the nexus of three cities: Walnut Creek, Pleasant Hill, and Concord (see Figure 1). BART, a 104-mile commuter rail system, has 44 stations serving five counties and an annual ridership approaching 350,000 people. The San Francisco Bay Area has a population of nearly 8,000,000 people of which about 11 percent reside within walking distance of BART.1 Figure 2 shows the station area circa 2000.

Before the station opened, the Pleasant Hill BART station area was characterized as semi-rural with low-density single-family residential and widely dispersed neighborhood serving commercial. When the station opened in the mid-1970s and the surrounding area began to transition to a more suburban form, the Pleasant Hill BART station (now known as the Pleasant Hill /Contra Cost Centre Station) quickly attracted long-distance commuters. Even as late as the early 2000s, the station had the highest rate of morning passenger boardings in the BART system and consistently had the highest weekday ridership of any of the Contra Costa stations. The station's combination of having the most parking spaces in the BART system,2 easy access to I-680, adjacent to a route of regional significance, and trains that initiate service at the Pleasant Hill/Contra Costa Centre station established a commuter park-and-ride function that attracted riders from a wide area. In this role, the area around the station was dominated by vehicular traffic. Treat Boulevard, the station’s primary access, is a major six-lane arterial that connects the station area to I-680. There were few pedestrian amenities and no bicycling facilities until the Iron Horse Trail was constructed within an abandoned railroad corridor 200 feet from the station in the 1980s. Initially, however, there was no connection between the trail and the station. Although the growing number of residential developments surrounding the station provided sidewalks for pedestrian access to BART, the pedestrian and bicycle environment was uninviting as a result of the station being dominated by a surface parking lot.

1 Characteristics of Rail and Ferry Station Area Residents in the San Francisco Bay Area: Evidence from the 2000 Bay Area Travel Survey, Metropolitan Transportation Commission, 2006.
2 Pleasant Hill Bart Station Access Plan, BART, August 2002.
The Vision and Early Plans
Initially, there were no developments around the station. Although no formal vision for the station area existed, in the 1970s elected officials believed it was important to co-locate and concentrate housing and jobs with access to BART. In 1975, the first plan for the area recognized the future desirability for intensified development near the station because of its accessibility. The plan established a minimum parcel size in anticipation of commercial development, but the area’s land use remained governed by the county general plan. In 1978, a general plan amendment permitted higher-density, transit-oriented development around the station. Even though the first development project (a three-story office building surrounded by parking) met the requirements of the general plan amendment, it did not reflect the type of development envisioned by elected officials: a high-density, urban, walkable, mixed-use and transit-oriented place. Despite the convenient transit access provided by the station and the Iron Horse Trail nearby, development remained conventionally suburban in nature.

After the failure of the initial development to achieve the vision for the station area, the county considered ideas for achieving transit-oriented-development and settled on the adoption of a specific plan to guide the appropriate type, mix and density of development. A redevelopment plan was also developed establishing a mechanism to finance the significant infrastructure upgrades needed to accommodate the development and to achieve full land assembly on the development sites. With the tools in the Pleasant Hill BART Station area-specific plan and redevelopment plan guiding new development, the station area became more transit-supportive and by the late 1990s the area was nearly three-fourths built out with two million square feet of office and commercial space and approximately 2,300 housing units. Eventually, the area became known as the Contra Costa Centre Transit Village.

The Final Puzzle Piece
One of the last remaining challenges to completing the transit village was the redevelopment of the BART station’s surface parking lot. Although the specific plan set the stage for development, what remained was a need for a plan that was both economically viable as well as supported by stakeholders and the public. For years, stakeholders had disputed the type and scale of development on the BART-owned property and the impasse was forestalling any proposal from going forward. Figure 3 shows the boundaries of the areas described in this case study. At the heart of the issue was the need to build and finance a parking structure to replace the 1,500 surface parking spaces used by BART commuters. Redeveloping the parking lot would remove both a physical and visual barrier to accessing the station and would allow subsequent developments to activate the space and to create a vibrant mixed-use center.

The predicament became an urban planning catch-22: Achieving the vision and financing public infrastructure improvements was not possible without private developer participation, but private development could not afford to construct the BART replacement parking garage.

The first plans for an entertainment and retail complex on the BART property fell through when it was perceived to compete with neighboring cities’ plans to build downtown multiplex theaters. The entertainment center proposal was followed by a plan, developed through the traditional iterative planning process over a two-year period, for an office complex that neither satisfied community concerns regarding traffic generation nor seemed to be economically sustainable.

Integrating Context Sensitive Solutions (CSS)
BART Property Charrette
A breakthrough of the stakeholder impasse was achieved when a then newly elected board of supervisors member championed a relatively new planning tool, the charrette, as a means of finding a workable solution for the development of the BART property’s surface parking lot (see Figure 4). In 2001, the County of Contra...
Costa held an intensive six-day public design charrette that included 80 hours of “open design studio” spanning the entire charrette. More than 500 participants\(^3\) took part in the process. Participants included two county supervisors, local residents, redevelopment agency representatives, and elected officials from the surrounding municipalities. More than six months were spent preparing for the charrette, analyzing existing conditions and setting the context for discussions such that meeting time was productive and effective.

Over the course of the charrette, participants addressed the future development on the BART property, pedestrian and cyclist issues, the need for 15 bus bays, parking capacity for BART patrons and residents, and new services and facilities for area residents. Participants also articulated desire for mixed-use developments with ground floor retail/restaurants and attractive streetscapes (see Figure 5). The result of the collaboration was a conceptual plan for which there was near-unanimous support.

The charrette process incorporated principles of CSS in its approach. It was led and facilitated by a planning and architectural consultant with an interdisciplinary team of engineers, economists, transportation planners, retail and housing specialists, and public financing experts. The process began without a predetermined outcome and instead focused on the longstanding vision for the BART station area contained in the specific plan and satisfying the diverse needs of the stakeholders. As a result, community values were integrated into the conceptual plan from the beginning. The supervisor who had championed the charrette approach earned support from other community leaders, giving political space for open and honest communication with stakeholders. This set the stage for a meaningful and inclusive process based on the core principles of CSS that addressed multiple facets—circulation, aesthetics, land use, environmental, and placemaking elements. The supervisors and the agencies responsible for implementing the plan committed to the stakeholders that “what you see is what you’ll get”.

**The Charrette as a Tool to Achieve the Vision**

A longstanding vision for the BART property, established in the 1983 Pleasant Hill BART Station area specific plan, was the creation of a housing and employment center that would benefit from convenient access to the BART station, I-680, and Treat Boulevard. More specifically, the vision consists of a higher-density transit-oriented “village” that affords a mix of uses—office, retail, housing, hotel, and civic—and a public facilities realm (see Figure 6). The premise is that the right mix of uses, physically and functionally well-integrated, set the stage for a vibrant and highly valuable development. The convenient transportation connections provided by the BART station, Treat Blvd, the Iron Horse Trail, and I-680 make the area too important to be underutilized. For the charrette participants, this vision was the armature upon which they built various concepts for a new neighborhood—a neighborhood that could be enjoyed by all, with features that addressed concerns about traffic, massing, and aesthetics; a neighborhood that would be financially successful.

A design philosophy was developed to support the vision of a mixed-use transit-oriented village. The design philosophy in the specific plan fosters a local identity through the creation of attractive features that complement the surrounding context. By creating a sense of place and by providing a network of public open spaces with amenities, the vision entails an enhanced public realm around the station area. For pedestrians, the design philosophy specifies that the village’s features are at a human scale that visually and functionally create a vibrant neighborhood.

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\(^3\) Contra Costa Centre: Financing Transit Oriented Development, presentation by Jim Kennedy, Contra Costa County Redevelopment Director, Rail-Volution, October 20, 2010.
**Resulting Plan**

The charrette culminated in a site development plan that was approved by Contra Costa Council County in 2005. The charrette process articulated a conceptual plan for the BART parking lot that would see it transformed into a mixed-use, walkable urban neighborhood with shops, office space, and residential units. The plan includes affordable housing, placemaking features, and a balance of jobs and residential units. Subsequent planning identified the innovative financial arrangements that would facilitate implementation of the plan. All stakeholders and the public were invited to participate in the charrette as a means of maximizing input so that all alternatives could be considered. Figure 7 illustrates the site plan resulting from the charrette.

The plan itself incorporated principles of CSS, a circulation network that both complements the surrounding site developments and accommodates pedestrians, bicycles, transit, and motor vehicles. The circulation system truly accommodates all users, with major thoroughfares and minor streets that complement the site and surrounding developments. The mixed land uses in close proximity to one another captured travel internally as well as brought people to the neighborhood for purposes other than public transportation. The pedestrian-scaled buildings, landscape, and streetscape design with pedestrian amenities helped support all of the development’s function from access to transit to outdoor dining. All of these things were achieved while maintaining Treat Boulevard’s vehicular capacity consistent with regional priorities.

**Implementing the Vision for the BART Property**

The conceptual plan that came out of the charrette process in 2001 was taken forward and refined by McLarand Vasquez Emsiek & Partners and Sasaki Associates. The plan for the 18-acre site focuses on a residential mixed-use transit-oriented village. AvalonBay Communities and Millennium Partners developed the site and implemented the plan. The designers reduced the scale of the BART parking lot to five pedestrian-scale blocks, with retail and live/work spaces fronting on to smaller-scale internal streets. Each block is no more than 200 feet in length. Although each contains a mix of uses, some focus more on retail or office space while others have a more residential focus. Figure 8 is a rendering of the mixed-use development fronting Treat Boulevard, and Figure 9 is the completed building.
Three of the blocks are designed with development on a continuous edge around the block enclosing a space that is used for either a parking structure or a courtyard. The plan is being implemented in two phases. Phase I has been completed and phase II will begin construction in five years. When completed the Transit Village originally developed in the charrette and refined by AvalonBay Communities and Millennium Partners’ architects will include:

- 522 residential units;
- 35,590 square feet of local serving retail (including restaurants, business services, and convenience retail);
- 10 live-work units;
- 290,000 square feet of office; and
- 20,000 square feet of business conference center.

Walkable Thoroughfare Design
The streets for the site are walkable by design. Vehicles are discouraged from speeding by short blocks, closely spaced controlled intersections, and landscaping features. Placemaking features, such as pedestrian-scaled lighting, attractive sidewalks wide enough for outdoor dining, visually interesting building facades, public open space with seating and water features, and street frontages that include several smaller-scale retail and live/work spaces create an inviting promenade for pedestrians and cyclists.

The interior streets are markedly different from the urban arterials that surround the site; Treat Boulevard, Jones Road and Oak Road. Pedestrian crossings are given greater prominence through highly visible street markings or colored/textured concrete; which conveys the priority of pedestrians (Figure 10). The streets provide on-street parking that is also highly visible through pavement markings and curb extensions at pedestrian crossings.

A solid strip of colored pavement delineating the parking lane space creates a buffer between the pedestrian path and traffic lane and clearly differentiates the space from a regular traffic lane (unlike many other streets that provide on-street parking).

The incorporation of barrier-free design, with pedestrian space level to travel lane space introduces some ambiguity to the prioritized user of the space that, in turn, encourages drivers to slow down. Wayfinding and placemaking features, such as community chessboards and a plaza with a water mister, signal that the space has been designed with the pedestrian in mind. The town square will also include a public art feature and discovered art in the near future.

Connections
Supporting and enhancing the transportation connections to the station is a key element of the vision for the BART property. The vision supports all modes—local transit, pedestrian, cycling, and motor vehicle—but specifically discourages any through traffic in the station area. To this end, the plan includes improved access for underserved communities and initiatives that address capacity issues, particularly through enhancements to the pedestrian and transit facilities and services. The plan sees the use of parking primarily by commuters accessing the BART station and indicates a need for replacing all BART patron parking displaced by development on the BART property.

Pedestrian connections throughout the BART property are prioritized, with direct connections to the BART station from each block in the village. Pedestrian paths directly link to surrounding neighborhoods through highly visible pedestrian crossings at intersections. An east-west pedestrian and bicycle route, the “town green,” connects the Iron Horse Trail with bicycle parking at the station.

The site provides vehicular access throughout the site to each of the blocks. The design of the internal streets, however, discourages their use as through routes from one side of the transit village to the other.

Innovative Solutions and Design Flexibility
Transforming a Major Arterial into a Walkable Thoroughfare
Creating a walkable thoroughfare along a major arterial was one of the most challenging aspects of the project. Treat Boulevard connects I-680 near the Pleasant Hill/Contra Cost Centre BART Station to Central Concord. As a route of regional significance, it carries significant through traffic, connects multiple jurisdictions, and serves a major transportation hub, the Pleasant Hill/Contra Cost Centre BART Station. This six-lane facility is part of a corridor of arterials that conveys more than 125,000 vehicles per day. With limited ability to add roadway capacity, transportation improvements on routes of regional significance focus on efficiency. The importance of Treat Boulevard as a critical regional traffic conduit amplifies the challenge to balance multimodal objectives and create a walkable thoroughfare.
In addition to its role as an important pedestrian connection to the BART station, the design goals for Treat Boulevard were to create a comfortable, intimately scaled streetscape that, combined with ground floor retail, cafes, and locally serving shops, encourages pedestrian activity. The street standards for the station area mandated “human-scaled elements at the street level” including street trees, wide sidewalks with space for commercial activity, on-street parking, benches, and pedestrian-scaled lighting. The station area’s architectural code required large windows on the first floor and awnings to create shade.

The pedestrian-oriented, ground floor retail frontage specified for Treat Boulevard is an exceptional treatment for a high-speed six-lane arterial with traffic volumes that rival some freeways. The design and implementation of two of the frontage’s elements required innovation, design flexibility, or a process of building consensus amongst stakeholders, as discussed below.

**On-Street Parking**
Of primary concern to the engineers in the county’s public works department was how to safely incorporate on-street parking into a two-block segment of Treat Boulevard. In the charrette, on-street parking was identified as a crucial element of the success of Treat Boulevard as an exceptional treatment for a high-speed arterial (Pleasant Hill BART Comprehensive Station Plan, Recommendation W3). During off-peak times, however, the speeds are typically over 40 mph near the Pleasant Hill BART station.

Concerns centered around two issues: first, the hazards caused by vehicles maneuvering into and out of parking spaces and drivers exiting their vehicles adjacent to high-speed traffic and, second, the impediment to traffic flow caused by parking maneuvers on a route of regional significance for which uninterrupted flow is a critical regional priority.

The negotiated solution was the creation of space within the traveled way that buffered the parking lane from moving traffic. This 12-foot wide buffer serves as a refuge for drivers waiting to park and provides maneuverability without impeding traffic flow (Figure 11), resolving the county public works concerns. The buffer’s visibility is enhanced through the use of bands of colored concrete. One concrete band forms the gutter for stormwater drainage at the outer edge of the parking lane. Although designed this way for a variety of reasons, the location of the gutter assists drainage around the curb extensions, which can be a challenge to properly drain. The buffer also benefits pedestrians by increasing the distance between the streetside and moving traffic—best practices on the design of pedestrian facilities universally agree that distance from moving traffic is an important factor in pedestrian comfort. The buffer also provides benefits for streetside activities such as outdoor dining, reducing the noise and exhaust of traffic. The sidewalk becomes a true public space, not just an access path for pedestrians.

The buffer space solution did not come without controversy and conditions. Although it resolved the initial concerns about safety and impeding traffic, there remained concerns that the buffer will be used as a right-turn lane pitting higher-speed traffic against vehicles maneuvering into parking spaces. The final agreement permitting on-street parking on Treat Boulevard contained a condition that allows the county public works department to remove the parking if monitoring shows that the buffer is being misused and creating safety concerns. This solution may not be ideal as an example of a walkable thoroughfare, but it illustrates the very real tradeoffs and compromise that frequently occurs in thoroughfare design. A hallmark CSS principle is collaboration amongst stakeholders early in the planning to resolve tensions between community and economic needs and traffic safety concerns.

**Streetside Design**
The Pleasant Hill/Contra Costa Centre BART Station property regulating plan and codes did not include an explicit streetscape design. However, all of the planning and regulating documents convey the creation of a place that focuses on streetside activity. Below are quotes from key regulating documents:

*Shopfront and workplace buildings are common in every American downtown. These building types are designed to foster active street life. Their ground floor fronts have large windows to encourage a connection between the commercial activity within and the public life of street and sidewalk. Street trees are part of an overall streetscape plan designed to give special character to each public space and coherence to each area.* (Pleasant Hill/Contra Cost Centre BART Station Property and Architectural Codes).

*Develop quality pedestrian streets and sidewalks – Work with AvalonBay Communities and Millennium Partners and County Redevelopment to ensure that streets, sidewalks and pedestrian amenities are inviting to pedestrians.* (Pleasant Hill BART Comprehensive Station Plan, Recommendation W3).

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4 Treat Boulevard has a posted speed limit of 35 mph, making it applicable to the guidance in *Designing Walkable Urban Thoroughfares*. During off-peak times, however, the speeds are typically over 40 mph near the Pleasant Hill BART station.
The transit village’s Treat Boulevard frontage and internal streets provide walkable streetsides through the application of many of the principles of context sensitive design, urban design, and walkable thoroughfare design as described in Designing Walkable Urban Thoroughfares (see Figure 12). The features along the Treat Boulevard frontage and internal streets that create walkable thoroughfares include:

- A wide streetside that can accommodate frontage or furnishings zones sufficient for outdoor dining and other commercial activities;
- Public realm amenities and placemaking features such as benches, pedestrian-scaled lighting, trash receptacles, and bicycle racks;
- Buildings with arcades and articulated ground floors incorporating architectural elements that are interesting, attractive, and scaled to the pedestrian;
- Street trees in treewells spaced to form a shaded canopy when mature;
- Curb extensions at intersections to reduce crossing distance and improve pedestrian visibility, and pedestrian refuges at unsignalized crossings of multilane collector streets;
- On-street parking to serve the short-term parking needs of the ground floor retail and, in combination with the additional buffer space, to separate pedestrians from moving traffic;
- Wayfinding signs directing users to the BART station, transit center, and stops for individual bus routes;
- Plazas and public space that can be utilized for civic and/or community functions, dining, and as a pleasant place to wait for transit; and
- Colored pavement creating highly visible pedestrian crossings and slow-traffic zones adjacent to on-street parking.

Figures 13 through 15 illustrate some of the features described above (which all conform to the guidance in Designing Walkable Urban Thoroughfares). The design of the streetside did not require any particularly innovative solution to gain initial agreement among the stakeholders. Although additional right of way was required to accommodate the width of the streetside and parking buffer space along Treat Boulevard, the additional right of way was part of BART’s land development agreements. The most challenging aspect of the streetside was not related to design or construction but to maintenance of the high-quality urban design features. County public works declined the long-term financial responsibility of maintaining the nonstandard elements and extensive landscaping.
Rather than settle for lower-quality amenities and risk the attractiveness of the pedestrian environment, the private development partner, AvalonBay Communities and Millennium Partners, agreed to “take ownership” of the maintenance of the streetscape within the public right of way.

**Connectivity and BART Station Access**
The vision for the Pleasant Hill/Contra Cost Centre BART Station property relied on the streets to define the block pattern for the site. The connected street system, therefore, established the size and configuration of the buildings, parks, and plazas that comprise the development’s built environment.

Figure 16 depicts the plan’s street layout, its relationship to surrounding streets, and illustrates the pedestrian and bicycle connectivity to the BART station. Key aspects of the plan’s connectivity and station access include:

- Multiple direct pedestrian connections approach the station from any direction, each oriented with a vista of the station platform or the BART parking structure’s tower;
- Regional pedestrian and bicycle access provided via the Iron Horse Trail paralleling the east side of the station area. An award-winning pedestrian and bicycle overcrossing (Robert I. Schroeder Bridge) of the daunting Treat Boulevard grade crossing at Jones Road was recently completed;5
- Pedestrian access to the transit village primarily occurs at grade. Two signalized intersections provide access to the BART Station across Treat Boulevard (Figure 17);
- The nexus of the pedestrian system is a cluster containing the BART station fare gates, the bus transit center, and the town square;
- A direct connection from the Iron Horse Trail passes through the Village Green and the Town Square crossing only on one street; and
- Bicycles access the station via either the off-street Iron Horse Trail or the on-street bike lanes on Oak Road. Both routes lead to the station's bike racks/lockers and proposed bike station.

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5 Pedestrian grade-separations are generally avoided on walkable urban thoroughfares because they divert pedestrian activity from the street and promote higher vehicle speeds by removing activity that normally cues motorists they are entering a pedestrian district. However, the overcrossing was planned in the original specific plan to allow continuous flow along the county's most important regional multi-use trail. It eliminates a major impediment to long-distance pedestrian and bicycle travel. Signalized at-grade crosswalks remain on Treat Boulevard.
The plan originally included a direct connection between the Iron Horse Trail and the Town Square and BART fare gates via a greenway within the median of what is now called Harvey Drive. This original design envisioned a 110-foot wide right of way with a pair of one-way lanes paralleling a 54-foot-wide greenway that also served as public open space (see Figure 18). As a low-speed residential street that primary functions as a pedestrian and bicycle connection to BART and community open space with a secondary function for vehicle access, the travel lanes were 10 feet wide adjacent to eight-foot-wide parking lanes.

The greenway design faced the classic dilemma between lane width and minimum clearance for fire vehicle access. The fire district required a 20-foot-wide clear travel way, which the greenway design did not provide. The clear travel way allows fire vehicles to pass a stopped vehicle or for ladder engines to extend their stabilizers. This is particularly important on streets with tall buildings. Three- to four-story buildings were proposed adjacent to the greenway.

The fire district’s 20-foot requirement was nonnegotiable so the designers sought an alternative to widening the street. The solution that was eventually constructed narrowed the right of way and placed the greenway to one side of the street. While the street did not result in the grand entry and neighborhood park originally envisioned, the greenway is an attractive multi-use connection between the Iron Horse Trail and the BART station and provides a limited amount of open space (see Figure 19) and neighborhood amenity.

**Project Funding**

Although a prominent feature of using the principles of context sensitive solutions in creating places and walkable thoroughfares is their design, funding the project often requires the most innovation and flexibility. Development of the BART property overcame many financing challenges and highlighted the value of public/private partnerships in achieving a vision.

First and foremost, the primary obstacle to developing the property, funding the BART replacement garage and upgrading the backbone infrastructure, had to be addressed. Once it became clear that any financially feasible development that could absorb the cost of these fundamental elements contradicted the objectives of the Contra Costa Centre Transit Village, the County Redevelopment Agency decided to fund these significant prerequisites through the sale of tax-exempt bonds (secured by the tax increment from the entire 125-acre redevelopment area) with secondary contributions from an assessment district, development impact fees, and from their private partners, AvalonBay Communities and Millennium Partners (Figure 20).

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**Figure 18** The greenway developed in the charrette had a 110-foot right of way with ample space for public open space and a multi-use connection, but had narrow lanes that didn’t meet Fire District requirements. Source: Pleasant Hill BART Community Plan.

**Figure 19** The greenway actually built had a narrower right of way then envisioned (83 ft. versus 110 ft.) and the greenway was situated to one side rather than in the median to meet Fire District requirements for a 20 ft. clear travel way. The greenway is an attractive multi-use connection between the Iron Horse Trail and the BART station. Source: Arup.

**Figure 20** The 1,500 space replacement garage under construction in 2008. The County Redevelopment Agency funded the structure using tax increment financing (housing bonds), an assessment district, and developer contributions. Source: Jim Kennedy.
Once the major infrastructure hurdle was passed, the partnership devised an innovative win-win financing strategy that created long-term revenue for the private partner and an income-generating arrangement for the public partner. BART leased the property to a newly formed Joint Powers Authority (comprised of the County, the Redevelopment Agency and BART), which in turn sub-leased the property to the private partner. Revenue from the private lease is divided between BART and the County, with the large majority going to the County in recognition of the significant up-front investment by the County Redevelopment Agency.

Benefits of the Project

After many decades of development around the Pleasant Hill/Contra Cost Centre BART station, the area lacked a “heart.”

The county initiated a process based on the principles of CSS to improve past performance and build consensus on development of the BART property to create that heart. Now completed and nearly fully leased, the entire Contra Costa Centre benefits from a well-conceived plan that used collaboration to reach a consensus on the needs of the stakeholders, that creates a new “place” in the community, that encourages the use of public transportation, and that financially beneficial to both sides of the public/private partnership. Residents and businesses have moved into the station area. Contra Costa Centre development includes:

- Specific plan area: 7,000 jobs and 6,000 residents within a quarter-mile of BART fare gates;
- BART property: 522 units and 345,000 square feet of commercial space;
- Exceeded goal of 30% reduction in single occupant vehicle use by employees (see Figure 21);
- TDM programs: Guaranteed Ride Home, Mid-Day Shuttle Service and the Centre’s progressive Green Fleet Program provide more services to commuters who choose to leave their cars at home;
- Residential occupancy: 98% leased; and
- Commercial occupancy: 95% leased.

A 2008 analysis of residential values in the area external to the Pleasant Hill BART Station Specific Plan area indicated that at no time did the existence of higher density transit-oriented-development negatively influence surrounding housing prices, even during the period 1996–2001 when the public was opposed to the several proposed developments in the specific plan area.

Lessons Learned

The planning of the Pleasant Hill/Contra Costa Centre BART station area was an arduous process spanning over 30 years. Over this time, planning techniques, markets, and transit systems saw numerous changes. The planning of the station area experienced successes and setbacks along with these changes but remained steadfast on achieving the objective of a well-connected, high-density, mixed-use transit village centered on the BART station. After the 1978 general plan amendment failed to attract the

As a result of these lessons, the county prepared the Pleasant Hill BART Station specific plan and redevelopment plan, which, employing traditional planning methods, guided development into the 1990s until the last remaining undeveloped property in the station area was the BART surface parking lot. The final piece of the puzzle turned out to be the most challenging due to the complexities of site ownership, market conditions, infrastructure needs, financing, and achieving stakeholder concurrence. After various strategies failed to produce a feasible or acceptable plan, a relatively new planning technique using a “charrette” process resulted in a successful plan. Lessons learned through the BART property-planning process included:

- The traditional planning process, which takes one land-use concept through multiple iterations of refinement, can be excessively long and often fails to gain consensus on a plan;
- The economics of developing the BART property with required replacement parking and long-term ground leasing requires an innovative financing strategy and public/private partnership;
- Replacement of BART parking at a 1:1 ratio makes many development proposals infeasible (in 2006 the replacement garage cost 50 percent more than the value of the property);
- Neighboring jurisdictions are more likely to accept development proposals that don’t compete with their own development strategies;
- Stakeholder ownership of a plan gained through a participatory planning process such as a charrette can substantially reduce the time required to adopt the plan;
- The redevelopment agency needs to be prepared to take a significant financial risk before final development agreements are in place;

Figure 21. In 2008, employees of Contra Costa Centre exceeded the goal of reducing single-occupant vehicles by 30%. Source: Presentation by Jim Kennedy, Contra Costa County Redevelopment Director, Rail-Volution, October 20, 2010.

6 www.contracostacentre.com
CSS Qualities: Process
The Pleasant Hill BART Station specific plan area was mostly developed using a traditional planning process; some principles of CSS have been used since the first development project. Until the rigorous application of the CSS process in planning the BART station property, stakeholder involvement was limited to elected officials and a steering committee mostly made up of agency staff. Consensus on the vision and development projects was achieved infrequently and over long periods of time. Of all of the elements highlighted in this case study, the decision to use an open charrette process involving all stakeholders make this a great example of how multiple agencies and a diverse community can collaborate to plan and implement an exceptional transit-oriented and pedestrian-friendly walkable place within one of the most challenging site-planning environments in the Bay Area. The CSS principles related to outcomes (see “Appendix 2: Introduction to Context Sensitive Solutions” in ITE’s recommended practice Designing Walkable Urban Thoroughfares) applied on this project include:

- Commitment to a participatory process from local leaders;
- Process addressed multiple facets – circulation, aesthetics, land use, financing, environmental, and placemaking elements;
- Provision of a full interdisciplinary team to work with stakeholders to develop the plan;
- Extensive involvement of a full range of stakeholders;
- Completely open and transparent process with regular and frequent communication;
- No predetermined outcome at the start of the process;
- A process with a clearly defined purpose and timeline for developing the plan;
- Extensive facilitation and assessment of alternatives to seek consensus on the transportation, community and environmental objectives of the plan, even when they are in conflict;
- Flexibility and innovation in transportation design and project financing;
- Formation of partnerships in the interest of achieving a vision;
- Process emphasized an outcome that coordinated multimodal transportation and land use decisions; and
- Interdisciplinary team use of a full range of communication and visualization tools to inform stakeholders, encourage dialogue, and increase credibility of the process.

CSS Qualities: Outcomes
The development of the BART station property successfully achieved the vision of the Pleasant Hill BART station specific plan in terms of land use, mix of uses, transit orientation, multimodal connectivity, and aesthetics. While the segment of Treat Boulevard along the BART property was not fully transformed as envisioned in the charrette, it did replace a pedestrian-unfriendly connection to BART with a significantly improved pedestrian environment serving the activities of adjacent retail and restaurants and directs BART patrons through an attractive new neighborhood once occupied by a bleak asphalt parking lot. The design of Treat Boulevard may serve as the prototype for other segments of this automobile-dominated arterial undergoing redevelopment. The tradeoffs negotiated into the design should not be considered an example of conceding defeat but rather an example of how small design tradeoffs can be leveraged to secure larger benefits for the community.

The CSS principles related to outcomes (see “Appendix 2: Introduction to Context Sensitive Solutions” in ITE’s recommended practice Designing Walkable Urban Thoroughfares) applied on this project include:

- A transportation system and street designs that are compatible with the surrounding context and effectively and safely serve all users;
- A street design that balances the provision of a walkable and commercially viable streetside with the region’s priority of traffic movement on routes of regional significance using solutions agreed upon by a full range of stakeholders;
- Thoroughfares and local streets that integrate usable public open space and that combine attractive urban design with multimodal functionality;
- The preservation of an abandoned railroad corridor, it development as a multi-use trail, and the construction of a unique and aesthetic bridge that preserves and enhances the environmental, scenic, aesthetic, historic, and natural resource values of the station area;
- A resulting built project that both met and exceeded the expectations of both designers and stakeholders and added value to the community, the environment, and the transportation system; and
- Finally, a planning and design process (six-day charrette) that was highly efficient and expeditious, making the best use of resources.
TDM Cost Effectiveness
How VMT Reduction Translates to Congestion Mitigation and Improved Air Quality

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One of the most elusive and difficult aspects of Transportation Demand Management (TDM) is determining the effectiveness of projects. Demand Management strategies are the cost effective partners to capacity improvements (e.g. highway or capacity widening). Although it is easy to see when a new freeway lane is built, it is more subtle to notice changes in commute behavior based on the effectiveness of TDM strategies.

Most large metropolitan areas concede that there is no way to build their way out of ever-increasing traffic congestion, and worsening air quality. The opportunity to mitigate some of these problems is to decrease the demand for the roadway capacity. The challenge for TDM is to be taken seriously and to be valued in a world of civil engineers who like to build infrastructure, and elected officials who can point to things that can be seen and are more easily identified.

Transportation dollars are becoming tighter due to budget problems at the Federal, State and local levels. Since many rideshare programs are funded by Congestion Mitigation Air Quality (CMAQ) or local Air District funds, it is now more important than ever to determine the effectiveness of projects and demonstrate how that translates to congestion management or air quality benefits.

TDM strategies are 'softer' and less tangible mitigation methods than capacity enhancements. To ensure an appreciation of the benefits of TDM strategies, it is more important than ever for advocates and TDM professionals to provide more substantive results. Calculating the cost effectiveness (based on performance measures) of projects can be challenging, however the reward for monitoring, tracking and documenting the cost effectiveness can make the difference if the project is to compete well for future funding.

The basis for this analysis of cost effectiveness is a list of program elements of a comprehensive TDM Program implemented by the Contra Costa Commute Alternative Network (CC CAN) in northern California. A brief project description of each element is included, with the corresponding methodology for determining the cost effectiveness for each. These will serve as sample project types in order to show examples of ways to calculate effectiveness for some projects. These particular projects are subject to the cost effectiveness criteria established by the Bay Area Air Quality Management District (BAAQMD) in the San Francisco Bay Area. Although some projects in Contra
Costa are funded by local half cent sales tax funds, and in some cases CMAQ funds, the more stringent BAAQMD cost effectiveness criteria are used for all projects. This is not only easier due to the standard monitoring methodology, but also provides more credibility to the programs due to these high standards. As a note, the BAAQMD re-evaluates its calculations on a biennial basis, making them more and more stringent, due to the cleaner newer vehicles on the road. Cleaner vehicles means that programs must take more single occupant vehicle (SOV) trips off the road to achieve the same cost effectiveness levels each year. In FY 2002/03 the BAAQMD required the cost effectiveness ratio to be lower than $50,000/ton of emissions reduction to qualify for TFCA funding (Transportation Fund for Clean Air).

The projects evaluated in this report include:
- Carpool Incentive Program
- Employer Based Trip Reduction
- Vanpool Incentive Program
- Transit Incentive Program
- Guaranteed Ride Home
- Bicycle Rack/Locker Project
- SchoolPool Program

Each project type is calculated separately due to different default trip lengths, different vehicle miles traveled (VMT) reduction, varying numbers of days per year of effectiveness, and the fluctuating cost of each project. At the end of each fiscal year (usually 2-3 months after the end of the year), follow-up surveys are conducted for all projects to retrieve information in determining one-way trip lengths, frequency of use of the alternative commute mode, and duration of use. Most project types are calculated on an annual basis, however some infrastructure projects (such as bicycle racks and lockers) are calculated based on 20 years (the reasonable useful life of the racks/lockers). This information gathering produces information about each project which is used to determine its cost effectiveness. The maximum number of days/year for which any project can receive credit is 240 days. Projects such as EBTR, vanpool and bicycle projects often receive 240 days of credit, whereas some transit projects receive only 90 days, for instance.

**Cost Effectiveness (Performance) Measurements**

The cost effectiveness measures calculated for each project type include the following:

1. **Vehicle trips reduced** is based on the number of participants, multiplied by 2 to determine one-way trips reduced, multiplied by the number of days/year of effectiveness. For instance if a carpool project has 800 participants averaging 189 days of carpooling during the year, the number of vehicle trips reduced would be $800 \times 2 \times 189 = 302,400$ VTR
2. Vehicle miles reduced is based on the number of one-way trips, multiplied by the number of days of effectiveness per year, multiplied by the average one-way trip length. The carpool project calculation would read:

\[1600 \text{ (one-way trips/day, based on 800 participants)} \times 189 \text{ (days per year)} \times 32 \text{ (average one-way trip length)} = 9,676,800 \text{ VMT reduction}\]

3. Days of effectiveness (DOE) is based on the average number of days that participants use the commute alternative. The total number of days of participation for all participants is added together and then divided by the number of participants. The BAAQMD has certain default DOE rates based on its own statistics, however if a project proponent can demonstrate a higher number of DOE for a given project, that will be considered. For instance, the BAAQMD default number of DOE for a transit rider is only 90 days, whereas based on Contra Costa follow-up surveys over 85% of respondents continue to take transit over 180 days after receiving the incentive.

4. Tons of emissions reduction includes calculations for ROG (Reactive Organic Gases), Nox (Oxides of Nitrogen), PM 10 (Particulate Matter), and CO2 (Carbon Dioxide). The ultimate reduction number is calculated by taking the total VMT and multiplying by various factors for each type of emission. The attached tables include the formulas for the various types of emissions reduced for each project. The sum of the emissions reduction provides the basis by which the cost effectiveness per tons of emissions reduction is calculated.

5. Cost savings per commuter is calculated by taking the average one-way trip length, multiplied by two (for the total round-trip savings), multiplied by the number of days, multiplied by the cost per trip (California DOT 2003 average cost per mile is $.36, however the 2003 AAA average cost is even higher at $.48 per mile).

**Carpool Incentive Program** (see Attachment A)

The CC CAN Carpool Incentive Program offers a $40 gas card to anyone who forms a new carpool or joins one. Based on origin/destination calculations from follow-up surveys, the average one-way trip length for a carpool in Contra Costa is 32 miles. The average in the Bay Area is 16 one-way miles. (Contra Costa provides much of the residential housing for employment destinations such San Francisco and Silicon Valley/San Jose).

Attachmentments A-G provide spreadsheets for each project which automatically applies the macro formulas and calculates the cost per tons of emissions. If any of the factors including the total TFCA Cost (in the upper right hand corner), or columns A (# trips/day), B (days/year), or C (one-way trip length) change, then the calculations across the page also change, as each one of those factors determines the cost effectiveness. This project had 800 participants which totaled 800 round trips, or 1600 one-way trips. (Calculations are actually computed differently, based on the number of carpool riders in each carpool, however for the purposes of this exercise it is assumed only one rider per carpool.)
At a cost of $146,000, the Carpool Incentive Program calculation indicates:

- 1600 (# one-way trips) X 189 (days/year) X 32 (one-way miles) = 9,676,800 VMT reduced. This translates to a total cost effectiveness ratio of $10,081/ton of emissions reduction. The emissions reduced include:
  - ROG = 5.52 tons
  - NOx = 6.83 tons
  - PM = 2.13 tons
  - CO2 = 4504.7

The cost savings for each carpool participant totals:

32 (one-way trip length) X 2 (for round trip) X 189 (days/year) X $.36 (cost to drive per mile) = $4,354.56 savings per year

**Employer Based Trip Reduction (EBTR) Program** (See attachment B)

The EBTR program includes a budget of $96,000 with many activities to promote the use of commute alternatives to all workplaces in Contra Costa, regardless of size or type (multi-tenant buildings are included, as well as retail big box). Due to the voluntary trip reduction environment in the San Francisco Bay Area, employers are encouraged to survey their employees each year. CC CAN conducts marketing campaigns such as California Rideshare Week, Bike to Work Day, Spare the Air, and Vanpool Appreciation Day, as well as the promotion of the Countywide Incentive Programs (including the Carpool Incentive Program, Vanpool Incentive Program, Transit Incentive Program and a Guaranteed Ride Home Program).

Due to the difficulties in determining changes in overall countywide employee commute modes, the BAAQMD default for the number of employees who likely change to a commute alternative based on the above efforts is 1% of the database employee population. CC CAN uses a 1.5% ratio instead, based on several factors including: CC CAN has an extensive residential marketing program, working with developers, Home Owner Associations, Chambers of Commerce, service organizations, title companies, realtors, and colleges; Contra Costa has the highest rate of BART train ridership in the Bay Area; and finally, in a voluntary trip reduction environment, only about 10% of the active employers survey each year, and even then, not all of the same ones survey each year. The Central/East Contra Costa EBTR Program, includes over 250 active employers with 41,000 employees, the effectiveness ratio includes:

- 1.5% of 41,000 employees = 615 participants, multiplied by 2 (for one-way trips) = 1230, multiplied by 240 days per year, multiplied by 34 one-way miles = 10,036,800 VMT reduced

The days/year for EBTR is 240 days (working 50 weeks/year and receiving 2 weeks vacation and 10 holiday days off = 240). In addition, for projects which access transit, any 'new' trips generated when commuters access transit must be added back into the equation. For EBTR it is estimated that 10% of the total trips require 'new' trips to access transit. (No new trips are generated accessing standard bus lines). This addition
is posted on Line 31 (and more below if necessary) on each cost effectiveness spreadsheet (Attachments A-G).

The CC CAN EBTR cost effectiveness ratio is $3,549/ton of emissions reduction.

The emissions reduced include:
- ROG = 5.62 tons
- NOx = 6.98 tons
- PM = 2.19 tons
- CO2 = 4631.1

The cost savings for each EBTR participant equals:
34 (trip length) X 2 (for round trip) X 240 (days/year) X $.36 (cost to drive per mile) = $5,875.20 per year savings

**Vanpool Incentive Program** (see Attachment C)
The Vanpool Incentive Program offers half off to new riders for the first three months after joining a vanpool. In addition, vanpool drivers who keep an active van on the road for one year receive a $1,000 bonus. In Contra Costa, the default one-way trip length for vanpools is 41.5 miles. Since vanpoolers ride in vans 5 days/week, the number of days/year is 240.

- 250 participants, multiplied by 2 (one-way trips), multiplied by 240 days/year, multiplied by 41.5 one-way miles = 4,980,000 VMT reduction

The Vanpool Incentive Program budget is $90,000 with a cost effectiveness which calculates to $17,246/ton of emissions reduction.

Emissions reductions include:
- The emissions reduced include:
  - ROG = 1.38 tons
  - NOx = 1.73 tons
  - PM = .55 tons
  - CO2 = 1154.9

The cost savings for each Vanpool participant equals:
41.5 (trip length) X 2 (for round trip) X 240 (days/year) X $.36 (cost to drive per mile) = $7,171.20 per year

**Transit Incentive Program** (see Attachment D)
At a cost of $170,000, the Transit Incentive Program offers free transit passes for new riders traveling to, from, or through Contra Costa. Commuters must sometimes trip link in order to get to work (using more than one form of transit). As a further complication, there are 27 transit agencies in the Bay Area. Due to the differing one-way trip distances, each type of transit has a different default for not only trip length, but number of days of effectiveness/year too. More details can be seen on Attachment D. In the notes to the
right of the table are explanations for the varying defaults as well as new trips generated by accessing transit. To illustrate the way defaults can differ, a one-way trip on BART averages 27 one-way miles, and a total days of effectiveness of 240 days/year, whereas a standard bus trip averages only 4.3 miles with a total days of effectiveness of 90/year. Consequently, the calculations have to be listed separately.

BART trips total:
- 1004 (# one-way trips) X 240 (days/year) X 27 (one-way miles) = 6,505,920 VMT reduction

Bus trips total:
- 400 (# one-way trips) X 90 (days/year) X 4.3 (one-way miles) = 154,800 VMT reduction

Express Bus trips total:
- 214 (# one-way trips) X 240 (days/year) X 46 (one-way miles) = 2,362,560 VMT reduction

Amtrak/ACE train trips total:
- 40 (# one-way trips) X 240 (days/year) X 60 (one-way miles) = 576,000 VMT reduction

Total VMT reduction for this project is 9,599,280 one-way trips.

New trips accessing transit also differ. No new trips are generated by commuters catching the local bus. For Express Bus service, 10% are SOVs to the pick up point. BART riders average a 30% SOV ridership to the BART station. All of these new trips accessing transit hubs average 3 one-way miles. These new trips must all be added back into the calculation to determine the true cost effectiveness.

The total cost effectiveness ratio for the Transit Incentive program is $12,200/ton of emissions reduction. The emissions reduced include:
- ROG = 5.3 tons
- NOx = 6.58 tons
- PM = 2.06 tons
- CO2 = 4357.0

The cost savings for each transit participant equals:
For bus riders: 4.3 (trip length) X 2 (for round trip) X 90 (days/year) X $.36 (cost to drive per mile) = $139.32 per year

For BART riders: 27 (trip length) X 2 (for round trip) X 240 (days/year) X $.36 (cost to drive per mile) = $2332.80 per year

For Express bus riders: 46 (trip length) X 2 (for round trip) X 240 (days/year) X $.36 (cost to drive per mile) = $3,974.40 per year

For Amtrak/ACE train riders: 60 (trip length) X 2 (for round trip) X 240 (days/year) X $.36 (cost to drive per mile) = $10,368 per year

**Guaranteed Ride Home** (see Attachment E)
At a cost of $115,500 the GRH Program offers six free taxi vouchers or a rental car six times per year in the event of personal or family illness, a loss of a rideshare ride home, or unscheduled overtime. This program has 3,360 participants in an annually updated and purged database. It includes over 750 registered employment sites. The BAAQMD does not equate all registrants to be reduced trips, therefor only 1,680 (50% of the total) are considered participants for the purpose of calculating the effectiveness. As a result, the 3,360 total equals 1,680 multiplied by 2 for # one-way trips/day.

- 1,680 (participants) multiplied by 2 (one-way trip), multiplied by 240 days/year, multiplied by 34 (one-way miles) = 27,417,600 VMT reduction

An additional 336 new trips are added back into the formula (10% of the total trips accessing rideshare options to GRH), averaging 3 one-way miles. The GRH budget is $115,500 with a cost effectiveness which calculates to $2,858/ton of emissions reduction.

Emissions reductions include:
- ROG = 15.34 tons
- NOx = 19.08 tons
- PM = 5.99 tons
- CO2 = 12,650.7

For GRH participants: 34 miles (trip length) X 2 (for round trip) X 240 (days/year) X $.36 (cost to drive per mile) = $5875.20 per year

**Countywide Bicycle Rack/Locker Program** (see Attachment F)
The Countywide Bicycle Rack/Locker Program provides racks and lockers to both public and private locations throughout the County, with public agencies receiving priority. CC CAN maintains a waiting list annually for locations requesting bicycle infrastructure. With $36,000 available for this program (all of which goes toward capital costs only), many locations were able to be served. The project includes the installation of a total of: four wave racks with a 7 bike capacity; sixteen double lockers with a 32 bike capacity; and four 15 loop racks with a 60 bike capacity, totaling 99 spaces/participants. The BAAQMD default number of days of effectiveness for bicycle projects is 240 days/year. The average one-way bicycle commute trip is 3 miles.

- 99 (participants) multiplied by 2 (one-way trips), multiplied by 240 days/year, multiplied by 3 (one-way miles) = 142,560 VMT reduction/year, for a total of 2,851,200 total VMT reduction.

The overall cost effectiveness calculates to $25,585/ton of emissions reduction:
Emissions reductions include:
- The emissions reduced include:
  - ROG = .03 tons
  - NOx = .03 tons
PM = .01 tons
CO2 = 25.1
The cost savings for bicycle riders is: 3 (trip length) \times 2 (for round trip) \times 240 (days/year) \times \$0.36 (cost to drive per mile) = \$518.40 per year

SchoolPool Program (see Attachment G)
The SchoolPool Program provides ridematch services for schools in West/Central and East areas of Contra Costa County (public and private). In addition, since there is little, or no school busing in most districts, public bus tickets are offered to those students for whom a carpool doesn’t work. Since there are four bus operators in the County, tickets must be distributed based on the location of the school and the corresponding operator. The operators assist in providing specialized transit schedules indicating which routes serve which schools, and in some cases even time schedules. For those parents who wish for their students to try the bus, a $20 pass is given.

For those students who take the bus, it constitutes one trip to school, and one trip home. For those with non-siblings in carpools, it is actually four one-way trips. The parent drives the children to school, then drives home, and then the two way trip is repeated in the afternoon again. Based on follow-up surveys, about 25% of the four trips are reduced by parents either dropping children off on the way to work, or children getting home by some other means in the afternoon. Therefore for SchoolPoolers in a carpool, the number of trips saved is actually 3 one-way trips/day. In order to do the calculations to determine total VMT reduction:

- 450 (SchoolPoolers/participants) multiplied by 3 (one-way trips) added to 550 (bus riders), multiplied by 2 (one-way trips) multiplied by 180 days/year, multiplied by 4.3 (one-way miles) = 1,896,300 VMT reduction

The overall cost effectiveness calculates to $20,274/ton of emissions reduction:
Emissions reductions include:
- The emissions reduced include:
- ROG = 1.58 tons
- NOx = 1.58 tons
- PM = .41 tons
- CO2 = 864.7

The cost savings for SchoolPoolers is: 4.3 (trip length) \times 3 (for three one-way trips), \times 180 (days/year) \times \$0.36 (cost to drive per mile) = \$835.92 per year

As is evidenced by the descriptions above, there are not only many cost effectiveness and performance measures for TDM projects, but there are also many variables within each project which can affect the overall cost effectiveness. In addition, the methods listed here are only some of the many ways in which to determine cost effectiveness or on which to base performance. With the ability to quantify the effectiveness of each however, the importance of these Demand Management strategies becomes more supportable by being the necessary elements to complement roadway enhancement projects.
CONTRA COSTA COUNTY PLANNING COMMISSION
TUESDAY, OCTOBER 18, 2011

SUFISM REORIENTED RELIGIOUS SANCTUARY

I. INTRODUCTION

SUFSISM REORIENTED (Owner and Applicant), County Files LP08-2034 and MS09-0008: Applicant requests approval of a Land Use Permit AND Minor Subdivision as follows:

Land Use Permit # LP08-2034: This is a request for a Land Use Permit to allow construction of a new sanctuary on approximately 3.12 acres. The proposed project includes: (1) a 66,074 square foot sanctuary building that includes a prayer hall, administrative offices, a library, classroom, archives, art and music program space, and related ancillary uses. Approximately 46,074 square feet of the building would be located below ground, including the administrative offices, bookstore, art studio, art storage, chorus rehearsal, video and audio production, music mixing and scoring, reception area, multi-purpose room, film/video and photo library, a music, drama, and dance studio, a coat room, women’s and men’s restrooms, and a kitchen. The 46,074 square feet includes approximately 13,800 square feet as open areas referenced as a rotunda, plaza, and east and west galleries (hallway) and a grand staircase; (2) a request for parking reduction based on a Transportation Demand Management Program (TDM) which includes the promotion of carpool, shuttle service, pedestrian and secure bicycle parking; (3) the removal of approximately 58 trees and the planting of at least 165 new trees; (4) the excavation and removal of soil (approximately 40,000 cubic yards of soil) an estimated 3,300 truck load of soil to be exported; and (5) demolition of three existing single family residences.

Minor Subdivision # MS09-0008: The applicant requests approval of a minor subdivision for the merging of seven (7) lots into one (1) parcel to create approximately 3.12 acres. The project addresses are 11 White Horse Ct., 1354, 1360, 1364, 1366, and 1384 Boulevard Way within the unincorporated (Saranap) Walnut Creek area of Contra Costa County [Zoning: Single Family Residential, 10,000 square foot minimum parcels (R-10); (General Plan: Single Family Residential High Density (SH), (Census Tract: 3410.00) (Parcel Nos. 184-450-006, 007, 012, 031, 032, 033, 034) (Zoning Atlas page:N-13)]

II. RECOMMENDATION

Staff recommends that the County Planning Commission take the following actions:

A. ACCEPT the recommendation from the County Zoning Administrator regarding the adequacy and completeness of the Final Environmental Impact Report (Final EIR).
B. CERTIFY the Final Environmental Impact Report ("Final EIR") dated September 2011, finding it to be adequate and complete, finding that it has been prepared in compliance with the California Environmental Quality Act (CEQA) and the State and County CEQA Guidelines, and finding that it reflects the County’s independent judgment and analysis, and specify that the Community Development Division (located at 651 Pine Street, Martinez, CA) is the custodian of the documents and other material which constitutes the record of proceedings upon which this decision is based.

C. CERTIFY the contents of the Final EIR and that the information was reviewed and considered prior to making a decision on the project.

D. ADOPT CEQA findings that address environmental impacts and mitigation measures, and that adopt a Mitigation Monitoring and Reporting Program. (Exhibit A)

E. APPROVE the minor subdivision, County File #MS09-0008 and the land use permit, County File #LP08-2034 with a minor modification to Project Variant B, based on the CEQA Findings, Growth Management Standards and Land Use permit findings and subject to the attached conditions of approval (Exhibit B).

F. APPROVE the Final Transportation Demand Management Program (TDM) as set forth in the conditions of approval.

G. DIRECT staff to file a Notice of Determination with the County Clerk.

III. PROJECT BACKGROUND

The project sponsor has proposed to develop a religious facility (sanctuary building) on approximately 3.12 acres in the Saranap neighborhood of unincorporated Walnut Creek. The applicant is Sufism Reoriented, a non-profit religious corporation recognized by the State of California and the Federal government.

The proposed 66,074 square foot sanctuary building includes a prayer hall, administrative offices, a library/bookstore, classroom and art program space, and related ancillary uses. Approximately 46,074 square feet of the building would be located below ground, including the administrative offices, a library/bookstore, classroom, and art program space. A list of each space and the respective square footage is located on page 5 of the Transportation Demand Management Plan (Exhibit C).

The project site would be further developed with a plaza, parking area, and landscaping. Sufism Reoriented's current sanctuary is located at 1300 Boulevard Way. If this project is approved and the new sanctuary building is constructed, Sufism Reoriented would cease its use of 1300 Boulevard Way, selling or leasing that property to another unknown user.
The new Sufism Reoriented Sanctuary will contain a concourse level, mechanical mezzanine plan, and ground level floor plans. The parsonage residence will remain and three existing single family homes that either are renter occupied or vacant will be demolished.

The concourse level which is below ground will be approximately (46,074 square feet) and consist of office space, a square foot bookstore and storage, consortium rehearsal, storage and Art Studio, video posting, music scoring, reception area, multi-purpose room, film video and photo library, a music, drama and dance studio, a coat room, women and men restrooms, and a kitchen. In addition, approximately 13,800 square feet are open areas referenced as a rotunda, plaza, and east and west galleries (hallway), a grand staircase.

The mechanical mezzanine is concrete and above the concourse level and will contain the equipment for the building elevator, heating, ventilation and air conditioning system. No part of this space will be useable space for activities.

The ground level will be approximately (20,000 square feet) and is proposed for the Prayer Hall, art vault, library, and archives display, (3) three areas designated for prayer hall storage space, classroom and classroom storage space and the Murshida’s Office (spiritual leader). Below is page 5 from the Transportation Demand Management Plan which describes the uses and square footage.

**SUFISM REORIENTED**  
TRANSPORTATION DEMAND MANAGEMENT PLAN  
PAGE 5

a. **Prayer Hall**
The 5,000 square-foot prayer hall would have a capacity of 400 people and include a backstage area with storage for items, such as chairs and video equipment. The prayer hall would be used for worship and devotional gatherings, chorus rehearsals and occasional larger celebrations.

b. **Library**
The 2,656 square feet of library space includes book, film and audio storage for reference and in use in productions. The ground floor library would be used to read transcripts of classes and listen to CDs or watch DVDs of classes.

c. **Classroom**
The classroom space, 1,065 square feet, would be used for small class meetings.

d. **Offices**
This 3,095 square-foot area would be used regularly by Sanctuary staff and participants working on craft or computer projects.

e. **Murshida**
This 1,079 square-foot main office would be used for work and to meet with students.

f. **Plaza**
This 9,100 square-foot area would be used for large group dining often followed by live dramatic and musical skits.
g. **Video and Audio Rooms**
   This area that comprises a total of 2,750 square feet would be used to shoot videos, edit videos, mix recordings and attach sound track.

h. **Dance and Drama Studio**
   This 2,200 square-foot area would be used for drama, dance and music rehearsals and classes.

i. **Searchlight Bookstore**
   The 1450 square-foot bookstore would be open to the public Tuesday nights and Saturday and Sunday during the day.

Please refer to Figure 3 to view the site plan of the proposed Sanctuary site.

This is a hearing on the proposed Sufism Reoriented “New Sanctuary” project. The land use permit was submitted on July 3, 2008 and the minor subdivision for the merging of lots to create one parcel was submitted on June 15, 2009. Due to the submittal of over 3,000 letters from those who opposed and supported the project, the County Zoning Administrator elected to refer the projects to the planning commission for hearing, consideration and initial decision. The letters and petitions can be located on the County website at the following link:


On October 3, 2011, the Zoning Administrator at a public hearing recommended the County Planning Commission certify the Environmental Impact Report (EIR) along with a chart added to Volume I listing the changes from the Draft EIR in the Final EIR. Exhibit G includes two letters received requesting the Zoning Administrator to not certify the EIR and a transcript of other oral comments provided.

IV. **GENERAL INFORMATION**

A. **General Plan:** The property is currently designated SH (Single-Family Residential High Density) under the Land Use Element Map to the Contra Costa County General Plan (2005-2020).

B. **Zoning:** The sites are zoned R-10 (Single-Family Residential, 10,000 square feet minimum parcel sizes).

C. **CEQA Status:** The Department of Conservation and Development determined that an EIR was required for the project and distributed a Notice of Preparation (“NOP”) on March 9, 2010. The Draft EIR was released for public review on March 29, 2011. The initial comment period was scheduled for 45 days ending on May 13, 2011. A public hearing before the Zoning Administrator to receive comments on the Draft EIR was held.
on April 18, 2011. During the public hearing several members of the public requested an extension of the time. On April 26, 2011, the Department distributed a revised notice extending the period to receive comments to May 27, 2011.

The Final EIR was published and distributed in September of 2011. The EIR identified potentially significant environmental impacts that would occur if the project was implemented and recommended mitigation measures that would reduce all of the potentially significant impacts to less than significant levels. All mitigation measures are included within the Mitigation Monitoring and Reporting Plan attached to the CEQA findings, which describes the timing and responsibility for monitoring compliance with all mitigation measures. All mitigation measures are included in the conditions of approval. (Exhibit B)

D. **Surrounding Land Use and Settings:** The subject parcels are surrounded by single family and multiple family developments to the north. The multi family development directly abutting the subject parcels is a 36-unit apartment building. To the south is predominantly single-family residential development. To the east, is a mix of uses consisting of single family homes, the existing Sufism Reoriented worship facility, and various commercial developments leading into the City of Walnut Creek. To the west, is additional single family residential development leading into the City of Lafayette. The neighborhood is predominantly an established neighborhood within the Saranap community, and has mature trees and fully grown vegetation.

E. **Existing Site Description:** The subject land is relatively flat topographically with a slight two and half percent grade gently descending from the east towards the northwest and fronts on Boulevard Way. The project involves seven (7) parcels. Parcel 184-450-032 contains a single family residence referred to as the parsonage that will remain. Parcels 184-450-007, 012, and 006 also contain single family residences that are either renter-occupied or vacant. Currently, access to the parsonage is either by White Horse Court to Boulevard Way or by a private access easement to Warren Road. All other parcels are accessed via Boulevard Way. In addition to the residential development the parcels contain mature trees, a grass lawn and concrete paving for vehicular parking.

F. **Regulatory Programs:**

1. **Flood Hazards:** This project is within Flood Zone X. The project site is considered not within a flood hazard and will not be required to comply with the Floodplain Management Ordinance prior to the issuance of building permits.
2. **Active Fault Zone:** The project is not within the Alquist Priolo Zone. No faults cross the property. The nearest active Concord fault is mapped approximately 5 miles northeast of the site. The active Hayward fault is approximately 8 miles southwest of the site and the non-active Calaveras fault line is north of the Town of Danville.

3. **Noise Hazards:** The project sites range from less than 50 dBA to 63 dBA (noise levels) according to the noise contours within the County General Plan for the Walnut Creek area and the noise study. The highest range is due to vehicular traffic. The long term effect of the sanctuary would not increase the noise level beyond an unacceptable level however the construction related noise and vibration activity such as the construction activity used to excavate soil will be mitigated as identified under NOI-4.10-1 and 4.10-2 on page 4.10-11 and 12 of the Draft EIR.

4. **Previous Applications:**

The previous applications on various parcels consisted of the following:

A. **MS020007:** This application was approved on July 21, 2003 for a Vesting Tentative Map to subdivide approximately .67 acres into two parcels on parcel 184-450-007.

B. **LL020009:** This application was a request for a lot line adjustment that was submitted in error and subsequently withdrawn by the applicant for parcel 184-450-007.

C. **TP030034:** This application was approved on October 4, 2003 for the removal of 1 Elm Tree with a trunk size of 36-inches in diameter on parcel 184-450-007.

D. **ZI 87-35:** This application was a zoning violation in 1987 for the removal of inoperable vehicles and rubbish on site.

E. **ZI 8610:** This was approval of cleanup and remediation associated with a request for the Ultramar clean fuels project, Phase II, approved on April 23, 2002.

F. **VR011013:** This application for an 8-foot wall with a variance to the front property line was withdrawn on August 16, 2001.

G. **SD978125:** This application was for the removal of 6 trees and the development of an 8 lot residential subdivision involving 1360 and
1364 Boulevard Way. This application was withdrawn in 1998.

H. TP010008: This application was approved on March 20, 2001 for the removal of 1 tree near a fence on a vacant lot for parcel 184-450-029.

I. MS990005: This application was withdrawn on February 7, 2000 for the subdivision of approximately 1.34 acres into 3 parcels.

J. LL990006: A lot line adjustment was approved between parcels 184-450-013, 019, & 027 on April 13, 1999.

K. VR001088: This application was approved on February 16, 2001 for an 8 foot fence (concrete) with a 0-foot setback.

L. TP000008: This application was approved on May 4, 2000 for the removal of a Ash Tree 18" in diameter and denied for a 20" Oak on parcel 184-450-028.

V. PROPOSED PROJECT

The proposed New Sanctuary consists of the following components:

A. **Height:** The sanctuary would be located partially underground. The portion of the building which is visible at grade will be 35-feet in height from original grade and 33.5-feet in height from finished grade to the top of the proposed main (center) dome and approximately 20-feet from ground to the smaller domes.

B. **Construction and Grading:** Approximately two-thirds (46,074 square feet) of the building is proposed to be constructed underground. Extensive soil excavation will be required. An estimated 3,310 truck loads of soil are expected to be exported from the site (approximately 40,000 cubic yards of soil). The project proposes no pile driving activity. Excavation on the site would occur to a depth of approximately 18- feet on the east side and 23-feet on the west side. It is anticipated that excavation will take approximately 6 to 8 weeks and approximately 16 to 18 months to complete the entire project. The haul route would transport soils via Boulevard Way to State Route 24 and I-680 and on to the Acme Landfill in Martinez.

C. **Parcels of Land:** The Sufism Reoriented Sanctuary will merge (7) seven lots into (1) parcel of land for a combined acreage of approximately 3.12 acres.

D. **Design:** The Sanctuary will include 13 (thirteen) circular domes. (12 small domes will be constructed around 1 larger dome) with a height ranging from approximately 20- feet from grade to the top of the small domes and a maximum of 35-feet from grade to the
top of the larger dome. The color scheme is proposed to be an off-white color palette with a lot of natural light provided by skylights.

E. **Aesthetics:** The proposed “new sanctuary” architecture reflects the spiritual value of Sufism Reoriented with the emphasis on spaciousness, light, and openness as well as a sacred place of worship. The proposed architectural design is unique. It is circular in shape with 12 small and medium domes will be constructed around 1 larger dome. The architecture reflects the symbolic imitation of planets in the solar system.

F. **Transportation Demand Management (TDM) and Parking:** The County Code would require 125 parking spaces if there were no TDM program. The project sponsor proposes to construct 74 parking spaces and implement the TDM program to reduce the number of automobile trips to the project site. Sixty (60) parking spaces for general use will be a pervious grass surface and eleven (11) spaces will be a pervious concrete and the remaining (3) spaces are reserved for the parsonage. In lieu of the 51 additional spaces required and as part of the program, the project sponsor proposes members walking, bicycling, public transit, carpool, and a remote lot shuttle service as alternative modes of transportation to reduce to the number of vehicles on project site and number of vehicle trips.

G. **Landscaping and Circulation:** At the entrance the project sponsor proposes a marble plaza with a reflection pool with sidewalks made of permeable pavers that would circle the sanctuary. The replacement landscaping plan will consist of drought tolerant plants and trees after the removal of 58 trees with the replacement of 165. In addition, a six foot high perimeter wall will be constructed around the property boundaries.

H. **Size:** The proposed 66,074 square foot “new sanctuary” is to accommodate the activities of the members in one facility. Currently various activities and preparation of such activities take place in the private homes of the members. Having one facility for all activities and preparation on the same grounds as the Murshida (spiritual leader) parsonage is the primary objective of the project sponsor. Below is the list of programs from Table 3-1 of the EIR that are likely to occur.
Table 3-1 Program of Activities

<table>
<thead>
<tr>
<th>Use/Activity</th>
<th>Time of Year</th>
<th>Day(s)</th>
<th>Time</th>
<th>Participants (Estimate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night Classes</td>
<td>October – June</td>
<td>Friday</td>
<td>8:00 PM to 9:30 PM</td>
<td>357</td>
</tr>
<tr>
<td>Annual Celebration</td>
<td>4 days total in the month of March</td>
<td>Friday - Monday</td>
<td>Fri: 8:00 PM to 10:00 PM Sat: 8:00 PM to 10:30 PM Sun: 2:00 PM to 5:00 PM Mon: 8:00 PM to 9:00 PM</td>
<td>200-400</td>
</tr>
<tr>
<td>Rehearsals for Annual Celebration</td>
<td>February and March</td>
<td>Every day</td>
<td>Weekdays: 8:00 PM to 10:00 PM Weekends: 9:00 AM to 5:00 PM</td>
<td>100</td>
</tr>
<tr>
<td>Devotional Gatherings</td>
<td>October – June</td>
<td>Sunday</td>
<td>8:00 PM to 9:00 PM</td>
<td>200-250</td>
</tr>
<tr>
<td>Taverns (T)</td>
<td>5 days total between October and June</td>
<td>Thursday - Monday</td>
<td>6:30 PM to 10:00 PM</td>
<td>175</td>
</tr>
<tr>
<td>Ancillary Activities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration, cleaning, landscaping, day classes, bookstore</td>
<td>Year-round</td>
<td>Every day</td>
<td>9:00 AM to 6:00 PM</td>
<td>25</td>
</tr>
<tr>
<td>Review Classes</td>
<td>October-June</td>
<td>Thursday</td>
<td>8:00 PM to 9:00 PM</td>
<td>30-50</td>
</tr>
<tr>
<td>Chorus Rehearsals</td>
<td>October-June</td>
<td>Wednesday</td>
<td>8:00 PM to 9:00 PM</td>
<td>70</td>
</tr>
</tbody>
</table>

* - "Taverns" is a cabaret style dinner and musical drama performance for members. Taverns are not concurrent with any other use. Friday Night Classes and Sunday Devotional Gatherings are suspended when Taverns take place.

Letters Received Prior to Application Process

In summary, the majority of the opposition letters received prior to processing the above applications were concerned with the scale of the sanctuary in comparison to a 350 membership count; the style of architecture, soil movement and instability, removal of mature trees to maintain wildlife habitats, the reduced parking spaces yielding only 59.2 percent of the total requirement, the removal of residence, the feasibility of the TDM plan when in inclement weather, the decline of the request to install story poles, the flow of water on adjacent property and into Las Trampas Creek, widening of the private road to the parsonage, no sidewalks and narrow streets, excess traffic and vehicular speeds, and visual impact of the Saranap semi-rural character. While there are other comments the above were the most commonly expressed oral and written comments.

The majority of the concerns listed above were discussed within the Final Environmental Impact Report with the exception of the request for story poles. The County does not have an Ordinance which requires the installation of story poles. As the Final EIR explains, the photo
simulations prepared by the County’s sub-consultant was sufficient to provide an adequate analysis of aesthetic impacts.

The comments related to soil stability were discussed in Chapter 4.5, page 4.5-1 (Geology and Soils) of the Draft EIR. Appendix I consists of the Geotechnical Engineering Investigation report and foundation recommendations. The flow of water was discussed in Chapter 4.8 (Hydrology and Water Quality) page 4.8-1, this section describes surface waters and groundwater resources. Streets and sidewalks were addressed in Chapter 4.13 (Traffic and Circulation) p. 4.13-1 of the Draft EIR. All potentially significant impacts were mitigated and can be found in the Mitigation Monitoring Reporting Program. (Exhibit A)

In reference to the style of architecture and scale of the sanctuary, the architecture is an expression of Sufism Reoriented spiritual values and beliefs with emphasis on space, both physical and solar. A large portion approximately 13,800 square feet of the 46,074 square feet is dedicated to hallway space, a rotunda, and a grand staircase and the remaining square footage is dedicated toward the expression of religion through dance, music, and performances.

In April of 2009, the environmental review for the project was started and resulted in the preparation of an Environmental Impact Report (EIR). The treatment of Boulevard Way has been the subject of many discussions between the County and the applicant. The Draft EIR evaluates two “Project Variants” [A (applicant) and B (public works)] which differ mainly in terms of improvements to the Boulevard Way right-of-way frontage. Project Variant B with a modification to eliminate a crosswalk is the recommendation of the Public Works Department and included within the conditions of approval.

The key differences are shown below on Table 3-2, (page 3-9 of the Final EIR, Volume I- Revised Draft EIR).
Table 3-2 Project Variants: Key Differences

<table>
<thead>
<tr>
<th>Existing Conditions</th>
<th>Project Variant A</th>
<th>Project Variant B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of Boulevard Way eastbound lane</td>
<td>12 feet</td>
<td>12 feet</td>
</tr>
<tr>
<td>Traffic Control at Blvd./Kinney/Garden</td>
<td>Stop sign at Kinney Road and Garden Court</td>
<td>No change</td>
</tr>
<tr>
<td>Cross walks for pedestrians</td>
<td>None</td>
<td>None proposed by applicant - but required in Boulevard Way per Mitigation Measure 4.13-1.</td>
</tr>
<tr>
<td>Sidewalk Pedestrian Improvements</td>
<td>None</td>
<td>None proposed - but required along Boulevard Way frontage per Mitigation Measure 4.13-1.</td>
</tr>
<tr>
<td>Utility undergrounding and street lighting</td>
<td>Utilities above ground, no street lights along project frontage</td>
<td>None proposed</td>
</tr>
<tr>
<td>Sight-distance setback</td>
<td>None</td>
<td>None proposed, but required per Mitigation Measure 4.13-2.</td>
</tr>
<tr>
<td>Bus Pullout</td>
<td>None</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: Circlepoint, 2011.

VI. AGENCY COMMENTS or CONSULTATIONS

The Department of Conservation and Development received comments from a very large number of members of the community (public) and various local and county agencies prior to the preparation of the EIR (Environmental Impact Report) and at the beginning stages of processing the land use and minor subdivision applications. Approximately 3,296 letters...
letters of support and 566 were letters of opposition. No comments were received from the Parkmead Community Association.

On April 21, 2009, the Saranap Community Association (SCA) provided a letter stating that the letter (dated July 31, 2008) regarding the Project did not reflect the usual process followed by the Association to evaluate and discuss projects and was not authorized by the Association as a whole. In addition, the Association requested to reserve its comments and recommendation until the distribution of the Draft EIR. The comments provided by the Association during the distribution of the Draft EIR are referenced as Letter 73 on page 3-365 of the Final EIR.

On July 9, 2011, the SCA provided a letter in support of the Project. The Association raised two concerns as follows:

- Boulevard Way-Kinney Drive intersection: The Association oppose any changes to encourage speeding along either Boulevard Way or Kinney Drive and widening of Blvd. Way without stop signs.

- Pedestrian safety: The Association believes adding one or more crosswalks would not only make the area safer but more pedestrian and bicycle friendly.

Correspondence was received in response to the NOP (Notice of Preparation) filed on March 9, 2010, and the Draft EIR released with a Notice of Completion and Availability on March 29, 2011. The initial comment period was scheduled for 45 days ending on May 13, 2011 then extended to May 27, 2011. All correspondence received during the 59-day public comment period for the Draft EIR and all of the responses to those comments are included in the Final EIR dated September 2011. The NOP and Notice of Completion have also been attached as Exhibit E.

VII. SUMMARY OF ENVIRONMENTAL IMPACTS

The Draft EIR identified environmental impacts which would occur if the new sanctuary project was implemented. Potentially significant impacts mitigated to less than significant were identified in the following Draft EIR areas: Aesthetics, Air Quality, Geology and Soils, Hydrology and Water Quality, Noise, and Transportation and Traffic and Cumulative Impacts.

**Aesthetics:** discussed in detail in Draft EIR Section 4.1 (page 4.1-16) and in the Final EIR. The project would result in the potential for substantial nighttime lighting which could adversely affect nighttime views. All potentially significant impacts can be mitigated to a less-than-significant level.

**Air Quality:** discussed in detail in Draft EIR Section 4.2 (page 4.2-14) and in the Final EIR. The project construction would result in emission of particulate matter in the form
of dust and create objectionable odors affecting a substantial number of people. All potentially significant impacts can be mitigated to less than significant.

**Biological Resources:** discussed in detail in Draft EIR Section (page 4.3 -17) A potential purchase of neighboring property would trigger a County Fire Protection District requirement to widen the secondary road access to the project site from Warren Road. In addition, the removal of trees could have an adverse effect on special status species. All potentially significant impacts can be mitigated to less-than-significant.

**Cultural Resources:** discussed in detail in Draft EIR section 4.4 (page 4.4-9) Demolition of existing structures and/or construction activities could inadvertently uncover human remains or damage previously unidentified historical resources. All potentially significant impacts can be mitigated to less-than-significant impacts.

**Geology and Soils:** discussed in detail in Draft EIR Section 4.5 (page 4.5-11) The proposed Project variants could expose people and structures to potential adverse effects to seismic ground shaking, soil erosion or be located on expansive soils, soil instability on site and adjacent properties. All potentially significant impacts can be mitigated to less-than-significant levels.

**Hazards and Hazardous Materials:** discussed in detail in Draft EIR Section 4.7 (page 4.7-8) Demolition of existing structures on the site could result in release of lead, asbestos and other contaminants. All potentially significant impacts can be mitigated to less-than-significant levels.

**Hydrology and Water Quality:** discussed in detail in Draft EIR Section 4.8 (page 4.8-14) and the Final EIR Improvements could impact storm water flow and construction could contribute sediment to Las Trampas Creek affecting water quality. All potentially significant impacts can be mitigated to less-than-significant levels.

**Noise:** discussed in detail in Draft EIR Section 4.10 (page 4.10-11) construction activity could generate a temporary increase in noise. Construction and operational activities could temporarily expose persons or structures to excess ground borne vibration. All potentially significant impacts can be mitigated to less-than-significant.

**Traffic and Circulation:** discussed in detail in Draft EIR Section 4.13 (page 4.13-23) proposed reliance on a TDM program would increase the number of bicyclists and pedestrians along Blvd Way frontage and Project Variant A would not allow adequate stopping sight distance creating a significant impact regarding a potential safety concern. All potentially significant impacts, including the site distance-related impact, can be mitigated to less-than-significant.

**Utilities and Service Systems:** discussed in detail in Draft EIR Section 4.14 (page 4.14-10) the proposed project would generate an increase in demand for water supply over exiting
uses. All potentially significant impacts can be mitigated to less-than-significant.

All mitigation measures are included in the Mitigation Monitoring and Reporting Program (CEQA Findings - Exhibit A and the conditions of approval - Exhibit B)

**Public Comments:**

Approximately 90 letters and/or correspondences were received during the public comment period for the Draft EIR. Prior to the determination of completeness of the applicant's application and during the processing of the application the County received approximately 3,296 letters from residents and businesses who opposed or support the project. Only those comments received during the release of the Draft EIR and the public hearing held on April 18, 2011 during the 59 day comment period are included in the Final EIR.

Oral and written comments were received during the public hearing related to the Draft EIR held on April 18, 2011. The Final Environmental Impact Report (FEIR) responds to and incorporates the written comments submitted at the public hearing on April 18, 2011.

**VIII. STAFF ANALYSIS AND DISCUSSION**

**A. General Plan Compliance:** The General Plan for the project is Single Family Residential – High Density (SH). This designation allows between 5.0 and 7.2 single family units per net acre. Population density would normally range from about 12.5 to about 22 persons per acre with an average of 2.5 to 3 persons per household. However, secondary land uses permitted within the SH designation are permitted that are compatible with low density homes including childcare facilities, churches and other similar places of worship. The General Plan states the (R-10) zoning district is consistent with the (SH) designation.

The new sanctuary project is consistent with the General Plan designations.

**B. Zoning Compliance:** According to Sections 84-8.404 and 84-4.404 (3), the (R-10)-Single Family Residential Zoning District permits the construction and establishment of churches and religious institutions and parochial and private schools including nursery schools with the issuance of a land use permit. The project as described above in section IV of this staff report is consistent with County Codes for building height and setbacks.

**C. Traffic and Circulation:** The subject site fronts Boulevard Way, a public road, along its northerly and westerly boundaries and is located at the intersection with Kinney Drive and Garden Court, both public roads. The existing pavement width varies from approximately 20 to 40 feet along the project frontage of Boulevard Way.

There is an existing private access easement, White Horse Court, located on the subject site, but it is not expected to be used as access to the developed site. The Parsonage
structure will continue to gain access from Warren Road via an existing private access easement located on the adjacent properties to the east and south.

The project sponsor proposes two driveways off of Boulevard Way along the northerly boundary. The main entrance, which will be used as access to the parking lot, will be located approximately 180 feet east of the intersection with Garden Court and Kinney Drive. The second driveway is located at the easternmost frontage of Boulevard Way approximately 450 feet from the intersection and will primarily provide access for trash pickup.

D. Boulevard Way Precise Alignment: Boulevard Way is an arterial per the County General Plan for which a Precise Alignment (PA 3851-69) was adopted in 1969. It had provided for a four-lane facility with a 500-foot centerline radius curve through the intersection within an 84-foot wide ultimate right of way.

However, a smaller facility has been determined to be more appropriate for the traffic needs in the area. Therefore, a new Precise Alignment (PA 3851-00) was developed around year 2000 which provided for two 12-foot lanes, one 14-foot left-turn lane in the middle, and 5-foot bike lanes with a 300-foot radius curve through the intersection within a 68-foot right-of-way.

The 1969 Precise Alignment was rescinded in May 2010 by the Board of Supervisors based on a Public Works recommendation. Although the 2000 Precise Alignment has not been formally adopted by the Board of Supervisors, compliance with this precise alignment has in the past been the requirement for all land development projects along Boulevard Way in lieu of the more imposing 1969 alignment.

E. Frontage improvements requirements: After discussing the site constraints with the project sponsor, Public Works Department recommends that the frontage improvements along Boulevard Way shall at a minimum accommodate pavement (half-width) of 17-feet from the existing striped centerline of Boulevard Way, thus retaining the existing geometry and providing a 12-foot wide travel lane and a 5-foot wide paved shoulder. Existing utility poles would need to be relocated but not required to be placed underground. A 5-foot wide sidewalk shall be provided along the entire frontage and extend to the intersection of Warren Road. Sidewalk should be constructed monolithically with the new curb, but may meander around the utility poles, as needed. Conforming pavement would be required to fill the gap between the existing street and the new sidewalk South of the Project Site.

F. Right-of-way requirements: The current right of way half width along the project frontage of Boulevard Way is approximately 25 feet, as measured from the existing striped centerline. The proposed conditions of approval attached as Exhibit B require that the new right of way or public utility easement shall be 10 feet from the new face of curb; therefore, to accommodate the 17-foot wide pavement, the right of way shall be
minimum 27-foot wide (half-width). The sidewalk, bus pullout, and curb ramps must be contained within the public right of way.

G. Intersection control: Currently, the intersection features stop signs at two of its legs – at Garden Court and Kinney Drive. The traffic flow along Boulevard Way (which has 4500 daily trips) moves through the intersection without stopping.

The project sponsor’s consultant has suggested installing one stop sign on Boulevard Way at the southern leg of the intersection. The Public Works Department does not recommend this modification for the following reasons:

- Stop sign warrants are not met
- Reduction of the free flow of the main movement along Boulevard Way
- Increased traffic congestion along Boulevard Way
- Speed increase as drivers tend to make up time lost due to stopping
- Increased air pollution due to vehicle stopping and acceleration

H. Drainage: The project site is located within unformed Drainage Area 121. The property drains to three drainage areas, all of which drain to Las Trampas Creek.

Of the three drainage areas, one is of particular concern due to inadequate drainage system on the private property located at the southeast corner of Warren Road and Boulevard Way with a “marginal” outfall into Las Trampas Creek located on the same property. There is an approved minor subdivision (MS03-0015) at this property that is conditioned to upgrade this private drainage system. However, there has been no recent activity on that property.

The second area, which drains generally eastward along Warren Road, has an inadequate 12-inch culvert at Warren Road. This culvert will be replaced by the applicant with an 18-inch pipe. The rest of this drainage system appears to be adequate, including a section of a collapsed pipe recently replaced by a private owner.

The third area drains along Boulevard Way via storm drain system that appears to have sufficient capacity for the 10-year design storm.

A drainage report prepared by Aliquot Associates (dated January 3, 2011) shows that the applicant proposes to utilize pervious paving systems for the parking lot to reduce the stormwater runoff and maintain the post-project design flows below the pre-project levels. Since certain types of pervious paving systems become silted in and clogged over time, the project sponsor will be required to develop a long-term maintenance plan to guarantee the infiltration performance of these systems.

I. Transportation Demand Management (TDM): In accordance with Chapter 82-32 of the County Code, pertaining to Transportation and Demand Management, the project sponsor may qualify for reductions in off-street parking requirements. The conceptual
TDM program must identify measures that can be demonstrated to attain the trip reductions necessary to qualify for a parking reduction. The TDM requirement does apply to all development projects residential and non-residential. The intent and purpose of this Chapter is to further the goals of the General Plan, Bay Area Air Quality and Growth Management Standards. The project sponsor’s conceptualized TDM incorporates bicycle use, walking, transit, carpool, and van/shuttle service programs. Approximately 224 members live within one-half mile of the new site. In addition, the project sponsor has submitted a pledge from approximately 167 members who will walk to the new facility under all weather conditions. The vast majority of members live within one quarter mile of the Project site.

The Program of Activities shown on Table 3-1, page 3-6 indicates the days and time of activities that have had with the most membership attendance, and projects they will occur predominantly in the evenings around 8pm. Given the above information and in review of the Traffic Study prepared, the Final TDM meets the intent and purpose of the County code. The project sponsor will replace the conceptual TDM with a Final TDM pursuant to condition of approval #7. Specifically, the project sponsor shall perform the following:

A. Walking: Continue the written commitment of a substantial number of its members to walk to the site, particularly for special or regularly scheduled general membership events and any other events with similar attendance, (including but not limited to Friday and Sunday night activities, annual celebrations and taverns), as necessary to achieve goal (b).

B. Transit. Install bus stop(s) as shown on approved plans.

C. Bicyling: Install and maintain racks for 12 bicycles. Construct shower facilities as proposed in application.

D. Carpools: Continue to organize and use car pools for special or regularly scheduled general membership events and any other events with similar attendance (including but not limited to Friday and Sunday night activities, annual celebrations and taverns), as necessary to achieve goal (b). Register carpools and reserve on-site parking spaces for them.

E. Remote Lot Shuttle Service. Provide over-flow, off-site parking for large events with a minimum of parking for 54 vehicles with shuttle service to site as necessary to achieve goal (b). The off-site parking shall be located at the Lafayette School District property now leased to The Meher Schools. If that site becomes unavailable, applicant shall notify CDD and provide another off-site location or locations, within two miles of the site, for the parking of no fewer than 54 vehicles.

F. Van. Initially, the shuttle service shall continue to be provided in passenger cars. Within 30 days of written notice from CDD, based on a need demonstrated by monitoring reports or other evidence, Applicant shall purchase a van for the shuttle service.

Given the above information and in review of the Traffic Study prepared, the TDM will meet the intent and purpose of the County Code.
J. **Stormwater:** This project is required to be in compliance with Provision C.3 of the National Pollutant Discharge Elimination System (NPDES) Permit and the County's Stormwater Management and Discharge Control Ordinance (§1014). A Stormwater Control Plan dated February 17, 2009 was reviewed and determined to be preliminarily complete. A final Stormwater Control Plan must be submitted prior to issuance of building permits.

The newly-issued Municipal Regional Permit (MRP) has changed requirements that apply to projects that have not passed certain thresholds in the development process by specified dates. The MRP requires projects to comply with new regulations unless they have had funding committed and are scheduled to begin construction no later than December 1, 2012. **If funding has not been committed by and construction is not scheduled to begin by December 1, 2012, then the project may be required to implement “Low Impact Development” requirements by managing stormwater runoff through harvesting and reuse, infiltration or evapotranspiration, unless these methods are determined to be infeasible, in which case bioretention-type treatment (as is generally required under the superseded permit) may be employed.** Criteria for infeasibility and design criteria for harvest/reuse, infiltration and evapotranspiration, will be determined by reports that will be generated by permitees and subject to approval by the SFBRWQCB.

K. **Annexation to a lighting district:** Some of the subject parcels that are a part of the proposed development are annexed into the County Service Area L-100 Lighting District. Other parcels that make up this development proposal are not. Therefore, the project sponsor shall annex all parcels to Community Facilities District CFD 2010-1 for Countywide Street Light Financing.

**IX. CONCLUSION**

The project is consistent with the General Plan and zoning designations for the project. All environmental impacts would be mitigated to less-than-significant levels, the health and safety of the general public would not be threatened. Staff recommends that the County Planning Commission approve the project by adopting the recommendation as listed above in Section II.

**List of Exhibits**

A. CeQA Findings and Mitigation Monitoring Program
B. Land Use Permit Findings & Conditions of Approval
C. General Plan & Zoning Maps with Project Drawings
D. Notice of Preparation, Completion & Extension
E. Agency Comments
F. Oct. 3, 2011 ZA transcript & letters on EIR adequacy

S-18
Exhibit A

CEQA Findings

Mitigation Monitoring & Reporting Program
CEQA FINDINGS FOR COUNTY FILES # LP08-2034 AND # MS09-0008, SUFISM REORIENTED (Applicant and Owner).

A. Introduction.

The Contra Costa County Planning Commission adopts the following findings for certification of the EIR and approval of a modification of Variant B of the New Sanctuary For Sufism Reoriented project pursuant to the California Environmental Quality Act, California Public Resources Code, Sections 21000, et seq. the Guidelines for Implementation of CEQA, Title 14 of the California Code of Regulations, Sections 15000, et seq. ("CEQA Guidelines") and the County’s CEQA Guidelines.

Pursuant to Public Resources Code Section 21081 and CEQA Guidelines Section 15091, no public agency shall approve and carry out a project where an Environmental Impact Report (the “EIR”) has been certified, which identifies one or more significant impacts on the environment that would occur if the project is approved, unless the public agency makes one or more findings for each of those significant impacts, accompanied by a brief explanation of the rationale for each finding. The possible findings, which must be supported by substantial evidence in the record, are:

a. Changes or alterations have been required in, or incorporated into, the project that mitigation or avoid the significant impact on the environment.

b. Changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency.

c. Specific economic, legal, social, technological or other considerations make infeasible the mitigation measures or project alternatives identified in the EIR.

For those significant impacts that cannot be mitigated to below a level of significance, the public agency is required to find that specific overriding economic, legal, social, technological or other benefits of the project outweigh the significant impacts of the projects. The New Sanctuary for Sufism Reoriented Project did not present any significant impacts that cannot be mitigated below to a less-than-significant impact level.

B. Project and EIR.

The Project is a new religious facility (sanctuary) on approximately 3.12 acres in the Saranap neighborhood of unincorporated Walnut Creek. The Project includes a 66,074 square foot sanctuary building that includes a prayer hall, administrative offices, a library, classroom, archives, art and music program space, and related ancillary uses. Approximately 46,074 square feet of the building would be located below ground, including the administrative offices, bookstore, art studio, art storage, chorus rehearsal, video and audio post production, music mixing and scoring, reception area, multi-purpose room, film/video and photo library, a music, drama and dance studio, a coat room, women's and men's restrooms, and a kitchen. Approximately 13,800 square feet of the 44,074 square feet are open areas referenced as a rotunda, plaza, and east and west galleries (hallway), and a grand staircase.
The Project Site would be further developed with a plaza, parking area, and landscaping. Further details are provided in Chapter 3 of the EIR. The term “Project” as used in these findings refers to the Project as described in the EIR. That project has two variants: Variant A is the project as proposed by the applicant. Variant B adds frontage and additional sidewalk improvements recommended by the County Public Works Department. These findings pertain to approval of Variant B, slightly modified.

Sufism Reoriented’s current sanctuary is located at 1300 Boulevard Way. Upon construction of the new sanctuary, Sufism Reoriented would cease its use of 1300 Boulevard Way, selling or leasing that property to another unknown user.

The Department of Conservation and Development determined that an EIR was required for the project. Accordingly, the County, as lead agency for this Project, distributed a Notice of Preparation on March 9, 2010. The Draft EIR, State Clearinghouse Number 2010032038, was released for public review on March 29, 2011. The initial comment period was scheduled for 45 days ending on May 13, 2011. A public hearing before the Zoning Administrator to receive comments on the Draft EIR was held on April 18, 2011. During the public hearing several members of the public requested an extension of the time. On April 26, 2011, the Department distributed a revised notice extending the period to receive comments to May 27, 2011.

The Final EIR was published and distributed in September of 2011. The Zoning Administrator held a hearing on October 3, 2011 and recommended certification of the EIR. The Zoning Administrator recommended that a chart be prepared that indicates where revisions to text can be found in the Final EIR. On September 27, 2011, the applicant’s counsel submitted a letter addressing alternatives and identifying where in the “Final EIR Vol. I - Revised Draft EIR” revisions to the text of the Draft EIR could be found. The County’s consultant have peer-reviewed that chart, determined its accuracy, and County staff has made it available to the public online at http://www.cccounty.us/DocumentCenterii.aspx?FID=621.

The “EIR” as referenced in these findings includes the Draft EIR (and its appendices) as supplemented and revised by the Final EIR, and the Final EIR (and its appendices). The Final EIR contains a Volume 1 that restates and revises some text, figures and tables of the Draft EIR. When these findings refer to sections, tables, figures or text of the EIR, and unless the context clearly indicates otherwise, these findings refer to the revised versions in Volume I of the Final EIR.

The EIR identifies potentially significant environmental impacts that would occur if the project were implemented, and feasible mitigation measures would reduce all of the potentially significant impacts to less than significant levels. The EIR provides a comprehensive analysis of the Project’s impacts, and cumulative impacts to which the Project would contribute. The EIR includes responses to all written and oral comments received during the comment period, and provides adequate, good faith, and reasoned responses to all comments raising significant environmental issues. The EIR also addresses a reasonable range of alternatives. Evidence regarding the range of alternatives, and the evidence indicating that offsite and reduced development alternatives were not studied in detail because they would not achieve most of the project objectives is in the EIR and in the record. The Commission adopts the analysis and conclusions of the EIR and bases its decision upon the evidence referenced in the EIR and its
appendices. The Commission further concludes that in these unique circumstances the No Project/No Build alternative represents a reduced density and off-site alternative.

The Commission also finds that, while no projection of future circumstances can be certain, the program of activities in Table 3-1 represents a reasonable projection of future activities, and it is that reasonable projection that informed the analysis of impacts. This conclusion is based upon the information and analysis in the EIR and in the applicant’s letter of June 30, 2011. The conditions of approval and mitigation measures are tied to the proposed program of activities in that the conditions and mitigation measures ensure that there will likely be no greater or more severe significant impacts from actual activities than would occur from implementation of the program of activities in Table 3-1.

The comprehensive analysis in the EIR provides the Commission with the necessary information required by the California Environmental Quality Act (CEQA) to properly analyze and evaluate any and all of the potential environmental impacts of the Project.

Certification of EIR.

The Commission finds that the EIR has been completed in compliance with CEQA; that the Commission reviewed and considered the information contained in the EIR prior to approving the project; and the EIR reflects the County’s independent judgment and analysis.

No Recirculation Is Required.

CEQA Guidelines Section 15088.5 requires a lead agency to recirculate an EIR for further review and comment when significant new information is added to the EIR after public notice is given of the availability of the Draft EIR but before certification of the Final EIR. New information added to an EIR is not “significant” unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect that the project proponent declines to implement. The Guidelines provide examples of significant new information under this standard, which involve evidence of a new or more severe significant impact, all as more specifically set forth in section 1.3 of the EIR.

The Commission recognizes that the Final EIR incorporates information obtained since the Draft EIR was completed, and contains additions, clarifications, modifications, and other changes. These include information regarding trees that have grown since the original studies were undertaken in 2009, and additional information about drainage and hydrology contained in Appendix R and in the applicant’s June 30, 2011 submittal to the County. Various minor changes and edits have been made to the mitigation measures, text, tables and figures of the Draft EIR, as described in the Final EIR. Information that confirms the conclusions of the Draft EIR has been provided in response to comments, and mitigation measures have been edited for clarity, feasibility and to strengthen them. With respect to this information, the Commission adopts the conclusions and analysis of the EIR (especially section 1.3) based upon the evidence to which the EIR refers. This information confirms and provides additional support for the conclusions of the Draft EIR, and further confirms that impacts will remain less than significant.
The Commission also recognizes that the project that is approved varies slightly from Variant B of the Project studied in the EIR, as it incorporates mitigation measures, further refinements and details that have been developed since the Draft EIR was published, and reflects the factors regarding project refinement that are described in response to comment 21.3. The changes are environmentally beneficial or minor, and do not rise to the level of recirculation.

Based on the foregoing, and having reviewed the information contained in the EIR and in the documents comprising the administrative record the Commission finds that no significant new information has been added since public notice was given of the availability of the Draft EIR that would require recirculation of the EIR.

**Differences of Opinion Regarding Environmental Analysis.**

In making its determination to certify the Final EIR and to approve the Project, the Commission recognizes that the Project involves controversial environmental issues and that a range of technical and scientific opinion exists with respect to those issues. The Commission has acquired an understanding of the range of this technical and scientific opinion by its review of the Draft EIR, the comments received on the Draft EIR and the responses to those comments in the Final EIR, as well as other testimony, letters, and reports submitted for the record. The Commission recognizes that some of the comments submitted on the EIR, and at the hearing, disagree with the conclusions, analysis, methodology and factual bases stated in the EIR. The EIR was prepared by experts, and that some of these comments were from experts, thus creating an disagreement among experts. The Commission has reviewed and considered, as a whole, the evidence and analysis presented in the EIR and in the record, and has gained a comprehensive and well-rounded understanding of the environmental issues presented by the Project. In turn, this understanding has enabled the Commission to make its decisions after weighing and considering the various viewpoints on these important issues.

**Impact Conclusions and Mitigation Measures**

**Exhibit 1** (the summary of impacts, mitigation measures and resulting levels of significance that appears as Table 2-1 in the EIR) is attached to these findings and incorporated herein by reference. **Exhibit 1** summarizes the environmental determinations of the EIR about the Project’s impacts and describes mitigation measures. This exhibit does not attempt to describe the full analysis of each environmental impact contained in the EIR. Instead, **Exhibit 1** provides a summary description of each impact, describes the applicable mitigation measures identified in the EIR and adopted by the Commission, and states the Commission’s findings on the significance of each impact after imposition of the adopted mitigation measures. A full explanation of these environmental findings and conclusions can be found in the EIR. The Commission ratifies, adopts, and incorporates the analysis and explanation in the EIR, and ratifies, adopts, and incorporates in these findings the determinations and conclusions of the EIR relating to environmental impacts and mitigation measures. These findings are based upon the evidence contained in and referenced in the EIR, in staff reports, in the submittals from the applicant, and on the record as a whole.

**Exhibit 2** (the Mitigation, Monitoring and Reporting Program that appears as Chapter 4.0 in Volume II of the Final EIR) is attached to these findings, is hereby adopted by the Commission,
insofar as the mitigation measures pertain to Variant B, and is incorporated into these findings. The mitigation measures set forth in Exhibit 2 will feasibly reduce or avoid the potentially significant and significant impacts of the Project to less than significant levels, and will reduce some less-than-significant impacts as well. In adopting these mitigation measures, the Commission intends to adopt each of the mitigation measures identified by the EIR. Accordingly, in the event a mitigation measure recommended in the EIR and applicable to Variant B has inadvertently been omitted from Exhibit 2, such mitigation measure is hereby adopted and incorporated in these findings by reference. In addition, in the event the language describing a mitigation measure set forth in Exhibit 2 fails to accurately reflect the substance of the mitigation measures in the EIR due to a clerical error, the language of the mitigation measure as set forth in the EIR shall control, unless the language of the mitigation measure has been specifically and expressly modified by these findings. Some language has been modified to reflect County practices and procedures regarding department approval processes, and to reflect technical details of the project that do not substantively affect the mitigation of impacts.

The Commission finds that changes or alterations have been required in, or incorporated into, the Project which feasibly avoid or substantially lessen the significant environmental effects on the environment. As shown in Exhibit 2, primary responsibility for implementation, monitoring and enforcement of all mitigation measures except one lies with the County. The agency responsible for Mitigation Measure 4.14-1 is EBMUD. Other agencies may play a role in approving the project. For example, there may be consultation with the Regional Water Quality Control Board regarding stormwater plans and other water quality aspects of the Project, and resource agencies may become involved should any resource issues need their input as a result of pre-construction surveys. To these extent participation by other agencies involves discretionary approvals that implicate mitigation measures, and with respect to Mitigation Measure 4.14-1, the Commission finds that mitigation measures are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency.

In comments on the Draft EIR, various measures were suggested by commenters as proposed additional mitigation measures or modifications to the mitigation measures identified by the EIR. Some of the EIR’s mitigation measures were modified in response to such comments. Other comments requested minor modifications in mitigation measures identified in the Draft EIR, requested mitigation measures for impacts that were less than significant, or requested additional mitigation measures for impacts as to which the Draft EIR identified mitigation measures that would reduce the identified impact to a less-than-significant level; these requests are declined as unnecessary. With respect to the additional measures suggested by commenters that were not added to the EIR, the Commission adopts the reasons set forth in the responses to comments contained in the EIR as its grounds for rejecting adoption of these mitigation measures. The alternative and additional mitigation measures are not necessary to reduce impacts to a less than significant level, some would have imposed requirements on this Project that are not generally imposed on similar projects in the County, and some purported to address an impact that was not potentially significant.

C. The Administrative Record.

Various documents and other materials constitute the record upon which the Commission bases these findings and the approvals contained herein. These findings cite specific pieces of
evidence, but none of the Commission’s findings are based solely only those pieces of evidence. These findings are adopted based upon the entire record, and the Commission intends to rely upon all supporting evidence in the record for each of its findings.

The location and custodian of the documents and materials that comprise the record is Contra Costa County, Department of Conservation & Development, Attn: Lashun Cross, 651 Pine Street, 4th Floor – North Wing, Martinez, CA, 94553, telephone (925) 335-1210.
Exhibit 1

Summary of Impacts
### Table 2-1 Summary of Impacts and Mitigation Measures

<table>
<thead>
<tr>
<th>Environmental Impacts</th>
<th>Level of Significance Without Mitigation</th>
<th>Mitigation Measure</th>
<th>Level of Significance with Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aesthetics</strong></td>
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<tr>
<td>Impact 4.1-1: Either Project Variant would result in the potential for substantial nighttime lighting which could adversely affect nighttime views.</td>
<td>S</td>
<td>Mitigation Measure 4.1-1: The applicant shall submit a lighting plan and a photometric study which shall demonstrate, to the satisfaction of the Department of Conservation and Development, that no bare bulbs will be visible from offsite. The plan shall also demonstrate that no lighting will be directed across property lines, and all lighting visible from offsite – including spillover onto adjacent properties – will be compatible with offsite private and public right-of-way lighting in the vicinity. The plans shall reflect the effect of lighting both before and after proposed site landscaping achieves maturity. <strong>If needed, the plans may include recommendations for turning off lights at specific times to reduce effects to nighttime views.</strong></td>
<td>LTS</td>
</tr>
<tr>
<td><strong>Air Quality</strong></td>
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</table>
| Impact 4.2-1: Construction would result in emissions of fugitive dust. | S                        | Mitigation Measure 4.2-1: Prior to the approval of a grading plan, County DCD shall ensure that grading and demolition plans include the following measures for all phases of construction as recommended by BAAQMD to reduce the air quality impacts of particulate matter (PM$_{10}$ and PM$_{2.5}$) associated with grading and new construction:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered a minimum of two times per day;
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered; | LTS                                    |
Air Quality (continued)

**Impact 4.2-1,continued**

- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. No dry power sweeping shall be performed (i.e., prohibited);
- All vehicle speeds on unpaved roads shall be limited to 15 mph;
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as feasible possible. Building pads shall be laid as soon as feasible possible after grading unless seeding or soil binders are used;
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to two minutes. Clear signage shall be provided for construction workers at all access points;
- All construction equipment and haul trucks shall be maintained and properly tuned in accordance with manufacturer’s specifications. All construction equipment and haul trucks shall be checked by a certified mechanic and determined to be running in proper condition prior to operation; and
- A publicly visible sign shall be posted with the telephone number of the Construction Manager and BAAQMD to report dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD complaint line telephone number shall also be visible to ensure compliance with applicable regulations.

**Impact 4.2-2: Emissions of diesel exhaust during construction would exceed BAAQMD thresholds for NOx.**

**Mitigation Measure 4.2-2: Emissions of NOx from construction activities shall be limited to less than 54 pounds per day. This performance standard would be achieved by limiting vehicle miles travelled (VMT) for standard hauling trucks to 4,764 VMT per day.**
<table>
<thead>
<tr>
<th>Environmental Impacts</th>
<th>Level of Significance Without Mitigation</th>
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<tbody>
<tr>
<td><strong>Air Quality (continued)</strong></td>
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<tr>
<td><strong>Impact 4.2-2 continued</strong></td>
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<td>Assuming 13 cubic-yard-trucks and delivery to the Acme landfill, and assuming a round trip of 31.2 miles, this would mean that soil hauling would be capped at 74 60 round trips per day, which would extend the excavation schedule from an earlier projection by the applicant of 35 working days to 45 55 working days. If other sites at a different distance were identified to accept the fill, the schedule could be revised accordingly to fit within the same VMT limitation. However, all hauling trucks must use a haul route that leaves the project site, heads east on Boulevard Way, and enters Highway 24 near Mt. Diablo and Boulevard Way.</td>
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</table>

| Impact 4.2-3: The Project Variant ultimately selected could create objectionable odors affecting a substantial number of people during construction. | S | Mitigation Measure 4.2-3: Prior to the approval of a grading permit, County DCD shall verify that grading plans include a requirement that limits the allowable idling time of diesel-powered construction equipment to two minutes or less | LTS |

| Biological Resources | | | |
| **Impact 4.3-1: Potential future purchase of the adjacent Odell property would trigger a County Fire Protection District requirement to widen the existing secondary road providing access to the project site from Warren Road. This would result in the removal of and/or damage to several existing trees.** | S | Mitigation Measure 4.3-1: If the applicant purchases the Odell property, compliance with the CCCFPD condition to widen the secondary access drive to Warren Road shall be required. In compliance with Chapter 816-6.8002 of the Tree Protection and Preservation Ordinance, a permit shall be obtained for the removal of all protected trees. If the applicant purchases the Odell property after August 2012, a qualified arborist shall examine the property and the recommendations of the arborist reports dated June 22, 2009 and August 4, 2009, included as Appendix G to this EIR, to confirm and/or append to the conditions included in the earlier reports. | LTS |
Mitigation Measure 4.3-2a: Given the potential for occurrence of roosting bats on the project site, the Contra Costa County Department of Conservation and Development (DCD) shall require a qualified biologist to conduct pre-construction surveys for roosting bats prior to issuance of demolition permits.

If roosting bats are detected, DCD shall require that a qualified biologist, in consultation with the California Department of Fish and Game (CDFG), shall exclude/evict the bats prior to removal of the occupied structure or tree. Abandoned structures or trees that are proposed for removal shall be removed before ground-disturbing activities begin to avoid conflicts with potential nesting periods. Immediately prior to construction, DCD shall require another pre-construction survey to be conducted to detect presence and confirm absence of active nesting in the trees that will remain.

During the pre-construction survey, the qualified biologist may enact other measures to protect roosting bats on the project site. These measures must be followed throughout the pre-construction and construction period.

Mitigation Measure 4.3-2b: Given the potential for occurrence of special-status bird species on the project site and the possibility for overlap of demolition and tree removal with the nesting season, DCD shall require a qualified biologist to conduct pre-construction surveys for nesting birds prior to issuance of demolition permits and no more than one week prior to tree removal.

If an occupied bird's nest is detected, a buffer zone of 50 to 300 feet shall be implemented to protect adults and nestlings from construction disturbances. If occupied nests are detected, exclusion areas are required until young birds have fledged.
### Biological Resources (continued)

#### Impact 4.3-2, continued

During the pre-construction survey, the qualified biologist may enact other measures to protect raptors and birds on the project site. These measures must be followed throughout the pre-construction and construction period. Destruction of occupied nests would be in violation of the Migratory Bird Treaty Act (MBTA) and the CDFG Code.

<table>
<thead>
<tr>
<th>Environmental Impacts</th>
<th>Level of Significance Without Mitigation</th>
<th>Mitigation Measure</th>
<th>Level of Significance with Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact 4.3-3: Construction activities could disturb potential nesting habitat in trees that are not proposed for removal.</td>
<td>S</td>
<td>Implement Mitigation Measures 4.3-2a and 4.3-2b.</td>
<td>LTS</td>
</tr>
</tbody>
</table>

#### Cultural Resources

| Impact 4.4-1: Demolition of existing structures and construction activities could inadvertently damage previously unidentified historical, archaeological, and paleontological resources on the project site. | S | Mitigation Measure 4.4-1: **When demolition and site clearing activities are complete, a qualified archaeologist, hired by the applicant, shall reinspect the project site to ascertain whether clearance activities exposed any previously undetected archaeological resources.** In the event that any buried cultural (historical, archeological, and/or paleontological) resources are encountered, the Contra Costa County Department of Conservation and Development (DCD) shall ensure that construction, excavation, and/or grading activities within 100 feet of the find are temporarily halted until a qualified archaeologist or paleontologist, hired by the applicant, can assess the significance of the find and provide proper management recommendations to be incorporated in to the Project Variant ultimately selected. Prehistoric cultural materials include, but is not limited to, shell midden deposits, hearth remains, stone and/or shell artifacts, and/or burials. Historic materials, including but not limited to, whole or fragmentary ceramic, glass or metal objects, wood, nails, brick, or other materials may occur. | LTS |
### Cultural Resources (continued)

**Impact 4.4-1 continued**

On the project site in deposits such as old privies or dumps. If the site is found to contain significant cultural or paleontological resources (as determined by the CEQA Guidelines) by a qualified archaeologist or paleontologist, funding shall be provided by the applicant to identify, record, report, evaluate, and recover the resources as necessary. Construction within the area of the find shall not recommence until impacts to the cultural or paleontological resource are mitigated. Additionally, as required by Public Resources Code Section 5097.993, the applicant must inform project personnel that collection of any Native American artifact is prohibited by law.

**Impact 4.4-2: Construction activities could inadvertently uncover human remains.**

<table>
<thead>
<tr>
<th>Level of Significance Without Mitigation</th>
<th>Mitigation Measure</th>
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</thead>
</table>
| S                                      | Mitigation Measure 4.4-2: In accordance with Public Resource Code Section 5097.98, should human remains be found on the site at any time during pre-construction or construction activities, the Contra Costa County Department of Conservation and Development (DCD) shall ensure that no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains shall be disturbed until:

- The County Coroner in which the remains are discovered is contacted and determines that no investigation of the cause of death is required; and

- If the County Coroner determines the remains to be Native American then:

  1. The coroner shall contact the Native American Heritage Commission within 24 hours; | LTS |
Geology and Soils

| Impact 4.5-1: Either Project Variant could expose people and structures to potential adverse effects from strong seismic ground shaking. | S | Mitigation Measure 4.5-1: Prior to the issuance of a building permit, the County Building Official shall verify that plans incorporate the following CBC seismic site categorization and design coefficients, in conformance with the most recent version of the California Building Code as shown in the table below:: | LTS |
## Geology and Soils (continued)

### Impact 4.5-1 continued

<table>
<thead>
<tr>
<th>Environmental Impacts</th>
<th>Level of Significance Without Mitigation</th>
<th>Mitigation Measure</th>
<th>Level of Significance with Mitigation</th>
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</thead>
<tbody>
<tr>
<td><strong>Categorization/Coefficient</strong></td>
<td><strong>Design Value</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Class (Table 1613.5.2)</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.2 Second Spectral Response Acceleration, $S_0$ (Figure 1613.5(3))</td>
<td>1.5g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0 Second Spectral Response Acceleration, $S_1$ (Figure 1613.5(4))</td>
<td>1.6g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seismic Site Coefficient, $F_h$ (Table 1613.5.3(1))</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seismic Site Coefficient, $F_v$ (Table 1613.5.3(2))</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-period Transition Period, $T_1$ (Figure 22-6$^1$)</td>
<td>1.0</td>
<td></td>
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</tbody>
</table>

$^1$ From ASCE/SEI 7-05 (2006)


The County Building Official shall certify that a qualified geotechnical engineer has reviewed final plans and specifications for consistency with CBC and UBC design standards. The County Building Official shall verify that all pertinent recommendations of the geotechnical engineer are incorporated into final building plans.

### Impact 4.5-2: The project site is located on soil that could become unstable as a result of construction activities, and potentially result in instability on neighboring sites.

**Mitigation Measure 4.5-2a:** Prior to the issuance of a grading permit, where permitted by the owner or tenant in possession, the County Building Official shall direct the applicant or their contractor to complete the following actions:

- inspect existing structures/utilities to document any evidence of then existing damage, cracking, distortion, weaknesses in structural elements, deterioration, corrosion, excessive stress, overloading, or use of the structure in a manner which may not have been intended by its design prior to issuance of any...
construction permits. The inspection shall include an assessment of the condition of the following structures and facilities:

- the parsonage
- structures on neighboring properties adjacent to the project site
- Boulevard Way
- potentially affected utilities within the project site, as determined by a qualified engineer

All inspections and notations of pre-existing damages shall be thoroughly documented, to the extent permitted by the relevant owner or tenant in possession, prior to the issuance of a demolition or grading permit. Photographs and mapping, and reference markings or measurement points shall be established on critical or previously damaged structures/utilities to assist in determining whether any damage or movement has occurred as a result of construction.

Such inspections shall be completed before issuance of the grading permit and again, after construction of the building shell is substantially complete. To the extent required by Civil Code Section 832, the applicant shall be responsible to repair or compensate for damage caused by the project. The County Building Official shall, prior to issuance of an occupancy permit: (a) confirm that the applicant has undertaken a written obligation to repair or compensate for damage caused by the construction of the project as recommended by the architect of record, or has established procedures that assure such repairs will be made or such compensation will be paid; and (2)
**Geology and Soils (continued)**

**Impact 4.5-2 continued**

- confirm that any such repairs or payment of compensation is planned to be completed within a time frame the Official deems reasonable under the circumstances.

Where existing structures are in close proximity to the excavation, additional measures beyond pre-construction inspection, such as building underpinning, shall be required as determined by the geotechnical consultant.

Mitigation Measure 4.5-2b: Prior to the issuance of a grading permit, the County Geologist shall review the final plans to ensure that proposed excavation shoring and dewatering systems meet minimum performance requirements. These minimum performance requirements include:

a. Protect personnel that enter excavations;

b. Protect adjacent existing utilities, pavements, and structures;

c. Installation should not cause settlement or heave of the ground surface nor produce construction vibrations that could damage adjacent utilities or structures;

d. Prevent caving or lateral movement of excavation walls and associated loss of adjacent ground and adjacent ground surface settlement, even when subjected to construction vibration;

e. Prevent heave and or piping (boiling) of the excavation bottom; and

f. Where applicable, resist hydrostatic pressures and lateral loads for adjacent structural foundations, vehicular traffic, construction equipment, and spoils.

<table>
<thead>
<tr>
<th>Environmental Impacts</th>
<th>Level of Significance Without Mitigation</th>
<th>Mitigation Measure</th>
<th>Level of Significance with Mitigation</th>
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</table>

2-13
### Geology and Soils (continued)

**Impact 4.5-2 continued**

Mitigation Measure 4.5-2c: Prior to the issuance of a grading permit, the County Building Official shall ensure that grading plans show a requirement that a qualified geotechnical engineer monitor and document soil and groundwater conditions on an ongoing basis during excavation, grading, and construction. The geotechnical engineer shall anticipate changes and modifications to shoring systems and sloping (on the west side) in response to changes in soil and groundwater conditions. All sheeting and shoring shall be evaluated for stability by the geotechnical consultant prior to entry by personnel. The County Building Official and County Geologist shall review and consider the recommendations of the geotechnical engineer and incorporate any or all recommendations into final grading plans.

**Impact 4.5-3:** Either Project Variant would result in substantial soil erosion.

<table>
<thead>
<tr>
<th>Environmental Impacts</th>
<th>Level of Significance Without Mitigation</th>
<th>Mitigation Measure</th>
<th>Level of Significance with Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact 4.5-3</td>
<td>S</td>
<td>Incorporate Mitigation Measure 4.8-2.</td>
<td>LTS</td>
</tr>
</tbody>
</table>

**Impact 4.5-4:** Either Project Variant would be located on expansive soils that could create a risk to life and property.

<table>
<thead>
<tr>
<th>Environmental Impacts</th>
<th>Level of Significance Without Mitigation</th>
<th>Mitigation Measure</th>
<th>Level of Significance with Mitigation</th>
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</thead>
<tbody>
<tr>
<td>Impact 4.5-4</td>
<td>S</td>
<td>Mitigation Measure 4.5-4a: Prior to the issuance of a grading permit, the County Building Official shall ensure that plans for building foundations have been reviewed by a qualified geotechnical engineer to ensure measures are included to reduce potential future structural damage to the religious facility from expansive soils. Such measures shall include but are not limited to minimum requirements for the expansion potential of fill material, soil compaction, and soil moisture content. The County Building Official and County Geologist review and approval shall ensure that all pertinent recommendations of the geotechnical engineer are incorporated into final grading plans.</td>
<td>LTS</td>
</tr>
</tbody>
</table>
Reoriented Impact 4.5-4 continued

Greenhouse Gas Emissions

- There would be no significant impacts to greenhouse gas emissions.

Hazards and Hazardous Materials

| Impact 4.7-1: Demolition of existing structures on the site could result in the release of lead, asbestos, and other contaminants. | S | Mitigation Measure 4.7-1a: At least fifteen days prior to issuance of a demolition permit, a state certified contractor shall complete an asbestos and lead-based paint survey for all structures proposed for demolition that were constructed prior to 1980. The survey shall be submitted to the Department of Conservation and Development, Community Development Division for review and approval. If LBP or asbestos-containing materials are identified in the survey, they shall be removed from the site and properly disposed of in accordance with CAL/OSHA requirements:
  - Known or suspected asbestos-containing materials shall be abated by a certified asbestos abatement contractor in accordance with BAAQMD regulations and notification requirements.
  - Intact lead-based paint found to be secure (not flaking, peeling or cracked) may be discarded along with demolition debris during the demolition of the structure. | LTS |
Loose and peeling paint shall be disposed of as state and/or federal hazardous waste if the concentration of lead exceeds applicable waste thresholds.

- Hazardous wastes shall be appropriately managed, labeled, transported, and disposed of by trained workers in accordance with local requirements.

- The demolition and removal of materials potentially containing lead-based paint would be required to follow the CAL/OSHA Lead in Construction Standard, Title 8, California Code of Regulations (CCR).

- Other hazardous materials associated with buildings, such as fluorescent lights and electrical switches, shall be disposed of in accordance with DTSC hazardous waste regulations.

Mitigation Measure 4.7-1b: Prior to the issuance of grading or demolition permit, the County Building Official and Community Development Division shall review a Risk Management Plan prepared for the Project Variant ultimately selected by a qualified professional. The plan shall include, but is not limited to the following conditions:

- Should tanks, drums, free product, or other potential chemical hazards be encountered during excavation, the County, environmental consultant and the owner shall be consulted prior to proceeding. Excavated material shall be segregated and stockpiled in a designated area and covered in plastic. Stockpiles shall be maintained for profiling and disposal. A qualified environmental consultant shall take samples of each stockpile for analysis. Stockpiles and other hazardous wastes
### Hazards and Hazardous Materials (continued)

**Impact 4.7-1 continued**

- The contractor shall include specific information related to chemical hazards that could be present during the excavation. This information shall include, but shall not be limited to, the proper use of personal protective equipment (PPE), worker air monitoring, and action levels for use of PPE and stop work. Workers engaged in the excavation of petroleum-affected soil shall be trained per OSHA standards for hazardous waste operations and emergency response.

### Hydrology and Water Quality

**Impact 4.8-1:** Improvements, primarily the introduction of a parking area for 74 cars, could affect the quality of stormwater flowing from the project site.

<table>
<thead>
<tr>
<th>Level of Significance Without Mitigation</th>
<th>Mitigation Measure</th>
<th>Level of Significance with Mitigation</th>
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<tbody>
<tr>
<td>S</td>
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<td>LTS</td>
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</tbody>
</table>

Mitigation Measure 4.8-1a: Prior to the approval of a building permit, the County Department of Conservation and Development shall ascertain that final landscaping plans for the Project Variant ultimately selected shall:

- Be designed to minimize irrigation and runoff and to minimize use of fertilizers and pesticides that can contribute to stormwater pollution.
- Specify plantings within planters and swales that are tolerant of the sandy loam soils and periodic inundation.
- Include pest-resistant plants.
Hydrology and Water Quality (continued)

Impact 4.8-1 continued

- Include plantings appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency and plant interactions.

- Note that all on-site storm drain inlets shall be marked with the words “No Dumping! Drains to Creek” or similar language.

Mitigation Measure 4.8-1b: Prior to the approval of a building permit, the applicant shall submit a Final Storm Water Control Plan to the Public Works Department in general conformance with the Preliminary Drainage Report for review and approval. The Final Drainage Report and Storm Water Control Plan shall demonstrate use of GrassPave2 and pervious pavers or pervious concrete with comparable or better infiltration and storage capacity.

Mitigation Measure 4.8-1c: Prior to the approval of a building permit, the applicant shall submit a Maintenance Program to the Public Works Department. The Maintenance Program shall include procedures for maintaining the pervious surfaces employed within the project site in the Operation and Maintenance Plan of the SWCP. The Maintenance Program shall include the following measures:

- Landscaping grades shall follow a post-project Sediment Control Plan. Landscape areas shall be designed to drain away from pervious surfaces in the parking lot area wherever possible in order to curtail run-off from carrying silt onto the pervious pavements. The Sediment Control Plan would be included in the Storm Water Control Plan and grades directing water away from the parking lot area shall be shown on the Grading plan.
### Hydrology and Water Quality (continued)

<table>
<thead>
<tr>
<th>Environmental Impacts</th>
<th>Level of Significance Without Mitigation</th>
<th>Mitigation Measure</th>
<th>Level of Significance with Mitigation</th>
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<tbody>
<tr>
<td>Impact 4.8-1 continued</td>
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<tr>
<td>• The applicant shall engage an outside contractor experienced in maintenance of pervious pavers. The contractor will follow the procedures listed in the Operation and Maintenance Plan of the Storm Water Control Plan.</td>
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<tr>
<td>• Permeable paver surfaces will be kept clean of organic materials. Leaves and other organic material shall be swept and removed from the paver surfaces periodically when debris accumulates and weekly during the rainy season (October 15 to April 15), or as otherwise directed by the Public Works Department for any other wet times of the year.</td>
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<tr>
<td>• Periodic vacuuming should be used to clear out voids with conventional street sweepers or like equipment with vacuums and brushes, a minimum of two (2) times a year, but the actual required frequency will be determined by conditions of the site. With an interlocking paver system, additional aggregate fill material will be added after cleaning, if needed to return aggregate fill material to its initial installation levels.</td>
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<tr>
<td>• The landowner shall be obligated to comply with the Operation and Maintenance Plan and Agreement. The landowner’s maintenance obligations shall be reflected in such recorded documents as the County lawfully and routinely requires.</td>
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</table>

| Impact 4.8-2: During construction, excavated materials could contribute sediment to Las Trampas Creek that could adversely affect water quality. | S | Mitigation Measure 4.8-2: Prior to the issuance of a grading permit, the Public Works Department and the County Building Official shall approve a Storm Water Pollution Prevention Plan (SWPPP) prepared by the applicant. The SWPPP shall comply with current San Francisco Bay Regional Water Quality Control Board guidelines and shall adopt acceptable best management practices (BMPs) for control of sediment | LTS |
Hydrology and Water Quality (continued)

Impact 4.8-2 continued

and stabilization of erosion in the project area. The SWPPP shall include acceptable BMPs for the protection of water quality. **PWD shall ensure that the project site is annexed into Community Facilities District 14.**

Land Use and Planning

There would be no significant impacts to land use and planning.

Noise

<table>
<thead>
<tr>
<th>Impact 4.10-1: Construction activities could generate a temporary increase in noise in the project vicinity.</th>
<th>$</th>
<th>Mitigation Measure 4.10-1: The DCD shall ensure that applicant adheres to the following mitigation measures in order to generate the least noise impacts <strong>feasible</strong> during construction:</th>
</tr>
</thead>
<tbody>
<tr>
<td>All construction activities shall be limited to the hours of 8:00 AM to 5:00 PM, Monday through Friday, and shall be prohibited on state and federal holidays, <strong>except as provided below:</strong></td>
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</tr>
<tr>
<td>The applicant shall hold a pre-construction meeting with the job inspectors and the general contractor/onsite manager to confirm that all noise mitigation measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed prior to beginning construction;</td>
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<tr>
<td>The applicant shall notify neighbors within 300 feet of the construction area, at least 30 days in advance of extreme noise generating <strong>excavation and grading</strong> activities, about the estimated duration of the activity;</td>
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</tbody>
</table>
The applicant shall designate a construction noise coordinator who will be responsible for implementing the noise control measures and responding to complaints. This person's name and contact information shall be posted clearly around the project site and shall also be distributed to properties within 200 feet of the site boundaries. The construction noise coordinator shall be available during all times during construction activities and shall maintain a log of complaints. A copy of the log shall be provided to the DCD monthly on the 30th day of each month;

The applicant shall require construction contractors to limit noise generating construction activities as required by the DCD. No construction activities shall be allowed before 8 AM or after 5 PM, or on weekends without prior authorization of the Zoning Administrator, and no extreme noise generating excavation and grading shall be allowed after hours or on weekends and holidays;

The applicant shall require construction contractors to implement the following measures to reduce daytime noise due to construction activities:

- Equipment and trucks used for construction shall utilize the best available noise control techniques wherever feasible (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds, wherever feasible).
Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever feasible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is not feasible, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.

Stationary noise sources shall be located as far from adjacent receptors as feasible, and shall be muffled and enclosed within temporary sheds, insulation barriers, or other measures to the extent feasible.

Prior to the start of construction, the applicant shall construct a temporary sound barrier along those portions of the northern and southern property lines that do not, at the time of grading and construction, already have a wall that meets the following standards, to provide the maximum protection feasible for the residential uses to the north and south. The barriers can be constructed out of wood or other materials as long as they have a minimum surface weight of approximately 2.5 pounds per square foot. Possible materials include 1-1/8-inch-thick plywood or fully overlapping 1x redwood boards (1-1/2-inch thick total). The barriers would likely be 6 to 8 feet tall but this would be refined and approved by a qualified acoustician prior to the issuance of grading permits. Issues to consider when...
4.10-1 continued

**Impact 4.10-2: Construction and operational activities could temporarily expose persons or structures to excessive groundborne vibration.**

- Level of Significance Without Mitigation: S
- Mitigation Measure: Mitigation Measure 4.10-2: The DCD shall ensure that the applicant isolates the equipment in the mechanical well per the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Guidelines. ASHRAE is considered the industry standard for mechanical system design standards.
- Level of Significance with Mitigation: LTS

**Population and Housing**

There would be no significant impacts to population and housing.

**Public Services**

There would be no significant impacts to public services.

**Traffic and Circulation**

Impact 4.13-1: The proposed reliance on a TDM program would increase the number of pedestrians and bicyclists along the Boulevard Way frontage of the project site, thereby necessitating a sidewalk along this frontage.

- Level of Significance Without Mitigation: S
- Mitigation Measure: Mitigation Measure 4.13-1: If Project Variant A is ultimately selected and approved, the County Department of Conservation and Development and County Public Works Department shall verify that final plans incorporate a sidewalk on the Boulevard Way frontage similar to that incorporated in Project Variant B. Plans shall show the sidewalk along all project frontage and extending to Warren Road. Sidewalk plans shall conform to prevailing County standards.
- Level of Significance with Mitigation: LTS
**Traffic and Circulation (continued)**

**Impact 4.13-1 continued**

In addition, if Project Variant A is approved, prior to the approval of any building or grading permit, the County Department of Conservation and Development and County Public Works Department shall verify that final plans for the public right-of-way area show a north-south crosswalk at a location mutually acceptable to the aforementioned County departments and the applicant. The crosswalk shall conform to any pertinent state or County regulations regarding crosswalk location and safety. As appropriate, final plans for the crosswalk shall incorporate features to help reduce conflicts between vehicles and pedestrians. Such features may include but are not limited to signage advising motorists of the crosswalk, lighting at the crosswalk, and the use of contrasting color and/or reflective paint to improve nighttime visibility of the crosswalk area.

**Impact 4.13-2: Project Variant A would not allow for adequate stopping sight distance, thus creating a potential safety concern.**

Mitigation Measure 4.13-2: If Project Variant A is ultimately selected and approved, the County Department of Conservation and Development and County Public Works Department shall verify that final plans reflect the inclusion of adequate sight distance to the west of the project driveway. This can be achieved by relocating the proposed perimeter wall from its current location to the same location as shown in the plan for Project Variant B (Figure 3-8) and keeping the area north of the wall free of potential visual obstructions (trees or other tall vegetation).
### Utilities and Service Systems

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<thead>
<tr>
<th>Environmental Impacts</th>
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</thead>
<tbody>
<tr>
<td>Impact 4.14-1: The proposed sanctuary building would generate an increase in demand for water supply over existing uses on the project site.</td>
<td>S</td>
<td>Mitigation Measure 4.14-1: In the event of multiple drought years, the applicant shall comply with EMBUD's <em>then-applicable</em> Drought Management Program and reduce water usage by 20 percent. In the event of critical shortages (shortages of 25 percent or more), the applicant shall comply with reduction goals based on customer categories set by EBMUD.</td>
<td>LTS</td>
</tr>
</tbody>
</table>

### Cumulative Impacts

There would be no considerable contributions to cumulative impacts.

**Notes:**
- LTS = Less Than Significant
- S = Significant

**Source:** Circlepoint, 2011.
Exhibit 2

Mitigation Monitoring Reporting Program
### Table 4-1 Mitigation Monitoring and Reporting Program

<table>
<thead>
<tr>
<th>Environmental Impacts</th>
<th>Mitigation Measures</th>
<th>Responsible Agency</th>
<th>Timing</th>
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</thead>
<tbody>
<tr>
<td><strong>Aesthetics</strong></td>
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<tr>
<td>Impact 4.1-1: Either Project Variant would result in the potential for substantial nighttime lighting which could adversely affect nighttime views.</td>
<td>Mitigation Measure 4.1-1: The applicant shall submit a lighting plan and a photometric study which shall demonstrate, to the satisfaction of the Department of Conservation and Development, that no bare bulbs will be visible from offsite. The plan shall also demonstrate that no lighting will be directed across property lines, and all lighting visible from offsite - including spillover onto adjacent properties - will be compatible with offsite private and public right-of-way lighting in the vicinity. The plans shall reflect the effect of lighting both before and after proposed site landscaping achieves maturity. If needed, the plans may include recommendations for turning off lights at specific times to reduce effects to nighttime views.</td>
<td>Department of Conservation and Development and project applicant</td>
<td>Prior to issuance of grading or building permit or installation of outdoor lighting system, whichever occurs first</td>
</tr>
</tbody>
</table>

| **Air Quality**       |                     |                    |        |
| Impact 4.2-1: Construction would result in emissions of fugitive dust. | Mitigation Measure 4.2-1: Prior to the approval of a grading plan, County DCD shall ensure that grading and demolition plans include the following measures for all phases of construction as recommended by BAAQMD to reduce the air quality impacts of particulate matter (PM$_{10}$ and PM$_{2.5}$) associated with grading and new construction:  
  - All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered a minimum of two times per day;  
  - All haul trucks transporting soil, sand, or other loose material off-site shall be covered;  
  - All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. No dry power sweeping shall be performed (i.e., prohibited); | Department of Conservation and Development | Prior to the approval of a grading plan |
<table>
<thead>
<tr>
<th>Environmental Impacts</th>
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<th>Responsible Agency</th>
<th>Timing</th>
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<tbody>
<tr>
<td><strong>Air Quality (continued)</strong></td>
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</table>
| **Impact 4.2-1 continued** | - All roadways, driveways, and sidewalks to be paved shall be completed as soon as feasible. Building pads shall be laid as soon as feasible after grading unless seeding or soil binders are used;  
- All vehicle speeds on unpaved roads shall be limited 15 mph;  
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to two minutes. Clear signage shall be provided for construction workers at all access points;  
- All construction equipment and haul trucks shall be maintained and properly tuned in accordance with manufacturer's specifications. All construction equipment and haul trucks shall be checked by a certified mechanic and determined to be running in proper condition prior to operation; and  
- A publicly visible sign shall be posted with the telephone number of the Construction Manager and BAAQMD to report dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD complaint line telephone number shall also be visible to ensure compliance with applicable regulations. | | |
| **Impact 4.2-2: Emissions of diesel exhaust during construction would exceed BAAQMD thresholds for NOx.** | Mitigation Measure 4.2-2: Emissions of NOx from construction activities shall be limited to less than 54 pounds per day. This performance standard would be achieved by limiting vehicle miles travelled (VMT) for standard hauling trucks to 1,872 VMT per day. Assuming 13 cubic-yard-trucks and delivery to the Acme landfill, and assuming a round trip of 31.2 miles, this would mean that soil hauling would be capped at 60 round trips per day, which would extend the excavation schedule from an earlier projection by the applicant of 35 working days to 55 working days. If other sites at a different distance were identified to accept the fill, the schedule could be revised | Department of Conservation and Development | Approval of VMT calculations prior to excavation; VMT limitation during project construction |
### Environmental Impacts

#### Air Quality (continued)

<table>
<thead>
<tr>
<th>Impact 4.2-2 continued</th>
<th>Mitigation Measures</th>
<th>Responsible Agency</th>
<th>Timing</th>
</tr>
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<td>according to fit within the same VMT limitation. However, all hauling trucks must use a haul route that leaves the project site, heads east on Boulevard Way, and enters Highway 24 near Mt. Diablo and Boulevard Way.</td>
<td>Department of Conservation and Development</td>
<td>Prior to the approval of a grading plan</td>
</tr>
</tbody>
</table>

| Impact 4.2-3: The Project Variant ultimately selected could create objectionable odors affecting a substantial number of people during construction. | Mitigation Measure 4.2-3: Prior to the approval of a grading permit, County DCD shall verify that grading plans include a requirement that limits the allowable idling time of diesel-powered construction equipment to two minutes or less | Department of Conservation and Development | |

#### Biological Resources

| Impact 4.3-1: Potential future purchase of the adjacent Odell property would trigger a County Fire Protection District requirement to widen the existing secondary road providing access to the project site from Warren Road. This would result in the removal of and/or damage to several existing trees. | Mitigation Measure 4.3-1: If the applicant purchases the Odell property, compliance with the CCCFPD condition to widen the secondary access drive to Warren Road shall be required. In compliance with Chapter 816-6.8002 of the Tree Protection and Preservation Ordinance, a permit shall be obtained for the removal of all protected trees. If the applicant purchases the Odell property after August 2012, a qualified arborist shall examine the property and the recommendations of the arborist reports dated June 22, 2009 and August 4, 2009, included as Appendix G to this EIR, to confirm and/or append to the conditions included in the earlier reports. | Department of Conservation and Development and project applicant | If the applicant purchase the Odell property |

| Impact 4.3-2: Demolition and tree removal activities could have an adverse effect on special-status species including roosting bats that are potentially nesting in trees and/or abandoned buildings found on the project site, as well as migratory birds and raptors that may nest in mature trees. | Mitigation Measure 4.3-2a: Given the potential for occurrence of roosting bats on the project site, the Contra Costa County Department of Conservation and Development (DCD) shall require a qualified biologist to conduct pre-construction surveys for roosting bats prior to issuance of demolition permits. If roosting bats are detected, DCD shall require that a qualified biologist, in consultation with the California Department of Fish and Game (CDFG), shall exclude/evict the bats prior to removal of the occupied structure or tree. Abandoned structures or trees that are | Department of Conservation and Development | Prior to the issuance of demolition permits and throughout pre-construction and construction |
### Biological Resources (continued)

<table>
<thead>
<tr>
<th>Environmental Impacts</th>
<th>Mitigation Measures</th>
<th>Responsible Agency</th>
<th>Timing</th>
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<tbody>
<tr>
<td><strong>Impact 4.3-2 continued</strong></td>
<td>proposed for removal shall be removed before ground-disturbing activities begin to avoid conflicts with potential nesting periods. Immediately prior to construction, DCD shall require another pre-construction survey to be conducted to detect presence and confirm absence of active nesting in the trees that will remain. During the pre-construction survey, the qualified biologist may enact other measures to protect roosting bats on the project site. These measures must be followed throughout the pre-construction and construction period. Mitigation Measure 4.3-2b: Given the potential for occurrence of special-status bird species on the project site and the possibility for overlap of demolition and tree removal with the nesting season, DCD shall require a qualified biologist to conduct pre-construction surveys for nesting birds prior to issuance of demolition permits and no more than one week prior to tree removal. If an occupied bird’s nest is detected, a buffer zone of 50 to 300 feet shall be implemented to protect adults and nestlings from construction disturbances. If occupied nests are detected, exclusion areas are required until young birds have fledged. During the pre-construction survey, the qualified biologist may enact other measures to protect raptors and birds on the project site. These measures must be followed throughout the pre-construction and construction period. Destruction of occupied nests would be in violation of the Migratory Bird Treaty Act (MBTA) and the CDFG Code.</td>
<td>Department of Conservation and Development</td>
<td>Prior to the issuance of demolition permits</td>
</tr>
</tbody>
</table>

**Impact 4.3-3**: Construction activities could disturb potential nesting habitat in trees that are not proposed for removal. **Implement Mitigation Measures 4.3-2a and 4.3-2b.** **Department of Conservation and Development** **Prior to the issuance of demolition permits**
## Cultural Resources

### Impact 4.4-1: Demolition of existing structures and construction activities could inadvertently damage previously unidentified historical, archaeological, and paleontological resources on the project site.

**Mitigation Measure 4.4-1:** When demolition and site clearing activities are complete, a qualified archaeologist, hired by the applicant, shall reinspect the project site to ascertain whether clearance activities exposed any previously undetected archaeological resources. In the event that any cultural (historical, archeological, and/or paleontological) resources are encountered, the Contra Costa County Department of Conservation and Development (DCD) shall ensure that construction, excavation, and/or grading activities within 100 feet of the find are temporarily halted until a qualified archaeologist or paleontologist, hired by the applicant, can assess the significance of the find and provide proper management recommendations to be incorporated in the Project Variant ultimately selected. Prehistoric cultural materials include, but is not limited to, shell midden deposits, hearth remains, stone and/or shell artifacts, and/or burials. Historic materials, including but not limited to, whole or fragmentary ceramic, glass or metal objects, wood, nails, brick, or other materials may occur on the project site in deposits such as old privies or dumps. If the site is found to contain significant cultural or paleontological resources (as determined by the CEQA Guidelines) by a qualified archaeologist or paleontologist, funding shall be provided by the applicant to identify, record, report, evaluate, and recover the resources as necessary. Construction within the area of the find shall not recommence until impacts to the cultural or paleontological resource are mitigated. Additionally, as required by Public Resources Code Section 5097.993, the applicant must inform project personnel that collection of any Native American artifact is prohibited by law.

**Mitigation Measure:** Department of Conservation and Development

**Responsible Agency:** Department of Conservation and Development

**Timing:** When demolition and site clearing activities are complete, and during grading.

### Impact 4.4-2: Construction activities could inadvertently uncover human remains.

**Mitigation Measure 4.4-2:** In accordance with Public Resource Code Section 5097.98, should human remains be found on the site at any time during pre-construction or construction activities, the Contra Costa County Department of Conservation and Development (DCD) Department of Conservation and Development

**Responsible Agency:** In the event that human remains are found on the project site

**Timing:**
<table>
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<th>Environmental Impacts</th>
<th>Mitigation Measures</th>
<th>Responsible Agency</th>
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<tr>
<td><strong>Cultural Resources (continued)</strong></td>
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</table>

**Impact 4.4-2 continued**

shall ensure that no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains shall be disturbed until:

- The County Coroner in which the remains are discovered is contacted and determines that no investigation of the cause of death is required; and

- If the County Coroner determines the remains to be Native American then:
  1. The coroner shall contact the Native American Heritage Commission within 24 hours;
  2. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descended from the deceased native American; and
  3. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.

The landowners or their authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance if the following conditions occur:

- The NAHC is unable to identify a most likely descendant or the most likely descendant failed to make a recommendation within 24 hours after being notified by the commission;

- The descendent identified fails to make a recommendation; or
4.0 Mitigation Monitoring and Reporting Program

Cultural Resources (continued)

Impact 4.4-2 continued

- The landowners or their authorized representative reject the recommendation of the descendent, and the mediation by the NAHC fails to provide measures acceptable to the landowner.

Geology and Soils

Impact 4.5-1: Either Project Variant could expose people and structures to potential adverse effects from strong seismic ground shaking.

Mitigation Measure 4.5-1: Prior to the issuance of a building permit, the County Building Official shall verify that plans incorporate the following CBC seismic site categorization and design coefficients, in conformance with the most recent version of the California Building Code shown in the table below:

<table>
<thead>
<tr>
<th>Categorization/Coefficient</th>
<th>Design Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Class (Table 1613.5.2)</td>
<td>C</td>
</tr>
<tr>
<td>0.2 Second Spectral Response Acceleration, S₁ (Figure 1613.5(3))</td>
<td>1.5g</td>
</tr>
<tr>
<td>1.0 Second Spectral Response Acceleration, S₁ (Figure 1613.5(4))</td>
<td>1.6g</td>
</tr>
<tr>
<td>Seismic Site Coefficient, F₁ (Table 1613.5.3(1))</td>
<td>1.0</td>
</tr>
<tr>
<td>Seismic Site Coefficient, F₅ (Table 1613.5.3(2))</td>
<td>1.3</td>
</tr>
<tr>
<td>Long period Transition Period, T₁ (Figure 22-6)₁</td>
<td>1.0</td>
</tr>
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</table>

₁ From ASCE/SEI 7-05 (2006)

The County Building Official shall certify that a qualified geotechnical engineer has reviewed final plans and specifications for consistency with CBC and UBC design standards. The County Building Official shall verify that all pertinent recommendations of the geotechnical engineer are incorporated into final building plans.

County Building Official
Prior to the issuance of building permit
## Environmental Impacts

<table>
<thead>
<tr>
<th>Impact 4.5-2: The project site is located on soil that could become unstable as a result of construction activities, and potentially result in instability on neighboring sites.</th>
</tr>
</thead>
</table>

## Mitigation Measures

Mitigation Measure 4.5-2a: Where permitted by the owner or tenant in possession, the County Building Official shall direct the applicant or their contractor to complete the following actions:

- inspect existing structures/utilities to document any evidence of then-existing damage, cracking, distortion, weaknesses in structural elements, deterioration, corrosion, excessive stress, overloading, or use of the structure in a manner which may not have been intended by its design prior to issuance of any construction permits. The inspection shall include an assessment of the condition of the following structures and facilities:
  - structures on properties adjacent to the project site
  - Boulevard Way
  - potentially affected utilities within the project site, as determined by a qualified engineer

All inspections and notations of pre-existing damages shall be thoroughly documented, to the extent permitted by the relevant owner or tenant in possession, prior to the issuance of a demolition or grading permit by photographs and mapping, and reference markings or measurement points shall be established on critical or previously damaged structures/utilities to assist in determining whether any damage or movement has occurred as a result of construction.

Such inspections shall be completed before issuance of the grading permit and again, after construction of the building shell is substantially complete. To the extent required by Civil Code Section 832, the applicant shall be responsible to repair or compensate for damage caused by the project. The County Building Official shall, prior to issuance of an occupancy permit: (a) confirm that the applicant has undertaken a written obligation to repair or compensate for damage caused by the construction of the project as recommended by the architect of record, or has established procedures that assure such repairs will be made or such compensation will be paid;

## Responsible Agency

County Building Official

## Timing

Prior to the issuance of a grading permit
4.0 Mitigation Monitoring and Reporting Program

<table>
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<tr>
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<th>Mitigation Measures</th>
<th>Responsible Agency</th>
<th>Timing</th>
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</thead>
</table>
| **Geology and Soils (continued)** | and (2) confirm that any such repairs or payment of compensation is planned to be completed within a time frame the Official deems reasonable under the circumstances. Where existing structures are in close proximity to the excavation, additional measures beyond pre-construction inspection, such as building underpinning, shall be required as determined by the geotechnical consultant. Mitigation Measure 4.5-2b: Prior to the issuance of a grading permit, the County Geologist shall review the final plans to ensure that proposed excavation shoring and dewatering systems meet minimum performance requirements. These minimum performance requirements include:  
a. Protect personnel that enter excavations;  
b. Protect adjacent existing utilities, pavements, and structures;  
c. Installation should not cause settlement or heave of the ground surface nor produce construction vibrations that could damage adjacent utilities or structures;  
d. Prevent caving or lateral movement of excavation walls and associated loss of adjacent ground and adjacent ground surface settlement, even when subjected to construction vibration;  
e. Prevent heave and or piping (boiling) of the excavation bottom; and  
f. Where applicable, resist hydrostatic pressures and lateral loads for adjacent structural foundations, vehicular traffic, construction equipment and spoils. Mitigation Measure 4.5-2c: Prior to the issuance of a grading permit, the County Building Official shall ensure that grading plans show a requirement that a qualified geotechnical engineer monitor and | County Geologist | Prior to the issuance of a grading permit |
|                       |                                                                                      |                    |                               |

New Sanctuary for Sufism Reoriented
Final EIR – Volume II
### Environmental Impacts

**Mitigation Measures**

**Geology and Soils (continued)**

**Impact 4.5-2 continued.**

Document soil and groundwater conditions on an ongoing basis during excavation, grading, and construction. The geotechnical engineer shall anticipate changes and modifications to shoring systems and sloping (on the west side) in response to changes in soil and groundwater conditions. All sheeting and shoring shall be evaluated for stability by the geotechnical consultant prior to entry by personnel. The County Building Official and County Geologist shall review and consider the recommendations of the geotechnical engineer and incorporate any or all recommendations into final grading plans.

**Impact 4.5-3: Either Project Variant would result in substantial soil erosion.**

Incorporate Mitigation Measure 4.8-2.

**Impact 4.5-4: Either Project Variant would be located on expansive soils that could create a risk to life and property.**

Mitigation Measure 4.5-4a: Prior to the issuance of a grading permit, the County Building Official shall ensure that plans for building foundations have been reviewed by a qualified geotechnical engineer to ensure measures are included to reduce potential future structural damage to the religious facility from expansive soils. Such measures shall include but are not limited to minimum requirements for the expansion potential of fill material, soil compaction, and soil moisture content. The County Building Official and County Geologist review and approval shall ensure that all pertinent recommendations of the geotechnical engineer are incorporated into final grading plans.

Mitigation Measure 4.5-4b: Prior to the issuance of a building permit, the County Building Official shall ensure that plans are revised as necessary to show that foundations for the new facility consist of a reinforced concrete floor slab or a mat slab, consistent with recommendations of the County Geologist.

**Responsible Agency**

- The project applicant and the County Building Official

**Timing**

- Prior to the issuance of a grading permit

- Prior to the issuance of grading permits
Mitigation Measure 4.7-1a: At least fifteen days prior to issuance of a demolition permit, a state certified contractor shall complete an asbestos and lead-based paint survey for all structures proposed for demolition that were constructed prior to 1980. The survey shall be submitted to the Department of Conservation and Development, Community Development Division for review and approval.

If LBP or asbestos-containing materials are identified in the survey, they shall be removed from the site and properly disposed of in accordance with CAL/OSHA requirements:

- Known or suspected asbestos-containing materials shall be abated by a certified asbestos abatement contractor in accordance with BAAQMD regulations and notification requirements.
- Intact lead-based paint found to be secure (not flaking, peeling or cracked) may be discarded along with demolition debris during the demolition of the structure.
- Loose and peeling paint shall be disposed of as state and/or federal hazardous waste if the concentration of lead exceeds applicable waste thresholds.
- Hazardous wastes shall be appropriately managed, labeled, transported, and disposed of by trained workers in accordance with local requirements.
- The demolition and removal of materials potentially containing lead-based paint would be required to follow the CAL/OSHA Lead in Construction Standard, Title 8, California Code of Regulations (CCR).

Other hazardous materials associated with buildings, such as fluorescent lights and electrical switches, shall be disposed of in accordance with DTSC hazardous waste regulations.
4.0 Mitigation Monitoring and Reporting Program

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<th>Environmental Impacts</th>
<th>Mitigation Measures</th>
<th>Responsible Agency</th>
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<tr>
<td><strong>Hazard Mitigation Measures</strong></td>
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<tr>
<td>Impact 4.7-1 continued</td>
<td>Mitigation Measure 4.7-1b: Prior to the issuance of grading or demolition permit, the County Building Official and Community Development Division shall review a Risk Management Plan prepared for the Project Variant ultimately selected by a qualified professional. The plan shall include, but is not limited to the following conditions:</td>
<td></td>
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<td></td>
<td>- Should tanks, drums, free product, or other potential chemical hazards be encountered during excavation, the County, environmental consultant and the owner shall be consulted prior to proceeding. Excavated material shall be segregated and stockpiled in a designated area and covered in plastic. Stockpiles shall be maintained for profiling and disposal. A qualified environmental consultant shall take samples of each stockpile for analysis. Stockpiles and other hazardous wastes shall be appropriately managed, labeled, transported, and disposed of by trained workers in accordance with all applicable laws and regulations.</td>
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<td></td>
<td>- The contractor shall include specific information related to chemical hazards that could be present during the excavation. This information shall include, but shall not be limited to, the proper use of personal protective equipment (PPE), worker air monitoring, and action levels for use of PPE and stop work. Workers engaged in the excavation of petroleum-affected soil shall be trained per OSHA standards for hazardous waste operations and emergency response.</td>
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</table>

County Building Official and Community Development Division |
Prior to the issuance of grading or demolition permit
## Environmental Impacts

### Hydrology and Water Quality

<table>
<thead>
<tr>
<th>Impact 4.8-1: Improvements, primarily the introduction of a parking area for 74 cars, could affect the quality of stormwater flowing from the project site.</th>
<th>Mitigation Measure 4.8-1a: Prior to the approval of a building permit, the County Department of Conservation and Development shall ascertain that final landscaping plans for the Project Variant ultimately selected shall:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Be designed to minimize irrigation and runoff and to minimize use of fertilizers and pesticides that can contribute to stormwater pollution.</td>
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<td></td>
<td>- Specify plantings within planters and swales that are tolerant of the sandy loam soils and periodic inundation.</td>
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<td></td>
<td>- Include pest-resistant plants.</td>
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<td></td>
<td>- Include plantings appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency and plant interactions.</td>
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<tr>
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<td>- Note that all on-site storm drain inlets shall be marked with the words “No Dumping! Drains to Creek” or similar language.</td>
</tr>
<tr>
<td>Mitigation Measure 4.8-1b: Prior to the approval of a building permit, the applicant shall submit a Final Storm Water Control Plan to the Public Works Department in general conformance with the Preliminary Drainage Report for review and approval. The Final Drainage Report and Storm Water Control Plan shall demonstrate use of GrassPave2 and pervious pavers or pervious concrete with comparable or better infiltration and storage capacity.</td>
<td>Project applicant and Public Works Department Prior to the approval of a building permit</td>
</tr>
<tr>
<td>Mitigation Measure 4.8-1c: Prior to the approval of a building permit, the applicant shall submit a Maintenance Program to the Public Works Department. The Maintenance Program shall include procedures for maintaining the pervious surfaces employed within the project site in the Operation and Maintenance Plan of the SWCP. The Maintenance Program shall include the following measures:</td>
<td>Project applicant and Public Works Department Prior to the approval of a building permit</td>
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</table>
## Environmental Impacts

<table>
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<tr>
<th>Mitigation Measures</th>
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<tr>
<td>Landscaping grades shall follow a post-project Sediment Control Plan. Landscape areas shall be designed to drain away from pervious surfaces in the parking lot area wherever possible in order to curtail run-off from carrying silt onto the pervious pavements. The Sediment Control Plan would be included in the Storm Water Control Plan and grades directing water away from the parking lot area shall be shown on the Grading plan.</td>
</tr>
<tr>
<td>The applicant shall engage an outside contractor experienced in maintenance of pervious pavers. The contractor will follow the procedures listed in the Operation and Maintenance Plan of the Storm Water Control Plan.</td>
</tr>
<tr>
<td>Permeable paver surfaces will be kept clean of organic materials. Leaves and other organic material shall be swept and removed from the paver surfaces periodically when debris accumulates and weekly during the rainy season (October 15 to April 15), or as otherwise directed by the Public Works Department for any other wet times of the year.</td>
</tr>
<tr>
<td>Periodic vacuuming should be used to clear out voids with conventional street sweepers or like equipment with vacuums and brushes, a minimum of two (2) times a year, but the actual required frequency shall be determined by conditions of the site. With an interlocking paver system, additional aggregate fill material will be added after cleaning, if needed to return aggregate fill material to its initial installation levels.</td>
</tr>
<tr>
<td>The landowner shall be obligated to comply with the Operation and Maintenance Plan and Agreement. The landowner’s maintenance obligations shall be reflected in such recorded documents as the County lawfully and routinely requires.</td>
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<th>Environmental Impacts</th>
<th>Mitigation Measures</th>
<th>Responsible Agency</th>
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<tbody>
<tr>
<td>Hydrology and Water Quality (continued)</td>
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<tr>
<td>Impact 4.8-2: During construction, excavated materials could contribute sediment to Las Trampas Creek that could adversely affect water quality.</td>
<td>Mitigation Measure 4.8-2: Prior to the issuance of a grading permit, the Public Works Department and the County Building Official shall approve a Storm Water Pollution Prevention Plan (SWPPP) prepared by the applicant. The SWPPP shall comply with current San Francisco Bay Regional Water Quality Control Board guidelines and shall adopt acceptable best management practices (BMPs) for control of sediment and stabilization of erosion in the project area. The SWPPP shall include acceptable BMPs for the protection of water quality. PWD shall ensure that the project site is annexed into Community Facilities District 14.</td>
<td>The project applicant and the County Building Official</td>
<td>Prior to the issuance of a grading permit</td>
</tr>
</tbody>
</table>

Noise

Impact 4.10-1: Construction activities could generate a temporary increase in noise in the project vicinity. | Mitigation Measure 4.10-1: The DCD shall ensure that applicant adheres to the following mitigation measures in order to generate the least noise impacts feasible during construction: | County Department of Conservation and Development | During project construction |
| | | | |
| | * All construction activities shall be limited to the hours of 8:00 AM to 5:00 PM, Monday through Friday, and shall be prohibited on state and federal holidays except as provided below; | |
| | * The applicant shall hold a pre-construction meeting with the job inspectors and the general contractor/onsite manager to confirm that all noise mitigation measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed prior to beginning construction; | |
| | * The applicant shall notify neighbors within 300 feet of the construction area, at least 30 days in advance of excavation and grading activities, about the estimated duration of the activity; | |
### Environmental Impacts

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<th>Mitigation Measures</th>
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<td><strong>Noise (continued)</strong></td>
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**Impact 4.10-1 continued**

- The applicant shall designate a construction noise coordinator who will be responsible for implementing the noise control measures and responding to complaints. This person’s name and contact information shall be posted clearly around the project site and shall also be distributed to properties within 200 feet of the site boundaries. The construction noise coordinator shall be available during all times during construction activities and shall maintain a log of complaints. A copy of the log shall be provided to the DCD monthly on the 30th day of each month;

- The applicant shall require construction contractors to limit noise generating construction activities as required by the DCD. No construction activities shall be allowed before 8 AM or after 5 PM, or on weekends without prior authorization of the Zoning Administrator, and no excavation and grading activities shall be allowed after hours or on weekends and holidays;

- The applicant shall require construction contractors to implement the following measures to reduce daytime noise due to construction activities:
  - Equipment and trucks used for construction shall utilize the best available noise control techniques wherever feasible (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds).
  - Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or
### Environmental Impacts

<table>
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<th>Impact 4.10-1 continued</th>
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<td>Mitigation Measures</td>
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<td>Responsible Agency</td>
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**Noise (continued)**

- **Impact 4.10-1 continued**

  - Electrically powered wherever feasible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is not feasible, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.

  - Stationary noise sources shall be located as far from adjacent receptors as feasible, and shall be muffled and enclosed within temporary sheds, insulation barriers, or other measures to the extent feasible.

  - Prior to the start of construction, the applicant shall construct a temporary sound barrier along those portions of the northern and southern property lines that do not, at the time of grading and construction, already have a wall that meets the following standards, to provide the maximum protection feasible for the residential uses to the north and south. The barriers can be constructed out of wood or other materials as long as they have a minimum surface weight of approximately 2.5 pounds per square foot. Possible materials include 1-1/8-inch-thick plywood or fully overlapping 1x redwood boards (1-1/2-inch-thick total). The barriers would likely be 6 to 8 feet tall (but this would be refined and approved by a qualified acoustician prior to the issuance of grading permits). Issues to consider when determining the ultimate height, length, and location of the barriers are the actual construction practices, including equipment to be used and the location and duration.
### Environmental Impacts

**Noise (continued)**

<table>
<thead>
<tr>
<th>Impact 4.10-1 continued</th>
<th>Mitigation Measures</th>
<th>Responsible Agency</th>
<th>Timing</th>
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</thead>
<tbody>
<tr>
<td>Impact 4.10-2: Construction and operational activities could temporarily expose persons or structures to excessive groundborne vibration.</td>
<td>Mitigation Measure 4.10-2: The DCD shall ensure that the applicant isolates the equipment in the mechanical well per the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Guidelines. ASHRAE is considered the industry standard for mechanical system design standards.</td>
<td>County Department of Conservation and Development</td>
<td>During project construction</td>
</tr>
</tbody>
</table>

### Traffic and Circulation

| Impact 4.13-1: The proposed reliance on a TDM program would increase the number of pedestrians and bicyclists along the Boulevard Way frontage of the project site, thereby necessitating a sidewalk along this frontage. | Mitigation Measure 4.13-1: If Project Variant A is ultimately selected and approved, the County Department of Conservation and Development and County Public Works Department shall verify that final plans incorporate a sidewalk on the Boulevard Way frontage similar to that incorporated in Project Variant B. Plans shall show the sidewalk along all project frontage and extending to Warren Road. Sidewalk plans shall conform to prevailing County standards. In addition, if Project Variant A is approved, prior to the approval of any building or grading permit, the County Department of Conservation and Development and County Public Works Department shall verify that final plans for the public right-of-way area show a north-south crosswalk at a location mutually acceptable to the aforementioned County departments and the applicant. The crosswalk shall conform to any pertinent state or County regulations regarding crosswalk location and safety. As appropriate, final plans for the crosswalk shall incorporate features to help reduce conflicts between vehicles and pedestrians. Such features may include but are not limited to signage advising motorists of the crosswalk, lighting at the crosswalk, and the use of contrasting color and/or reflective paint to improve nighttime visibility of the crosswalk area. | County Department of Conservation and Development and County Public Works Department | If Project Variant A is ultimately selected and approved and prior to the approval of any building or grading permit |

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4-19
### Traffic and Circulation (continued)

| Impact 4.13-2: Project Variant A would not allow for adequate stopping sight distance, thus creating a potential safety concern. | Mitigation Measure 4.13-2: If Project Variant A is ultimately selected and approved, the County Department of Conservation and Development and County Public Works Department shall verify that final plans reflect the inclusion of adequate sight distance to the west of the project driveway. This can be achieved by relocating the proposed perimeter wall from its current location to the same location as shown in the plan for Project Variant B (Figure 3-8) and keeping the area north of the wall free of potential visual obstructions (trees or other tall vegetation). | County Department of Conservation and Development and County Public Works Department | If Project Variant A is ultimately selected and approved and prior to the approval of any building or grading permit |

### Utilities and Service Systems

| Impact 4.14-1: The proposed sanctuary building would generate an increase in demand for water supply over existing uses on the project site. | Mitigation Measure 4.14-1: In the event of multiple drought years, the applicant shall comply with EMBUD's then-applicable Drought Management Program. In the event of critical shortages (shortages of 25 percent or more), the applicant shall comply with reduction goals based on customer categories set by EBMUD. | EBMUD and the project applicant | In the event of multiple drought years |

Source: Circlepoint, 2011.
Exhibit B

Growth Management Standards
Land Use and Tree Permit Findings
Conditions of Approval
FINDINGS AND CONDITIONS OF APPROVAL FOR COUNTY FILES LP08-2034 and MS09-0008, SUFISM REORIENTED (Applicant and Owner).

A. General Plan Growth Management Element Performance Standards

1. **Traffic:** The County's Growth Management Plan (as part of voter approved Measure C) establishes that no traffic study is required when a project would add fewer than 100 vehicle trips during the peak hour of adjacent street traffic. However, should a project be expected to generate more than 100 peak hour trips a full transportation impact analysis would be required. The project sponsor submitted a Transportation Management Plan (TDM) for the reduction of parking spaces indicating the trip contribution would not exceed the CCTA threshold. As a result a traffic analysis was prepared for an understanding of traffic impacts in the neighborhood and effectiveness of the TDM program. The finding of the traffic study was that all intersections along Boulevard Way would continue to operate at acceptable conditions of (Level of Service) LOS B or better with small increases in daily volume during the AM and PM peak commute hours with project volumes but would continue to function within the capacity of the roadways.

2. **Water:** The project site is located within the service area of the East Bay Municipal Utilities District. Potential significant impacts mainly would result due to the “New Sanctuary” to generate an increase in demand for water supply over existing uses. The potential impacts would be mitigated to less-than-significant levels through implementation of the mitigation measure 4.14-1 described in the Draft EIR. All infrastructure and service to be reviewed and approved by the District.

3. **Sanitary Sewer:** The project site is served by the Contra Costa County Central Sanitary District. The project applicant intends to install and/or upgrade the existing infrastructure for the new facility. The project sponsor will be required to obtain the necessary permits from the District prior to issuance of any building permits from the County Building Inspection Division.

4. **Fire Protection:** The project site is within the service area of the Contra Costa County Consolidated Fire Protection District. The District has commented on the project in reference to the widening of a secondary access drive from Warren Road, hydrant locations, turnarounds, and paving systems for the facility. The project sponsor shall comply with all Fire District requirements for the proposed development.

5. **Public Protection:** The performance standard is 155 square feet of Sheriff’s station area and support facilities for every 1,000 members of the population. Implementation of the project would not create new housing opportunities or permanent new jobs, so no population growth is expected. Therefore, the facility would not result in an impact to the demand on public protection from the proposed use.

6. **Parks and Recreation:** Implementation of the project would not create new housing opportunities, so no population growth is expected, therefore no impact to existing parks
and recreation facilities. The completed landscaped grounds proposed for the sanctuary is an additional source for a park setting within the neighborhood.

7. Flood Control and Drainage: The site is located within Flood Zone X, which is not within the 100-year flood plain. The proposed project has been reviewed by the Public Works Department and shall be required to comply with their requirements for C.3 and drainage. Compliance with standard conditions of approval and the hydrology and water quality mitigation measures described in the Draft EIR would ensure the onsite and offsite drainage is adequate.

B. Land Use Permit Findings:

1. The proposed project as conditioned will not be detrimental to the health, safety and general welfare of the County.

Project Finding: The conditions of approval and mitigation measures will adequately mitigate and minimize all known health, safety, and general welfare impacts. These include implementation of the control measures to minimize construction related air pollutant emissions; pre-construction survey protection measures for animal species; protection of archaeological and paleontological resources. All potentially significant impacts will be mitigated for air quality, aesthetics, biological, cultural, geologic and soils, hazards and hazardous material hydrology and water quality, noise, traffic and circulation, and utilities and service systems. Based on above, the Sufism Reoriented “New Sanctuary” will not be detrimental to the health, safety, and general welfare of the County.

2. The proposed project as conditioned will not adversely affect the orderly development of the property within the County.

Project Finding: The proposed project will not adversely affect the orderly development in the area. The project site is located in the (SH) Single family residential High Density General Plan designation and the (R-10) Single Family Residential, 10,000 square foot minimum parcel sizes as designated by the County Zoning Code. The project is a secondary land use that is permitted within the SH designation upon the issuance of a land use permit. The proposed project is within the boundaries of existing developed parcels and will consolidate the existing parcels for construction. Implementation of the project would not adversely affect the orderly development of the property within the County.

3. The proposed project as conditioned will not adversely affect the preservation of the property values and protection of the tax base within the County.

Project Finding: Property values and the protection of the tax base within the County will not be adversely impacted by allowing the proposed project to be constructed on the existing parcels. The facility is a use that is compatible with the surrounding residential development with the granting of a land use permit. The project will help preserve the property value of the project site as a church facility without having a detrimental impact.
on other uses on site and within the community. The project will not change the current zoning or general plan land use designation of the site. Typically Religious facilities do not adversely affect the preservation of property values and tax base related to surrounding properties. There is no evidence that implementation of the project would adversely affect the preservation of property values and tax base related to surrounding properties.

4. The proposed project as conditioned will not adversely affect the policy and goals as set by the General Plan.

Project Finding: The project site is designated (SH) Single family residential high density under the County's General Plan Land Use designations. The purpose of the (SH) designation is to allow for residential development as a primary use and secondary uses such as home occupations, small residential care and childcare facilities, churches and other similar places of worship. The General Plan states that the designation is compatible with the R-10 zoning district. The R-10 zoning district allows religious facilities with a use permit. Hence, Sufism Reoriented sanctuary is a compatible use in the single family residential zoning designation.

5. The proposed project as conditioned will not create a nuisance and/or enforcement problem within the neighborhood or community.

Project Finding: The project’s conditions of approval and mitigation measures require reporting on the Transportation Demand program, a off-site parking agreement along with monitoring of the project by the Department of Conservation and Development and several conditions of approval will be in place to further ensure the proposed project would not create a nuisance and/or enforcement problem within the neighborhood. In addition, the project must comply with the building and zoning codes, which are designed to avoid the creation of nuisances. Based on the above, and because the proposal is a compatible use for the area and the General Plan, there is no substantial evidence that implementation of the project would create a nuisance or enforcement problem.

6. The proposed project as conditioned will not encourage marginal development within the neighborhood.

Project Finding: Sufism Reoriented operated at 1300 Boulevard Way for the past 20 years. This project has not encouraged marginal development. The proposed use permit for the facility would be privately owned and maintained. Therefore, there is no substantial evidence that the project will result in marginal development in the neighborhood.

7. That special conditions or unique characteristics of the subject property and its location or surroundings are established.

Project Finding: The applicant had indicated other parcels in the area are not available for the project or are not contiguous. Several hundred members of Sufism Reoriented
reside within one mile of the locations. In addition, the Murshida parsonage currently exists on this property. Hence, the proposed location is ideally suited for this facility. All parcels associated with this project are held by the project sponsor. The combination of above scenarios is already established and is also a unique characteristic of the area.

C. Minor Subdivision Findings

The advisory agency shall not approve a tentative map unless it shall find that the proposed subdivision, together with the provisions for its design and improvement, is consistent with the applicable general and specific plans required by law. When approving the tentative map for a minor subdivision, the advisory agency shall make findings as required concerning the fulfillment of construction requirements.

This Project if approved merges the existing adjacent parcels into one parcel, rather than subdividing an existing parcel into additional parcels. The merger is consistent with the General Plan, as the General Plan does not prohibit the resulting parcel size. Construction requirements are detailed in the attached conditions of approval. The application meets the requirements for a merger. The parcels are under common ownership, and the resulting parcel size conforms to General Plan and Zoning requirements.

D. Criteria for Review of the Tree Permit

1. Required Factors for Granting Permit. The County Planning Commission is satisfied that the following factors as provided by County Code Section 816-6.8010 for granting a tree permit have been satisfied as marked:

   a. ___ The arborist report indicates that the subject tree is in poor health and cannot be saved.

   b. ___ The tree is a public nuisance and is causing damage to public utilities or streets and sidewalks that cannot be mitigated by some other means.

   c. ___ The tree is in danger of falling and cannot be saved by some other means.

   d. ___ The tree is damaging existing private improvements on the lot such as a building foundation, walls, patios, decks, roofs, retaining walls, etc.

   e. ___ The tree is a species known to be highly combustible and is determined to be a fire hazard.

   f. ___ The proposed tree species or the form of the tree does not merit saving.
Findings & Conditions of Approval – LP08-2034 and MS09-0008

g. **X** Reasonable development of the property would require the alteration or removal of the trees and this development could not be reasonably accommodated on another area of the lot.

h. ___ The tree is a species known to develop weaknesses that affect the health of the tree or the safety of people and property. These species characteristics include but are not limited to short-lived, weak wooded and subject to limb breakage, shallow rooted and subject to toppling.

i. **X** Where the arborist or forester report has been required, and the Director of the Department of Conservation and Development is satisfied that the issuance of a permit will not negatively affect the sustainability of the resource.

j. ___ None of the above factors apply.

2. **Required Factors for Denying a Tree Permit.** The County Planning Commission is satisfied that the following factors as provided by County Code Section 816-6.8010 for denying (or modifying) a tree permit application have been satisfied as marked:

a. ___ The applicant seeks permission for the alteration or removal of a healthy tree that can be avoided by reasonable redesign of the site plan prior to project approval (for non-discretionary permits).

b. ___ It is reasonably likely that alteration or removal of a healthy tree will cause problems with drainage, erosion control, land suitability, windscreen, visual screening, and/or privacy and said problems cannot be mitigated as part of the proposed removal of the tree.

c. ___ The tree to be removed is a member of a group of trees in which each tree is dependent upon the others for survival.

d. ___ The value of the tree to the neighborhood in terms of visual effect, windscreen, visual screening, privacy and neighboring vegetation is greater than the hardship to the owner.

e. ___ If the permit involves trenching or grading and there are other reasonable alternatives including an alternate route, use of retaining walls, use of pier and grade beam foundations and/or relocating site improvements.

f. ___ Any other reasonable and relevant factors specified by the Director of the Department of Conservation and Development.

g. **X** None of the above factors apply.
CONDITIONS OF APPROVAL FOR COUNTY FILES #LP08-2034 AND #MS09-0008: SUFISM REORIENTED (APPLICANT AND OWNERS).

General/Administrative

1. This approval is to allow development of the Sufism Reoriented “New Sanctuary” project based on the following revised exhibits and documents:

   A. Land Use Permit application received on July 3, 2008 and revised supporting material received on July 31, 2008 and Minor Subdivision application received June 15, 2009 by the Community Development Division.

   B. Draft Environmental Impact Report and Appendices dated March 2011, as supplemented and revised by the Final Environmental Impact Report and Appendices (reports) dated September 2011.

   C. Mitigation Monitoring Reporting Program dated September 2011.

   D. Updated Transportation Demand Management Plan submitted in March 2009.

   E. Revised site plans, elevations, floor plans, sections, and topographic map submitted on July 1, 2009.


Indemnity/Hold Harmless Agreement

2. Upon approval of this Land Use Permit, the Applicant agrees to defend, indemnify, and hold harmless Contra Costa County and its agents, officers, and employees from any claim, action or proceeding against the County or its agents, officers, and employees to attack, set aside, void or annul this approval. The project sponsor also agrees to defend, indemnify, and hold harmless Contra Costa County and its agents, officers, and employees from any and all liability caused by negligent or wrongful acts of the project sponsor, its agents, or employees arising out of the issuance or exercise of this Land Use Permit or the interpretation of any of its provisions, and to pay all claims, damages, judgments, legal costs, adjuster fees, and attorney fees incurred by the County or its agents, officers, and employees related thereto. The project sponsor shall be entitled to select its own legal counsel in the defense of all such actions. The project sponsor shall submit a letter on company letterhead verifying acknowledgment and acceptance of this condition of approval.

Fees

Payment of Outstanding Application Processing Fees

3. This application is subject to an initial application deposit of $2,700 for the land use permit and $4,800 for the minor subdivision, which was paid with the application submittal, plus time, and material costs if the application review expenses exceed
100% of the initial deposit. **Any additional costs due must be paid within 60 days of the permit effective date or prior to use of the permit, whichever occurs first.**
The project sponsor may obtain current costs by contacting the project planner. If you owe additional fees, a bill will be sent to you shortly after permit issuance.

**Payment of CEQA Notice of Determination Filing Fee**

4. ___ ___ **Within two (2) business days of project approval,** the Project Sponsor shall pay the California Department of Fish & Game (CDFG) CEQA filing fee of $2,839.25. Payment of this fee is mandated by Assembly Bill 3158, which became effective on January 1, 1991. Pursuant to Fish & Game Code Section 711.4(c)(3), the project will not be operative, vested, or final, and any local permits issued for the project will be invalid until the fee is paid. If the fee is not paid by the date specified, then the 30-day statutory time limit to file a legal challenge against the approval will automatically extend to 180 days.

**Payment of Mitigation Monitoring Fees**

5. ___ ___ If the County elects to hire a third-party consultant to assist in monitoring the environmental mitigation measures set forth in the Final EIR and this permit, then the project sponsor shall be responsible for payment of all fees associated with the consultant’s contract.

**Permit Compliance**

**Application for Condition of Approval Compliance Verification**

6. ___ ___ **Prior to commencing construction-related activities, issuance of grading permits or issuance of building permits, whichever occurs first,** the project sponsor shall submit an application for Condition of Approval Compliance Verification. The initial deposit for a project of this size is $5,000, which is subject to staff time and materials costs. Should staff costs exceed the deposit, additional payment will be required. Submittals for this application shall include a checklist describing how each condition of approval has been or will be satisfied and applicable proof that each condition has been satisfied (i.e. appropriate documentation, plans, photographs, etc.). This application will remain active throughout the life of the project and additional submittals will be required to ensure compliance with each phase of the project (demolition, grading, building, reclamation, etc.).

**Transportation Demand Management Program (TDM)**

7. ___ ___ The TDM program shall be monitored periodically, a Final TDM Plan, and a TDM Program Monitoring Report (TDM PMR) shall be submitted to DCD for review by the County Zoning Administrator, or designee. Reporting requirements for the TDM PMR are established as follows:
TDM PMR Reporting: (Transportation Demand Management-Program Monitoring Report)

The first report shall be submitted to DCD no later than 3 months after the date of the issuance of Building Inspection final;

After the initial report submittal, subsequent reports are to be submitted to DCD every 6 months;

The frequency of TDM reporting to the Department of Conservation and Development (DCD) may be reduced administratively by the County Zoning Administrator, or designee, if over time it is demonstrated that the TDM program is performing successfully on a consistent basis. Requests for reporting modifications shall not be made sooner than 1 year after final build-out.

The contents of the TDM PMR shall include, but not be limited to:

Parking demand/on-site lot occupancy counts for no less than 3 Fridays, or any peak demand period during a non-special event (which ever has greater attendance), within the 6 month monitoring period;

Parking demand/on-site lot occupancy counts for the March special event and at least one rehearsal occurring February through March;

Walking and carpool pledge list (Updated TDM Plan – DCE, Attachment 1, Walking Program Participants) to be updated to reflect most accurate level of membership participation in these alternative transportation modes. The updated list shall be signed and dated by property owner/project applicant;

In the event the Zoning Administrator determines that the TDM program is not consistently successful in reducing parking demand, or the program is not enforced or reported, the County may consider revocation of the land use permit.

Off-site Parking Agreement

8. _____ The Project Sponsor shall maintain a written parking agreement with The Meher Schools for use of the parking lots for overflow parking for evening and weekend events held at the subject site. If the site becomes unavailable, the project sponsor shall notify Department of Conservation and Development and provide another off-site location within two miles of the site, for the parking of no fewer than 54 vehicles.

9. _____ The Project sponsor will provide for off-site pedestrian safety improvements along the pedestrian routes to the project site. These are necessary because the TDM Program in COA #7 cannot be safely accomplished unless the pedestrian routes to the project site are made safe. The pedestrian safety improvements will be made at
locations near the project site, as determined by the Contra Costa County Public Works Department in roadway improvements.

**Additional Requirements**

10. ____ No loudspeakers or amplified music shall be permitted outside the enclosed building.

11. ____ All on-site storage of excavated soil shall be covered and watered at least once per day or if necessary twice per day.

**Signage**

12. ____ No signs shall be permitted with the exception of a sign not exceeding 12 square feet in area for purposes of identification and announcement of church services. The design, color and location of the sign and any size modification shall be subject to Zoning Administrator review and approval. No interior illumination shall be allowed. Signage shall be a monument style.

**Submittal of Grading Plans**

13. ____ Prior to issuance of grading permits, the Project sponsor shall submit grading plans for review and approval by the County Zoning Administrator. The grading plans shall be compliant with the requirements of the County Code and shall incorporate all applicable mitigation measures identified in the Final EIR. The grading plans shall be accompanied with a $750 deposit.

14. ____ Haul routes shall be generally limited to those areas of the site which are proposed to be graded to avoid unnecessary disruption.

15. ____ The transporting of all debris material from the construction site shall be covered when in transition from project site to Landfill.

16. ____ This use permit is approved for a religious facility comprising of members and invited guests. The events at the facility may include night classes, annual celebrations, devotional gatherings, taverns, chorus rehearsals and other ancillary activities.

**Events**

17. ____ The facility shall not be leased or rented for special events. The dome lights shall be turned off at 11pm.

18. ____ The granting of this use permit does not allow Temporary Events, as defined in the Temporary Events Ordinance (County Code Chapter 82-44), except such events as are allowed subsequently by issuance of a temporary event permit pursuant to that Ordinance.
Parking

19. Prior to issuance of building permits, the Project Sponsor shall record a statement to run with the deeds to the property acknowledging the approved Final TDM program and on-site parking reduction to 74 parking spaces in lieu of 125 spaces is mandatory. Handicapped spaces shall be appropriately identified. The deed disclosure shall be subject to review and approval of the Zoning Administrator.

Site Inspections for Compliance

20. The Project sponsor shall allow staff of the Contra Costa County Department of Conservation & Development, California Department of Fish & Game, and any other responsible agency to conduct site inspections during construction and operation of the project in order to ensure compliance with approved permits, plans, and conditions of approval. Inspections shall be conducted at the discretion of said agencies. Discovery of noncompliance may be cause for commencement of proceedings to revoke this Land Use Permit, and for payment of applicable bonds.

Grading Bond

21. Prior to the issuance of a grading or building permit, a grading bond shall be required for the work necessary to carry out the recommendations of the soils engineer, reviewed and approved by the Building Inspection Division and Zoning Administrator. Sufficient subsurface information shall be provided to estimate the cost of the required soil improvements.

**Performance Bond Amount:** The amount of bond shall be based upon the number of cubic yards of material in excavation or fill, whichever is greater, plus the cost of all drainage and other protective devices or work necessary to eliminate geological hazards. That portion of the bond valuation based on the volume of material in excavation or fill shall be computed as set forth:

- Ten thousand cubic yards (7646 cubic meters) or less, one hundred (100) percent of the estimated cost of grading work; Over ten thousand cubic yards, one (100) hundred percent of the cost of the first ten thousand cubic yards, plus fifty percent of that portion in excess of ten thousand cubic yards.

- When the rough grading has been completed in conformance with the requirements of this code, the County Building Official may at his discretion consent to a proportionate reduction of the bond to an amount estimated to be adequate to ensure completion of the grading work, site development, or planting remaining to be performed. The cost referred in this section shall be estimated by the County Building Official.

**Performance bond- Conditions:** Every bond shall include the conditions that the principal shall comply with all the provisions of Article 716-4.12 of the County Code, applicable laws and regulations and all terms and conditions of this permit. No extension of time under the permit shall release the surety upon the bond.
Performance bond- Term: The term of each bond shall begin on the date of its posting and shall end on the satisfactory completion of the terms and conditions of the permit as evidenced by a certificate of completion, a copy of which will be sent to any surety on request.

Performance bond- Notice of default: Whenever the County Building Official finds that a default has occurred in the performance of any term or condition of any permit, he or she shall give written notice thereof to the principal and surety on the bond, stating the work to be done to achieve a safe and satisfactory condition, its estimated cost, and the period of time deemed reasonable and necessary to complete the work. If a cash bond has been posted and the notice of default has been given to the principal and if the principal does not comply within the specified time limit, the building official may use the deposited cash to have the required work done, by contract or other means to the discretion of the County Building Official.

If the County Building Official finds that a default has occurred in the performance of any term or condition of the permit, the surety, County Building Official, or any person employed on behalf of either shall have the right to go on the site to complete the required work or make it safe.

Restitution for Approved Tree Removal

22. Required Restitution for Approved Tree Removal - The following measures are intended to provide restitution for the trees that have been approved for removal.

A. Tree Restitution Planting/Irrigation Plan - Prior to issuance of a grading permit, building permit, or occupancy, the applicant shall submit a tree planting and irrigation plan prepared by a licensed arborist or landscape architect for the review and approval of the Zoning Administrator. The plan shall provide for the planting of at least 165 trees, minimum 24-gallons in size either on the owners property or within the area of the right of way easements with approval of the respective County agency. (Also, note below requirement that plans include a provision for other tree plantings for purposes of contingency restitution in the event that trees to be replanted are nonetheless damaged.) The plan shall be accompanied by an estimate prepared by a licensed landscape architect or arborist of the materials and labor costs to complete the improvements on the plan.

B. Required Security to Assure the Completion of Plan Improvements - Prior to issuance of a grading permit, building permit, or occupancy, the applicant shall submit a security (e.g., bond, cash deposit) that is acceptable to the Zoning Administrator. The bond shall include the amount of the approved cost estimate, plus a 20% inflation surcharge. Until evidence is submitted that the applicant has satisfactorily installed the required improvements, the County may hold the security for up to three years following the exercise of this permit.
C. **Initial Fee Deposit for Processing a Security** - The County ordinance requires that the applicant pay fees for all time and material costs of staff for processing a landscape improvement security (Code S-060B). At time of submittal of the security, the applicant shall pay an initial deposit of $100.

D. The landscaping and irrigation plan shall include select plants that will have foliage year-round that are endemic to the vicinity of the subject property. The plan shall comply with the state’s Model Water Efficient Landscape Ordinance, if the County’s Ordinance has been adopted, and verification of compliance shall accompany the plans.

**Merging of Parcels**

23. Prior to the issuance of a grading or building permit, the Project Sponsor shall provide documentation to the Public Works Department and Zoning Administrator, for the review and approval of the Zoning Administrator, the separate parcels have been merged and recorded.

**Monitoring of Groundwater**

24. A. Prior to requesting a building permit for the Sanctuary, the Project Sponsor shall submit a comprehensive plan for monitoring of groundwater levels. That plan shall be subject to review by the Peer Review Geologist and review/approval of the Zoning Administrator. The purpose of the monitoring plan is to ensure that fluctuations in the elevation of the water table are consistent with the criteria provided by the geotechnical engineers. If the water level begins to rise after the construction period, monitoring will allow early recognition of the changing water levels. That in turn would provide an opportunity to identify the source of the water (e.g. leaking utility pipes) and take corrective action.

B. The plan shall include (a) a map showing the location of monitoring stations, (b) provide details on the equipment and approaches to be used to measure water levels, (c) provide standards for the frequency of water level readings, (d) provide thresholds for notifying the geotechnical engineers of the situation, and (e) identify the responsible parties/staffing positions for compliance with the monitoring requirement.

C. The monitoring data shall be submitted to the Zoning Administrator and Public Works Department annually by July 1st. Monitoring shall go on for a period of at least 5 years beyond the certificate of occupancy. It may be extended if there is evidence of water levels that rise above elevation +222½ ft. (i.e. bathtub foundation)

D. After the construction period, it is anticipated that no groundwater will be pumped. If ultimately there is a need for pumping ground-water, no
groundwater may outfall into storm drainage facilities without first obtaining the approval of the Public Works Department. Prior to making a request to the Department for approval the Project Sponsor would need to provide data on the duration and maximum rate of pumping, along with water quality data and any other technical data that may be required by the Public Works Department.

**Mitigation Measures for Impacts to Aesthetic Resources**

25. _____ **Mitigation Measure 4.1-1.** The Project Sponsor shall submit a lighting plan and a photometric study which shall demonstrate, to the satisfaction of the Zoning Administrator, that no bare bulbs will be visible from offsite. The plan shall also demonstrate that no lighting will be directed across property lines, and all lighting visible from offsite – including spillover onto adjacent properties – will be compatible with offsite private and public right-of-way lighting in the vicinity. The plans shall reflect the effect of lighting both before and after proposed site landscaping achieves maturity. If needed, the plans may include recommendations for turning off lights at specific times to reduce effects to nighttime views.

**Mitigation Measures for Impacts to Air Quality**

26. _____ **Mitigation Measure 4.2-1.** Prior to the approval of a grading plan, County DCD shall ensure that grading and demolition plans include the following measures for all phases of construction as recommended by BAAQMD to reduce the air quality impacts of particulate matter (PM10 and PM2.5) associated with grading and new construction:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered a minimum of two times per day;
- All haul trucks transporting soil, sand, or other loose material offsite shall be covered;
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. No dry power sweeping shall be performed (i.e., prohibited);
- All vehicle speeds on unpaved roads shall be limited to 15 mph;
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as feasible. Building pads shall be laid as soon as feasible after grading unless seeding or soil binders are used;
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to two minutes. Clear signage shall be provided for construction workers at all access points;

- 13 -
- All construction equipment and haul trucks shall be maintained and properly tuned in accordance with manufacturer’s specifications. All construction equipment and haul trucks shall be checked by a certified mechanic and determined to be running in proper condition prior to operation; and

- A publicly visible sign shall be posted with the telephone number of the Construction Manager and BAAQMD to report dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD complaint line telephone number shall also be visible to ensure compliance with applicable regulations.

27. **Mitigation Measure 4.2-2.** Emissions of NOx from construction activities shall be limited to less than 54 pounds per day. This performance standard would be achieved by limiting vehicle miles traveled (VMT) for standard hauling trucks to 1,872 VMT per day. Assuming 13 cubic-yard-trucks and delivery to the Acme landfill, and assuming a round trip of 31.2 miles, this would mean that soil hauling would be capped at 60 round trips per day, which would extend the excavation schedule from an earlier projection by the project sponsor of 35 working days to 55 working days. If other sites at a different distance were identified to accept the fill, the schedule could be revised accordingly to fit within the same VMT limitation. However, all hauling trucks must use a haul route that leaves the project site, heads east on Boulevard Way, and enters Highway 24 near Mt. Diablo and Boulevard Way.

28. **Mitigation Measure 4.2-3** Prior to the approval of a grading permit, County DCD shall verify that grading plans include a requirement that limits the allowable idling time of diesel-powered construction equipment to two minutes or less.

**Mitigation Measures for Impacts to Biological Resources**

29. **Mitigation Measure 4.3-1:** If the project sponsor purchases the Odell property, compliance with the CCCFPD condition to widen the secondary access drive to Warren Road shall be required. In compliance with Chapter 816-6.8002 of the Tree Protection and Preservation Ordinance, a permit shall be obtained for the removal of all protected trees. If the project sponsor purchases the Odell property after August 2012, a qualified arborist shall examine the property and the recommendations of the arborist reports dated June 22, 2009 and August 4, 2009, included as Appendix G to this EIR, to confirm and/or append to the conditions included in the earlier reports.

**Mitigation for Impacts to Roosting Bats**

30. **Mitigation Measure 4.3-2a:** Given the potential for occurrence of roosting bats on the project site, the Contra Costa County Department of Conservation and Development (DCD) shall require a qualified biologist to conduct pre-construction surveys for roosting bats prior to issuance of demolition permits.
If roosting bats are detected, DCD shall require that a qualified biologist, in consultation with the California Department of Fish and Game (CDFG), shall exclude/evict the bats prior to removal of the occupied structure or tree. Abandoned structures or trees that are proposed for removal shall be removed before ground-disturbing activities begin to avoid conflicts with potential nesting periods. Immediately prior to construction, DCD shall require another pre-construction survey to be conducted to detect presence and confirm absence of active nesting in the trees that will remain.

During the pre-construction survey, the qualified biologist may enact other measures to protect roosting bats on the project site. These measures must be followed throughout the pre-construction and construction period.

31. ____ Mitigation Measure 4.3-2b. Given the potential for occurrence of special-status bird species on the project site and the possibility for overlap of demolition and tree removal with the nesting season, DCD shall require a qualified biologist to conduct pre-construction surveys for nesting birds prior to issuance of demolition permits and no more than one week prior to tree removal. If an occupied bird’s nest is detected, a buffer zone of 50 to 300 feet shall be implemented to protect adults and nestlings from construction disturbances. If occupied nests are detected, exclusion areas are required until young birds have fledged.

During the pre-construction survey, the qualified biologist may enact other measures to protect raptors and birds on the project site. These measures must be followed throughout the pre-construction and construction period. Destruction of occupied nests would be in violation of the Migratory Bird Treaty Act (MBTA) and the CDFG Code.

**Mitigation Measures for Impacts to Cultural Resources**

32. ____ Mitigation Measure 4.4-1a. When demolition and site clearing activities are complete, a qualified archaeologist, hired by the project sponsor, shall reinspect the project site to ascertain whether clearance activities exposed any previously undetected archaeological resources. In the event that any buried cultural (historical, archeological, and/or paleontological) resources are encountered, the Contra Costa County Department of Conservation and Development (DCD) shall ensure that construction, excavation, and/or grading activities within 100 feet of the find are temporarily halted until a qualified archaeologist or paleontologist, hired by the project sponsor, can assess the significance of the find and provide proper management recommendations to be incorporated into the Project Variant ultimately selected. Prehistoric cultural materials include, but is not limited to, shell middens deposits, hearth remains, stone and/or shell artifacts, and/or burials. Historic materials, including but not limited to, whole or fragmentary ceramic, glass or metal objects, wood, nails, brick, or other materials may occur on the project site in deposits such as old privies or dumps. If the site is found to contain significant cultural or paleontological resources (as determined by the CEQA Guidelines) by a
qualified archaeologist or paleontologist, funding shall be provided by the project sponsor to identify, record, report, evaluate, and recover the resources as necessary. Construction within the area of the find shall not recommence until impacts to the cultural or paleontological resource are mitigated. Additionally, as required by Public Resources Code Section 5097.993, the project sponsor must inform project personnel that collection of any Native American artifact is prohibited by law.

33. Mitigation Measure 4.4-2. In accordance with Public Resources Code Section 5097.98, should human remains be found on the site at any time during pre-construction or construction activities, the Contra Costa County Department of Conservation and Development (DCD) shall ensure that no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains shall be disturbed until:

- The County Coroner in which the remains are discovered is contacted and determines that no investigation of the cause of death is required; and

- If the County Coroner determines the remains to be Native American then:
  1. The coroner shall contact the Native American Heritage Commission within 24 hours;
  2. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descended from the deceased native American; and
  3. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.

The landowners or their authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance if the following conditions occur:

- The NAHC is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission;

- The descendent identified fails to make a recommendation; or

- The landowners or their authorized representative reject the recommendation of the descendent, and the mediation by the NAHC fails to provide measures acceptable to the landowner.
Mitigation Measures for Impacts Related to Geology and Soils

34. Mitigation Measure 4.5-1. Prior to the issuance of a building permit, the County Building Official shall verify that plans incorporate the following CBC seismic site categorization and design coefficients, in conformance with the most recent version of the California Building Code as shown in the table below:

<table>
<thead>
<tr>
<th>Categorization/Coefficient</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Class (Table 1613.5.2)</td>
<td>C</td>
</tr>
<tr>
<td>0.2 Second Spectral Response Acceleration, Ss (Figure 1613.5(3))</td>
<td>1.5g</td>
</tr>
<tr>
<td>1.0 Second Spectral Response Acceleration, S1 (Figure 1613.5(4))</td>
<td>1.6g</td>
</tr>
<tr>
<td>Seismic Site Coefficient, Fa (Table 1613.5.3(1))</td>
<td>1.0</td>
</tr>
<tr>
<td>Seismic Site Coefficient, Fv (Table 1613.5.3(2))</td>
<td>1.3</td>
</tr>
<tr>
<td>Long-period Transition Period, Tl (Figure 22-6)</td>
<td>1.0</td>
</tr>
</tbody>
</table>

1From ASCE/SEI 7-05 (2006)

The County Building Official shall certify that a qualified geotechnical engineer has reviewed final plans and specifications for consistency with CBC and UBC design standards. The County Building Official shall verify that all pertinent recommendations of the geotechnical engineer are incorporated into final building plans.

35. Mitigation Measure 4.5-2a. Where permitted by the owner or tenant in possession, the County Building Official shall direct the project sponsor or their contractor to complete the following actions:

- inspect existing structures/utilities to document any evidence of then existing damage, cracking, distortion, weaknesses in structural elements, deterioration, corrosion, excessive stress, overloading, or use of the structure in a manner which may not have been intended by its design prior to issuance of any construction permits. The inspection shall include an assessment of the condition of the following structures and facilities:
  - structures on properties adjacent to the project site
  - Boulevard Way
  - potentially affected utilities within the project site, as determined by a qualified engineer

All inspections and notations of pre-existing damages shall be thoroughly documented, to the extent permitted by the relevant owner or tenant in possession, prior to the issuance of a demolition or grading permit by photographs and mapping, and reference markings or measurement points shall be established on critical or previously damaged structures/utilities to assist in determining whether any damage or movement has occurred as a result of construction.
Such inspections shall be completed before issuance of the grading permit and again, after construction of the building shell is substantially complete. To the extent required by Civil Code Section 832, the applicant shall be responsible to repair or compensate for damage caused by the project. The County Building Official shall, prior to issuance of an occupancy permit: (a) confirm that the project sponsor has undertaken a written obligation to repair or compensate for damage caused by the construction of the project as recommended by the architect of record, or has established procedures that assure such repairs will be made or such compensation will be paid; and (2) confirm that any such repairs or payment of compensation is planned to be completed within a time frame the Official deems reasonable under the circumstances.

Where existing structures are in close proximity to the excavation, additional measures beyond pre-construction inspection, such as building underpinning, shall be required as determined by the geotechnical consultant.

36. **Mitigation Measure 4.5-2b.** Prior to the issuance of a grading permit, the County Geologist shall review the final plans to ensure that proposed excavation shoring and dewatering systems meet minimum performance requirements. These minimum performance requirements include:

- Protect personnel that enter excavations;
- Protect adjacent existing utilities, pavements, and structures;
- Installation should not cause settlement or heave of the ground surface nor produce construction vibrations that could damage adjacent utilities or structures;
- Prevent caving or lateral movement of excavation walls and associated loss of adjacent ground and adjacent ground surface settlement, even when subjected to construction vibration;
- Prevent heave and or piping (boiling) of the excavation bottom; and
- Where applicable, resist hydrostatic pressures and lateral loads for adjacent structural foundations, vehicular traffic, construction equipment and spoils.

37. **Mitigation Measure 4.5-2c.** Prior to the issuance of a grading permit, the County Building Official shall ensure that grading plans show a requirement that a qualified geotechnical engineer monitor and document soil and groundwater conditions on an ongoing basis during excavation, grading, and construction. The geotechnical engineer shall anticipate changes and modifications to shoring systems and sloping (on the west side) in response to changes in soil and groundwater conditions. All sheeting and shoring shall be evaluated for stability by the geotechnical consultant prior to entry by personnel. The County Building Official and County Geologist shall review and consider the recommendations of the geotechnical engineer and incorporate any or all recommendations into final grading plans.

38. **Mitigation Measure 4.5-4a.** Prior to the issuance of a grading permit, the County Building Official shall ensure that plans for building foundations have been reviewed by a qualified geotechnical engineer to ensure measures are included to
reduce potential future structural damage to the religious facility from expansive soils. Such measures shall include but are not limited to minimum requirements for the expansion potential of fill material, soil compaction, and soil moisture content. The County Building Official and County Geologist review and approval shall ensure that all pertinent recommendations of the geotechnical engineer are incorporated into final grading plans.

39. Mitigation Measure 4.5-4b. Prior to the issuance of a building permit, the County Building Official shall ensure that plans are revised as necessary to show that foundations for the new facility consist of a reinforced concrete floor slab or a mat slab, consistent with recommendations of the County Geologist.

Mitigation Measures for Impacts Related to Hazards and Hazardous Materials

40. Mitigation Measure 4.7-1a. At least fifteen days prior to issuance of a demolition permit, a state certified contractor shall complete an asbestos and lead-based paint survey for all structures proposed for demolition that were constructed prior to 1980. The survey shall be submitted to the Department of Conservation and Development, Community Development Division for review and approval. If LBP or asbestos-containing materials are identified in the survey, they shall be removed from the site and properly disposed of in accordance with CAL/OSHA requirements:

- Known or suspected asbestos-containing materials shall be abated by a certified asbestos abatement contractor in accordance with BAAQMD regulations and notification requirements.
- Intact lead-based paint found to be secure (not flaking, peeling or cracked) may be discarded along with demolition debris during the demolition of the structure.
- Loose and peeling paint shall be disposed of as state and/or federal hazardous waste if the concentration of lead exceeds applicable waste thresholds.
- Hazardous wastes shall be appropriately managed, labeled, transported, and disposed of by trained workers in accordance with local requirements.
- The demolition and removal of materials potentially containing lead-based paint would be required to follow the CAL/OSHA Lead in Construction Standard, Title 8, California Code of Regulations (CCR).
- Other hazardous materials associated with buildings, such as fluorescent lights and electrical switches, shall be disposed of in accordance with DTSC hazardous waste regulations.

41. Mitigation Measure 4.7.1b. Prior to the issuance of grading or demolition permit, the County Building Official and Community Development Division shall review a Risk Management Plan prepared for the Project Variant ultimately selected by a qualified professional. The plan shall include, but is not limited to the following conditions:

- Should tanks, drums, free product, or other potential chemical hazards be encountered during excavation, the County, environmental consultant and the owner shall be consulted prior to proceeding. Excavated material shall be segregated and stockpiled in a designated area and covered in plastic. Stockpiles
shall be maintained for profiling and disposal. A qualified environmental consultant shall take samples of each stockpile for analysis. Stockpiles and other hazardous wastes shall be appropriately managed, labeled, transported, and disposed of by trained workers in accordance with all applicable laws and regulations.

- The contractor shall include specific information related to chemical hazards that could be present during the excavation. This information shall include, but shall not be limited to, the proper use of personal protective equipment (PPE), worker air monitoring, and action levels for use of PPE and stop work. Workers engaged in the excavation of petroleum-affected soil shall be trained per OSHA standards for hazardous waste operations and emergency response.

Mitigation Measures for Impacts Related to Hydrology and Water Quality

42. ____ Mitigation Measure 4.8-1a. Prior to the approval of a building permit, the County Department of Conservation and Development shall ascertain that final landscaping plans for the Project Variant ultimately selected shall:
- Be designed to minimize irrigation and runoff and to minimize use of fertilizers and pesticides that can contribute to stormwater pollution.
- Specify plantings within planters and swales that are tolerant of the sandy loam soils and periodic inundation.
- Include pest-resistant plants.
- Include plantings appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency and plant interactions.
- Note that all on-site storm drain inlets shall be marked with the words “No Dumping! Drains to Creek” or similar language.

43. ____ Mitigation Measure 4.8-1b. Prior to the approval of a building permit, the project sponsor shall submit a Final Storm Water Control Plan to the Public Works Department in general conformance with the Preliminary Drainage Report for review and approval. The Final Drainage Report and Storm Water Control Plan shall demonstrate use of GrassPave2 and pervious pavers or pervious concrete with comparable or better infiltration and storage capacity.

44. ____ Mitigation Measure 4.8-1c. Prior to the approval of a building permit, the project sponsor shall submit a Maintenance Program to the Public Works Department. The Maintenance Program shall include procedures for maintaining the pervious surfaces employed within the project site in the Operation and Maintenance Plan of the SWCP. The Maintenance Program shall include the following measures:
- Landscaping grades shall follow a post-project Sediment Control Plan. Landscape areas shall be designed to drain away from pervious surfaces in the parking lot area wherever possible in order to curtail run-off from carrying silt onto the pervious pavements. The Sediment Control Plan would be included in the Storm Water Control Plan and grades directing water away from the parking lot area shall be shown on the Grading plan.
- The project sponsor shall engage an outside contractor experienced in maintenance of pervious pavers. The contractor will follow the procedures listed in the Operation and Maintenance Plan of the Storm Water Control Plan.
- Permeable paver surfaces will be kept clean of organic materials. Leaves and other organic material shall be swept and removed from the paver surfaces periodically when debris accumulates and weekly during the rainy season (October 15 to April 15), or as otherwise directed by the Public Works Department for any other wet times of the year.
- Periodic vacuuming should be used to clear out voids with conventional street sweepers or like equipment with vacuums and brushes, a minimum of two (2) times a year, but the actual required frequency shall be determined by conditions of the site. With an interlocking paver system, additional aggregate fill material will be added after cleaning, if needed to return aggregate fill material to its initial installation levels.
- The landowner shall be obligated to comply with the Operation and Maintenance Plan and Agreement. The landowner’s maintenance obligations shall be reflected in such recorded documents as the County lawfully and routinely requires.

45. **Mitigation Measure 4.8-2.** Prior to the issuance of a grading permit, the County Building Official shall approve a Storm Water Pollution Prevention Plan a (SWPPP) prepared by the applicant. The SWPPP shall comply with current San Francisco Bay Regional Water Quality Control Board guidelines and shall adopt acceptable best management practices (BMPs) for control of sediment and stabilization of erosion in the project area. The SWPPP shall include acceptable BMPs for the protection of water quality.

**Mitigation Measure for Impacts Related to Noise**

46. **Mitigation Measure 4.10-1.** The DCD shall ensure that project sponsor adheres to the following mitigation measures in order to generate the least noise impacts feasible during construction:
- All construction activities shall be limited to the hours of 8:00 AM to 5:00 PM, Monday through Friday, and shall be prohibited on state and federal holidays, except as provided below;
- The project sponsor shall hold a pre-construction meeting with the job inspectors and the general contractor/onsite manager to confirm that all noise mitigation measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed prior to beginning construction;
- The project sponsor shall notify neighbors within 300 feet of the construction area, at least 30 days in advance of excavation and grading activities, about the estimated duration of the activity;
- The project sponsor shall designate a construction noise coordinator who will be responsible for implementing the noise control measures and responding to complaints. This person’s name and contact information shall be posted clearly around the project site and shall also be distributed to properties within 200 feet of the site boundaries. The construction noise coordinator shall be available during all times during construction activities and shall maintain a log of complaints. A copy of the log shall be provided to the DCD monthly on the 30th day of each month;

- The project sponsor shall require construction contractors to limit noise generating construction activities as required by the DCD. No construction activities shall be allowed before 8 AM or after 5 PM, or on weekends without prior authorization of the Zoning Administrator, and excavation and grading activities shall be allowed after hours or on weekends and holidays;

- The project sponsor shall require construction contractors to implement the following measures to reduce daytime noise due to construction activities:

  1. Equipment and trucks used for construction shall utilize the best available noise control techniques wherever feasible (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds).

  2. Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever feasible possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is not feasible, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.

  3. Stationary noise sources shall be located as far from adjacent receptors as feasible possible, and shall be muffled and enclosed within temporary sheds, insulation barriers, or other measures to the extent feasible.

- Prior to the start of construction, the project sponsor shall construct a temporary sound barrier along those portions of the northern and southern property lines that do not, at the time of grading and construction, already have a wall that meets the following standards, to provide the maximum protection feasible for the residential uses to the north and south. The barriers can be constructed out of wood or other materials as long as they have a minimum surface weight of approximately 2.5 pounds per - square foot. Possible materials include 1-1/8-inch-thick plywood or fully overlapping 1x redwood boards (1-1/2-inch thick total). The barriers would likely be 6 to 8 feet tall but this would be refined and approved by a qualified acoustician prior to the issuance of grading permits. Issues to consider when determining the ultimate height, length, and location of
the barriers are the actual construction practices, including equipment to be used and the location and duration of noisier activities. The topography will also need to be considered in the final determination of barrier heights and effectiveness.

47. Mitigation Measure 4.10-2 The DCD shall ensure that the project sponsor isolates the equipment in the mechanical well per the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Guidelines. ASHRAE is considered the industry standard for mechanical system design standards.

Mitigation Measure for Traffic and Circulation

48. Mitigation Measure 4.13-1. If Project Variant A is ultimately selected and approved, the County Department of Conservation and Development and County Public Works Department shall verify that final plans incorporate a sidewalk on the Boulevard Way frontage similar to that incorporated in Project Variant B. Plans shall show the sidewalk along all project frontage and extending to Warren Road. Sidewalk plans shall conform to prevailing County standards. In addition, if Project Variant A is approved, prior to the approval of any building or grading permit, the County Department of Conservation and Development and County Public Works Department shall verify that final plans for the public right-of-way area show a north-south crosswalk at a location mutually acceptable to the aforementioned County departments and the project sponsor. The crosswalk shall conform to any pertinent state or County regulations regarding crosswalk location and safety. As appropriate, final plans for the crosswalk shall incorporate features to help reduce conflicts between vehicles and pedestrians. Such features may include but are not limited to signage advising motorists of the crosswalk, lighting at the crosswalk, and the use of contrasting color and/or reflective paint to improve nighttime visibility of the crosswalk area.

49. Mitigation Measure 4.13-2 If Project Variant A is ultimately selected and approved, the County Department of Conservation and Development and County Public Works Department shall verify that final plans reflect the inclusion of adequate sight distance to the west of the project driveway. This can be achieved by relocating the proposed perimeter wall from its current location to the same location as shown in the plan for Project Variant B (Figure 3-8) and keeping the area north of the wall free of potential visual obstructions (trees or other tall vegetation).

Mitigation Measure for Utilities and Service Systems

50. Mitigation Measure 4.14-1. In the event of multiple drought years, the project sponsor shall comply with EMBUD’s then-applicable Drought Management Program and reduce water usage by 20 percent. In the event of critical shortages (shortages of 25 percent or more), the project sponsor shall comply with reduction goals based on customer categories set by EBMUD.
Findings & Conditions of Approval – LP08-2034 and MS09-0008

Construction of Sound Barriers

51. Prior to the Zoning Administrator approval of the temporary sound barriers located on the north and south property lines, a brief report shall be submitted by an approved qualified acoustician indicating how the noise reduction is achieved in mitigation measure 4.10-1.

Litter Control and Recycling

52. The Project sponsor shall maintain the project site and surrounding areas in an orderly fashion. Litter and debris shall be contained in appropriate receptacles and shall be disposed promptly. All construction materials and construction-related debris shall be removed following cessation of construction activity.

53. To the extent possible, demolition debris and construction waste shall be diverted from the waste stream. Prior to commencing demolition or construction, the Project sponsor shall consult with Department of Conservation & Development – Conservation Programs Section staff to identify opportunities for debris/waste diversion.

Geologic/Soils Report

54. The project sponsor shall record a statement to run with deeds to property acknowledging the approved report by title, author (firm), and date, calling attention to approved recommendations and noting that the report is available from the seller.

Setbacks

55. The building shall comply with the building setbacks of the R-10 Zoning District, including the portion of the building located underground.

Construction Trailers

56. The Project sponsor must remove construction trailers from the project site within 30 days following completion of construction activities.

CONDITIONS OF APPROVAL ENFORCED BY THE PUBLIC WORKS DEPARTMENT

Unless otherwise stated, the Project sponsor must comply with the following conditions of approval prior to obtaining building permits or initiation of the use authorized by this Land Use Permit County File # LP082034 and Minor Subdivision # MS09-0008

General Requirements

57. Improvement plans prepared by a registered Civil Engineer shall be submitted, as necessary, to the Public Works Department, Engineering Services Division, along
Findings & Conditions of Approval – LP08-2034 and MS09-0008

with review and inspection fees, and security for all improvements required by the Ordinance Code for the conditions of approval of this land use permit. These plans shall include any necessary traffic signage and striping plans, for review by the Transportation Engineering Division of the Public Works Department.

Roadway Improvements (Boulevard Way)

58. _____ The Project Sponsor shall construct a 5-foot wide concrete sidewalk, curb and gutter, necessary longitudinal and transverse drainage, re-striping, street lighting (as necessary), pavement widening and transitions along the frontage of Boulevard Way. The Project Sponsor shall construct face of curb 17-feet from the existing striped centerline of Boulevard Way, providing a paved half-width consisting of a 12-foot wide travel lane and a 5-foot wide paved shoulder. Parking in the shoulder shall not be permitted. Striping or other pavement delineation shall be installed to clearly identify the shoulder along the Boulevard Way frontage.

59. _____ The Project Sponsor shall extend sidewalk and pavement conformance from the southwestern limits of the project frontage to the Warren Road intersection. A curb ramp, meeting minimum County standards, shall be constructed at the terminus of the sidewalk extension at the northeastern corner of the Warren Road and Boulevard Way intersection.

60. _____ The Project Sponsor shall construct a street-type connection with minimum 20-foot radius curb returns in lieu of a standard driveway depression at the intersection of the main on-site driveway and Boulevard Way. A standard driveway ramp may be used for the utility/emergency access driveway proposed at the eastern end of the property limits.

61. _____ Any vehicular entrance gate shall be a minimum of 20 feet from the edge of pavement to allow vehicles to queue without obstructing through traffic. Any proposed gate and the associated improvements shall be outside the public right of way.

62. _____ The Project Sponsor shall enter into a landscape maintenance agreement for any landscape improvements proposed within public right-of-way.

Construction Traffic

63. _____ Prior to the start of construction-related activities, the project sponsor shall prepare a Traffic Control Plan (TCP), including a haul route, for the review and approval of the Public Works Department.

64. _____ The Project sponsor shall perform a pre-construction survey of the roadways to be used as part of the haul route.
Findings & Conditions of Approval – LP08-2034 and MS09-0008

65. _____ The project owner shall restore any public roads, easements, and/or rights-of-way that have been damaged due to project-related construction activities to the pre-project conditions.

Access to Adjoining Property:

Proof of Access

66. _____ The Project Sponsor shall furnish proof to the Public Works Department of the acquisition of all necessary rights of way, rights of entry, permits and/or easements for the construction of off-site, temporary or permanent, public and private road and drainage improvements.

Encroachment Permit

67. _____ The Project Sponsor shall obtain an encroachment permit from the County’s Application and Permit Center, as necessary, for construction of any improvements within the Boulevard Way or other public road rights of way.

Sight Distance

68. _____ The Project Sponsor shall provide sight distance along the curve and at the intersection of the on-site driveway(s) and Boulevard Way for a design speed of 35 miles per hour pursuant to Figure 3-8 in the Final EIR. The project sponsor shall trim vegetation, as necessary, to provide sight distance at the intersection. Any new landscaping, fencing, retaining walls, or other obstructions proposed at the intersections shall be setback to ensure that the sight lines are clear.

Parcel Map

69. _____ The Project Sponsor shall record a parcel map to merge the separate parcels.

Right of Way Dedications

70. _____ The Project Sponsor shall dedicate on the parcel map or convey by a separate instrument, the right of way necessary to accommodate the required frontage improvements. The right of way shall be a minimum 10 feet back from the improved face of curb except east of the entrance driveway the applicant may dedicate a public utility easement for areas beyond the sidewalk. The sidewalk, bus pullout, and curb ramps must be contained within the public right of way.

Annexation to Lighting District

71. _____ The Project Sponsor shall annex to the Community Facilities District formed for Countywide Street Light Financing (CFD 2010-1).
Utilities/ Undergrounding

72. ____ ____ All new utility distribution facilities shall be installed underground. Existing utility poles located along Boulevard Way shall be relocated to accommodate the required frontage improvements.

Drainage Improvements

Collect and Convey

73. ____ ____ The Project Sponsor shall collect and convey all storm water entering and/or originating on this property without diversion to a different watershed and within an adequate storm drainage facility, to a natural watercourse having definable bed and banks, or to an existing adequate public storm drainage facility which conveys the storm waters to a natural watercourse, in accordance with Division 914 of the Ordinance Code.

74. ____ ____ Prior to issuance of building permits or approval of the parcel map, the Project Sponsor shall submit to the Public Works Department for review, an updated drainage study and analysis that details how stormwater runoff is collected and discharged into the area wide storm drain systems. The drainage study and analysis must confirm that post-project drainage flows do not exceed pre-project flows for the 10-year storm event.

75. ____ ____ The Project Sponsor shall replace the existing 12-inch diameter culvert crossing Warren Road with an 18-inch diameter pipe.

Miscellaneous Drainage Requirements

76. ____ ____ The Project Sponsor proposes to utilize pervious paving systems for the parking lot to reduce the stormwater runoff and maintain the post-project design flows below the pre-project levels. Since certain types of pervious paving systems become silted in and clogged over time, the applicant shall develop a long-term maintenance plan to guarantee the infiltration performance of these systems.

Provision C.3 of the National Pollutant Discharge Elimination System (NPDES) Permit

77. ____ ____ Improvement Plans shall be submitted to the Public Works Department to verify compliance with Provision C.3 of the National Pollutant Discharge Elimination System (NPDES) Permit and the County’s Stormwater Management and Discharge Control Ordinance (§1014).

78. ____ ____ A final Storm Water Control Plan (SWCP) shall be submitted to and approved by the Public Works Department for consistency with Provision C.3 prior to issuance of building permits. All time and materials costs for review and preparation of the SWCP shall be borne by the project sponsor.
79. Storm water management facilities shall be subject to inspection by Public Works Department staff; all time and materials costs for inspection of stormwater management facilities shall be borne by the applicant.

80. A final Storm Water Control Operation and Maintenance Plan (O+M Plan) shall be submitted to and approved by the Public Works Department for consistency with Provision C.3 prior to final building permit inspection.

81. The property owner(s) shall enter into a standard Stormwater Management Facility Operation and Maintenance Agreement with Contra Costa County, in which the property owner(s) shall accept responsibility for operation and maintenance of the stormwater facilities and grant access to relevant public agencies for inspection of stormwater management facilities. Such an agreement shall be fully executed and recorded prior to obtaining building permits.

82. The property owner(s) shall annex the subject property into Community Facilities District (CFD) No. 2007-1 (Stormwater Management Facilities), which funds responsibilities of Contra Costa County under its NPDES Permit to oversee the ongoing operation and maintenance of stormwater facilities by property owners. Annexation to CFD 2007-1 shall be completed prior to obtaining building permits.

83. Any proposed water quality features that are designed to retain water for longer than 72 hours shall be subject to the review of the Contra Costa Mosquito & Vector Control District.

National Pollutant Discharge Elimination System

84. The Project Sponsor shall comply with all rules, regulations, and procedures of the National Pollutant Discharge Elimination Systems (NPDES) for municipal, construction and industrial activities as promulgated by the California State Water Resources Control Board and the San Francisco Bay Regional Water Quality Control Board.

Compliance shall include developing long-term best management practices (BMP’s) for the reduction or elimination of storm water pollutants. The project design shall incorporate, wherever feasible, the following long-term BMP’s in accordance with the Contra Costa County Clean Water Program for the site’s storm water drainage:

- Minimize the amount of directly connected impervious surface area.
- Place approved markers ("No Dumping, Drains to Creek") on all storm drains.
- Construct concrete driveway weakened plane joints at angles to assist in directing runoff to landscaped/pervious areas prior to entering the street curb and gutter.
- Shallow roadside and on-site grassy swales.
- The owner shall sweep the paved portion of the site quarterly, at least once a year with a vacuum type sweeper. Verification (invoices, etc.) of the sweeping
shall be provided to the County Clean Water Program Administrative Assistant at 255 Glacier Drive, Martinez CA 94553 (925) 313-2238

- Trash bins shall be sealed to prevent leakage, OR, shall be located within a covered enclosure.
- Project Sponsor shall incorporate the use of pavers and/or pervious pavement on-site to reduce the amount of directly connected impervious surface area.
- Other alternatives, equivalent to the above, as approved by the Public Works Department.

Area of Benefit Fee Ordinance

85. _____ The Project Sponsor shall comply with the requirements of the Bridge/Thoroughfare Fee Ordinance for the South Walnut Creek Area of Benefit, as adopted by the Board of Supervisors. This fee shall be paid prior to the issuance of a building permit.

86. _____ The applicant shall comply with all mitigation measures recommended in the Final EIR, and with the Mitigation Monitoring and Reporting Program for Project Variant B.

ADVISORY NOTES

A. NOTICE OF 90-DAY OPPORTUNITY TO PROTEST FEES, DEDICATIONS, RESERVATIONS, OR OTHER EXACTIONS PERTAINING TO THE APPROVAL OF THIS PERMIT.

This notice is intended to advise the project sponsor that pursuant to Government Code Section 66000, et seq., the project sponsor has the opportunity to protest fees, dedications, reservations, and/or exactions required as part of this project approval. The opportunity to protest is limited to a 90-day period after the project is approved.

The ninety (90)-day period in which you may protest the amount of any fee or the imposition of any dedication, reservation, or other exaction required by this approved permit, begins on the date this permit was approved. To be valid, a protest must be in writing pursuant to Government Code Section 66020 and delivered to the Community Development Department within 90 days of the approval date of this permit.

B. Project must comply with the requirements of the Contra Costa County Department of Conservation & Development – Building Inspection Division. The Building Inspection Division will require three complete sets of plans that are approved by the Community Development Division.

C. Project must comply with the requirements of the California Department of Fish & Game. It is the Project Sponsor’s responsibility to notify CDFG (P.O. Box 47, Yountville, California 94599) of any activities that may affect any fish and wildlife resources, per the Fish and Game Code.

D. Comply with the requirements of the Central Contra Costa Sanitary District,

E. Comply with the requirements of the East Bay Municipal Utility District,
F. Project must comply with the requirements of the County Health Services Department, Hazardous Material Division.

G. Project must comply with the requirements of the Bay Area Air Quality Management District.

H. Project must comply with the requirements of the Regional Water Quality Control Board.

I. Project must comply with the requirements of the Contra Costa County Fire Protection District.
Exhibit C

General Plan

Zoning

Maps

Project Drawings
WEST ELEVATION

WHITE MASONRY DOMES

WHITE FINISHED METAL WINDOW FRAMES
W/CLEAR TEMPERED GLAZING

WHITE APPLIED ROOFING MEMBRANE ON MAIN DOME

WHITE MASONRY FACIA

WHITE MASONRY (TYP)

OUTLINE OF GARDEN WALL FRONTING ELEVATION

WHITE WINDOW & DOOR SYSTEM
W/CLEAR TEMPERED GLAZING

EAST ELEVATION

MEDIUM DOMES= EL 259.78
23.0' ABOVE GRND FLR FIN FLR
* GROUND FLR FIN FLR = 236.50
( T.O. MAIN DOME 35'
ABOVE EXISTING GRADE )

MAIN DOME= EL 270.00
33.5' ABOVE GRND FLR FIN FLR
* GROUND FLR FIN FLR = 236.50

SMALL DOMES= EL 256.05
19.55' ABOVE GRND FLR FIN FLR
* GROUND FLR FIN FLR = 236.50
NOTE:
SEE ARBORIST REPORT PREPARED BY JOE MCNEIL DATED JUNE 29, 2008 FOR COMPLETE LIST OF EXISTING TREES AND TREE PROTECTION GUIDELINES.
SANCTUARY FOR SUFISM REORIENTED

Sanctuary
1301 Boulevard Way
Walnut Creek, CA 94596
P 925.938.1137
F 925.938.1137

TOTAL PROPOSED IMPERVIOUS AREA (ON-SITE) = 38,491 SF

AREA TABULATION:

<table>
<thead>
<tr>
<th>IMP #</th>
<th>TYPE</th>
<th>IMPERV. AREAS</th>
<th>TOTAL AREA (SF)</th>
<th>AREA REQUIRED</th>
<th>AREA PROVIDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>PLANTER</td>
<td></td>
<td>10,750</td>
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<td>430</td>
</tr>
<tr>
<td>#2</td>
<td>GRASSY SWALE</td>
<td></td>
<td>17,229</td>
<td>689</td>
<td>689</td>
</tr>
<tr>
<td>#3</td>
<td>PLANTER</td>
<td></td>
<td>10,512</td>
<td>430</td>
<td>430</td>
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</tbody>
</table>

*AREA REQUIRED = 0.04 x TOTAL AREA

TOTAL PROPOSED IMPERVIOUS AREA (ON-SITE) = 38,491 SF
TYPICAL FLOW-THROUGH PLANTER
NOT TO SCALE

GRASSPAVE
NOT TO SCALE

PERVIOUS CONCRETE
NOT TO SCALE

GRASSY SWALE SECTION
NOT TO SCALE

NOTES:
1. SANDY LOAM MIX SHALL BE FREE OF STONES, SWMPS, ROOTS, OR SIMILAR OBJECTS, AND ALSO FREE OF NOXIOUS WEEDS.
2. GEOTEXTILE FILTER SHALL BE PERMALON FILTER PL 4-150 OR APPROVED EQUAL
3. A GEOTECHNICAL REPORT HAS BEEN PREPARED FOR THE PROJECT BY DCM ENGINEERING, DATED 8/22/97.
4. THE CONTRACTOR SHALL PROVIDE A SUBMITAL FOR OWNER REVIEW OF THE SPECIFIC SHORING DESIGN. THE SHORING DESIGN MUST BE PREPARED BY AND STAMPED BY A CALIFORNIA REGISTERED CIVIL ENGINEER PRACTICING IN DESIGN OR TEMPORARY EXCAVATION SHORING.
5. ALL EXCAVATION SHORING MUST BE MONITORED FOR MOVEMENT/DEFLECTION BY THE CONTRACTOR ON A REGULAR BASIS, AND THE CONTRACTOR SHALL SUBMIT A SHORING MOVEMENT/DEFLECTION PLAN FOR OWNER APPROVAL. THE CONTRACTOR SHALL SUBMIT MEASUREMENTS DAILY AND WEEKLY AS MEASUREMENTS ARE MADE.
Exhibit D

Notice of Preparation, Completion and Extension
NOTICE OF PREPARATION
NOTICE OF SCOPING SESSION

FOR AN ENVIRONMENTAL IMPACT REPORT
FOR THE PROPOSED SUFISM REORIENTED SANCTUARY PROJECT
(County Files: # LP08-2034 and #MS09-0008)

TO: ALL INTERESTED AGENCIES, ORGANIZATIONS AND INDIVIDUALS

1. PROPOSED PROJECT

The Sufism Reoriented Church is proposing to construct a new sanctuary on approximately 3.12 acres. The sanctuary would permanently replace the organization's current facility at 1300 Boulevard Way. The proposed design would locate approximately two-thirds of its total floor area (46,064 square feet) underground, including space for administrative offices, a multi media library, rehearsal and video studios for choral music, art studio, a kitchen, a bookstore, and a multi purpose room. The prayer hall, a classroom, and ancillary facilities (totaling 20,000 square feet in area) would be located above ground.

In addition, the project includes a request for parking reduction based on a Transportation Demand Management Program that includes the promotion of carpool, shuttle service, pedestrian and secure bicycle parking. The project includes the removal of approximately 43 trees, and the planting of at least 165 new trees. The project will require a land use permit under the Contra Costa County R-10 Single Family Residential District, Sections 84-8.404 and 84-4.404 (3) and a minor subdivision with a vesting tentative map for the merging of seven lots into one parcel to create the approximate 3.12 acre site.

The site currently contains a parsonage building at 11 White Horse Court plus three single family residences along Boulevard Way. The applicant, Sufism Reoriented, owns all of these buildings. The applicant proposes to retain the parsonage building at 11 White Horse Court and demolish the three residences along Boulevard Way.
Height

The sanctuary would be located partially underground. The facility will have the appearance of a single story building. The portion of the building which is visible above grade will range from approximately 20 to 34 feet in height from the ground to the top of the proposed domes.

Construction and Grading

Approximately two-thirds (46,064 square feet) of the building is proposed to be constructed underground therefore extensive soil excavation will be required. An estimated 3,510 truck loads of soil are expected to be exported from the project site (approximately 34,350 cubic yards). The project will not require pile driving. It is anticipated that excavation will take approximately 5 to 6 weeks and approximately 1 year to complete the entire project as proposed.

Environmental Impacts

The County has not determined the probable environmental impacts at this time. The Environmental Impact Report will evaluate all issues with a short discussion on Agricultural, Mineral and Recreational impacts. The County intends to use the amended California Environmental Quality Act (CEQA) guidelines in response to Senate Bill 97.

II. LOCATION OF PROJECT

The proposed new sanctuary is located within the (Saranap) Walnut Creek area of the County. Seven abutting parcels form the project site. To the north and east are single family residential uses, apartment buildings, condominiums and commercial and retail stores. To the south and west the site is surrounded by single family residential uses. The sites are 11 White Horse Ct., 1354, 1360, 1364, 1366 and 1384 Boulevard Way. {General Plan: Single Family High Density (SH); Zoning: Single Family Residential, 10,000 square foot minimum parcels (R-10); Census Tract: 3410; Assessor Parcel Numbers: 184-450-006, 007, 012, 031, 032, 033, 034}

III. PUBLIC COMMENTS

The Contra Costa County Department of Conservation and Development is the Lead Agency for the preparation of the Environmental Impact Report for this project. All responsible agencies, interested agencies and individuals are invited to submit comments, which address environmental concerns resulting from the implementation of the proposed project.

Responses to this Notice of Preparation must be received by the Contra Costa County Community Development Division by 5:00 p.m., Thursday, April 8, 2010.
Responses should be sent to:

Contra Costa County Community Development Division
Attention: Lashun Cross
651 Pine Street, 4th Floor - North Wing
Martinez, California 94553

Facsimile (925) 335-1350
Email: Lashun.Cross@ced.cccounty.us

IV. SCOPING SESSION

A Scoping Session will be held on Monday, March 22, 2010 at 3:30 p.m., in Room 107 of the McBrien Administration Building, 651 Pine Street, Martinez, California. Interested agencies and individuals may submit oral and written comments, which pertain to environmental concerns resulting from implementation of the proposed project.

V. SUPPORTING DOCUMENTS

The Land Use Permit Application and Minor Subdivision and supporting documents are available for viewing at the Contra Costa County Department of Conservation and Development. If you wish to obtain a copy of any supporting document related to this project, you may contact Lashun Cross of the Community Development Division at (925) 335-1229.

Signature: 

Lashun Cross

Title: Senior Planner
Contra Costa County
Department of Conservation and Development
Community Development Division
651 Pine Street, 4th Floor North Wing
Martinez, CA 94553-1229

Attachment: Site Location Map

County Clerk: 2 originals
NOTE: THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE INFORMATION DEPICTED HEREIN. ASSessor's PARCELS MAY NOT CONFORM TO LOCAL SET-SPOT OR BUILDING SITE ORDINANCES.
Notice of Completion and Availability of
Draft Environmental Impact Report

State Clearinghouse #2010032038

PROPOSED 66,074 SQUARE FOOT SANCTUARY PROJECT IN CONTRA COSTA COUNTY

County File #s LP082034 and MS090008

Notice is hereby given pursuant to the California Environmental Quality Act (CEQA) that a document entitled "New Sanctuary for Sufism Reoriented Project, Environmental Impact Report" (hereafter referenced as "Draft EIR") has been prepared for the proposed 66,074 square foot Sufism Reoriented religious facility within the Saranap neighborhood of the unincorporated Walnut Creek area of Contra Costa County.

The Sufism Reoriented Church is proposing to construct a new sanctuary on 3.12 acres. The sanctuary would permanently replace the organization’s current facility at 1300 Boulevard Way. The proposed design would locate approximately two-thirds of its total floor area (46,074 square feet) underground, including space for administrative offices, a multimedia library, rehearsal and video studios for choral music, art studio, a kitchen, a bookstore, and a multi purpose room. The prayer hall, a classroom, and ancillary facilities (totaling 20,000 square feet in area) would be located above ground.

In addition, the project includes a request for parking reduction based on a Transportation Demand Management Program that includes the promotion of carpool, shuttle service, pedestrian and secure bicycle parking. The project includes the removal of approximately 43 trees, and the planting of at least 165 new trees. The project will require a land use permit under the Contra Costa County R-10 Single Family Residential District, Sections 84-8.404 and 84-4.404 (3) and a minor subdivision with a vesting tentative map for the merging of seven lots into one parcel to create the approximate 3.12 acre site.
Approximately two-thirds (46,074 square feet) of the building is proposed to be constructed underground therefore extensive soil excavation will be required. An estimated 3,310 truck loads of soil are expected to be exported from the project site (approximately 43,000 cubic yards). The project will not require pile driving. It is anticipated that excavation will take approximately 6 weeks and approximately 16 to 18 months to complete the entire project as proposed.

The proposed new sanctuary is located within the (Saranap) Walnut Creek area of the County. Seven abutting parcels form the project site. The sites are 11 White Horse Ct., 1354, 1360, 1364, 1366 and 1384 Boulevard Way. (General Plan: Single Family High Density (SH); Zoning: Single Family Residential, 10,000 square foot minimum parcels (R-10); Census Tract: 3410; Assessor Parcel Numbers: 184-450-006, 007, 012, 031, 032, 033, 034)

ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT: Potentially significant impacts were identified in the following environmental topic areas:

- Air Quality
- Geology and Soils
- Noise
- Traffic and Circulation
- Cumulative Impacts

All potentially significant impacts can be mitigated to less than significant levels.

PUBLIC REVIEW & COMMENT PERIOD: There will be a forty-five (45) day review and comment period for the Draft EIR, which begins on the date listed at the top of this notice. Comments on the adequacy of the Draft EIR must be submitted by 5:00 p.m. on Friday, May 13, 2011. Comments must be in writing and submitted to the following address:

Attn: Ms. Lashun Cross, Senior Planner
Contra Costa County Department of Conservation and Development
651 Pine Street, 4th Floor- North Wing
Martinez, CA 94553

For accuracy of record, the County File Numbers, LP082034 and MS090008 should be included on all correspondence.

During the 45-day review period, the County Zoning Administrator will hold a public hearing to provide additional opportunity for public comment on the Draft EIR. The date and time of the Zoning Administrator hearing is as follows:

Monday, April 18, 2011, at 3:30 p.m.
Room 107, McBrien Admin. Building
651 Pine Street, Martinez, CA 94553
REPORT AVAILABILITY: Copies of the Draft EIR are available for review and purchase at the offices of the Contra Costa County Department of Conservation and Development, Community Development Division at the address listed above. The Draft EIR is available for purchase in both hard copy format ($20.00 [add $10.00 if mailing is required]) and CD format ($2.00 [add $1.25 if mailing is required]). The Draft EIR is also available for viewing on the Department website at http://www.cocoplans.org.

In addition to copies of the Draft EIR, supplemental information including maps and other material related to the project and the preparation of the Draft EIR are available for public review at the offices of the Department of Conservation and Development, Community Development Division.

The Draft EIR is also available for review at the following additional locations:

Office of Supervisor Gayle B. Uilkema, District II
McBrien Administration Building
651 Pine Street
Room 108-A
Martinez, CA 94553

Contra Costa County Library-Pleasant Hill, Main Branch
1750 Oak Park Boulevard
Pleasant Hill, CA 94523

Contra Costa County Library- Walnut Creek
1644 N. Broadway
Walnut Creek, CA 94595

Contra Costa County Library- Lafayette
952 Moraga Road
Lafayette, CA 94549

Martinez Library
740 Court Street
Martinez, CA 94553

ADDITIONAL INFORMATION: For additional information on the Draft EIR, please contact Ms. Lashun Cross of the Contra Costa County Department of Conservation and Development by email at lashun.cross@dcd.cccounty.us, by telephone at 925-335-1229 or by fax at 925-335-1250.

NOTICE ISSUED MARCH 29, 2011
Notice is hereby given pursuant to the California Environmental Quality Act (CEQA) that a document entitled “New Sanctuary for Sufism Reoriented Project, Environmental Impact Report” (hereafter referenced as “Draft EIR”) has been prepared for the proposed 66,074 square foot Sufism Reoriented religious facility within the Saranap neighborhood of the unincorporated Walnut Creek area of Contra Costa County.

The Sufism Reoriented Church is proposing to construct a new sanctuary on 3.12 acres. The sanctuary would permanently replace the organization’s current facility at 1300 Boulevard Way. The proposed design would locate approximately two-thirds of its total floor area (46,074 square feet) underground, including space for administrative offices, a multimedia library, rehearsal and video studios for choral music, art studio, a kitchen, a bookstore, and a multi-purpose room. The prayer hall, a classroom, and ancillary facilities (totaling 20,000 square feet in area) would be located above ground.

In addition, the project includes a request for parking reduction based on a Transportation Demand Management Program that includes the promotion of carpool, shuttle service, pedestrian and secure bicycle parking. The project includes the removal of approximately 43 trees, and the planting of at least 165 new trees. The project will require a land use permit under the Contra Costa County R-10 Single Family Residential District, Sections 84-8.404 and 84-4.404 (3) and a minor subdivision with a vesting tentative map for the merging of seven lots into one parcel to create the approximate 3.12 acre site.

Approximately two-thirds (46,074 square feet) of the building is proposed to be constructed underground therefore extensive soil excavation will be required. An estimated 3,310 truck loads of soil are expected to be exported from the project site (approximately 43,000 cubic yards). The project will not require pile driving. It is anticipated that excavation will take approximately 6 weeks and approximately 16 to 18 months to complete the entire project as proposed.
The proposed new sanctuary is located within the (Saranap) Walnut Creek area of the County. Seven abutting parcels form the project site. The sites are 11 White Horse Ct., 1354, 1360, 1364, 1366 and 1384 Boulevard Way.

ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT: Potentially significant impacts were identified in the following environmental topic areas:

- Air Quality
- Geology and Soils
- Noise
- Traffic and Circulation
- Cumulative Impacts

All potentially significant impacts can be mitigated to less than significant levels.

PUBLIC REVIEW & COMMENT PERIOD: The County has extended the time for receiving public comments from May 13, 2011 to May 27, 2011. Comments on the adequacy of the Draft EIR must be submitted by 5:00 p.m. on Friday, May 27, 2011. Comments must be in writing and submitted to the following address:

Attn: Ms. Lashun Cross, Senior Planner
Contra Costa County Department of Conservation and Development
651 Pine Street, 4th Floor- North Wing
Martinez, CA 94553

For accuracy of record, the County File Numbers, LP082034 and MS090008 should be included on all correspondence.

REPORT AVAILABILITY: Copies of the Draft EIR are available for review and purchase at the offices of the Contra Costa County Department of Conservation and Development, Community Development Division at the address listed above. The Draft EIR is available for purchase in both hard copy format {$20.00 [add $10.00 if mailing is required]} and CD format {$2.00 [add $1.25 if mailing is required]}. The Draft EIR is also available for viewing on the Department website at http://www.cocoplans.org

In addition to copies of the Draft EIR, supplemental information including maps and other material related to the project and the preparation of the Draft EIR are available for public review at the offices of the Department of Conservation and Development, Community Development Division. The Appendices are provided on the CD listed above for purchase, can be purchased by itself for $60, or reviewed at the County Application and Permit Center during normal business hours.

ADDITIONAL INFORMATION: For additional information on the Draft EIR, please contact Ms. Lashun Cross of the Contra Costa County Department of Conservation and Development by email at lashun.cross@dcd.eccounty.us, by telephone at 925-335-1229 or by fax at 925-335-1250.

NOTICE ISSUED APRIL 26, 2011
Exhibit E

Agency Comments
July 31, 2008

Lashun Cross  
Contra Costa County 
Community Development Department 
651 Pine Street – 2nd Floor, North Wing  
Martinez, CA 94553

Re: Review submittal LP08-2034 (Sanctuary for Sufism Reoriented)

Dear Mr. Cross:

We appreciate the opportunity that was provided to review and comment on the above noted application that is located within the City’s Sphere of Influence. Please consider the following comments on the proposed project.

1. The 70 parking spaces may be adequate but it is hard to tell because the Transportation Demand Management (TDM) program written by DC&E was not included in the packet. They probably do have 50% of the membership in the area because according to their website they have been in this location for a long time. However I am concerned that members may not walk to church because they are not providing a sidewalk along the entire frontage of the project. This is crucial to the success of a TDM program. The sidewalk should be provided along the entire frontage.

2. The intersection of Boulevard Way, Kinney Drive, and Garden Court can be difficult for pedestrians to cross due to its design. Additionally, there are limited opportunities for pedestrians to cross from the north side of the street elsewhere on or near the site. Given the size of the project and the expected pedestrian traffic, the County may wish to explore with the applicant the possibility of some improvements to the intersection or possibly a mid-block crossing with bulb-outs (which would also double as a traffic-calming measure).

3. The plans show that the 50-foot street right-of-way will remain. I believe this is substandard for this street, however if it is I would expect that the County Public Works Department will require additional right-of-way.

4. The driveway location is problematic because it is just past the turn of Boulevard Way. There may be a sight distance problem for the exiting traffic seeing northbound
Boulevard Way traffic. This may be further compounded by the 6-foot wall along the right-of-way and the shrubbery proposed to be planted within the ROW.

Again, thank you for considering our comments in your review of this application. Please feel free to contact me directly if you would like to discuss any aspect of this letter further or if I can be of any assistance.

Sincerely,

Andrew M. Smith
Senior Planner
(925) 943-5899 x213
asmith@walnut-creek.org
Ms. Lashun Cross, Senior Planner  
Department of Conservation and Development  
651 Pine Street, 4th Floor – North Wing  
Martinez, CA 94553  

Dear Ms. Cross,

This letter addresses two related issues: the SCA board of directors’ position on Sufism Reoriented’s LUPA and the board’s views on proposed changes to the adjacent Boulevard Way–Kinney Drive intersection.

**Sufism Reoriented’s LUPA.** Meeting in executive session on June 2, the SCA board voted by a vote of 10 to 0, with one member unavailable, to support the church’s LUPA. This was the culmination of a process that began in November 2007 when representatives of Sufism Reoriented first presented their plan for their proposed sanctuary to our board. Our position reflects the overwhelming support of the Saranap community for the project as expressed at three public meetings we have held on the project and the number of letters and petitions for and against the project that have been submitted to your office, as well as the views of board members.

**Community meetings.** The purpose of our three community meetings has been to educate the community (and ourselves) about the sanctuary project and to gauge community sentiment. These were forums at which neighbors could comment in favor of or opposition to the project and to state any concerns they might have. The meetings were publicized not only to our own members but via postal mailings to our entire Saranap mailing list, which includes some 1300 homes and apartments. All were open to the public, and all were attended by more than 100 people.

At the first of these, held in November 2008, representatives of Sufism Reoriented made a presentation about the project and responded to questions. The second meeting was held two months later to respond to questions raised at the November meeting that could not be answered that evening.

The third community meeting, held April 19 this year, focused on the draft EIR. In the postcard we mailed to announce the meeting, we included the URL of our Website, where the Executive Summary of the draft EIR was available for downloading, and the URL of the County Website, where the full report was available. Copies of the Executive Summary were also available at the meeting. A member of our Application Review Committee began the meeting with a 40-minute summary of the findings of the draft EIR, and the floor then was opened for questions and comments. (The EIR-specific results of this meeting were outlined in our May 16 letter to you.)

Also at this meeting, which was attended by about 140 people, attendees were invited to complete an anonymous form on which they could indicate whether they support the project, support it with certain reservations, or do not support it. Space was provided for them to state their reasons for their position. Ninety-six people responded (some cited more than one reason for their position):
• 90 people indicated they support the project—42 said it would enhance the neighborhood; 32 mentioned the aesthetics of the landscaping and/or the building itself; 15 mentioned the positive impact on traffic, especially at the Boulevard Way–Kinney intersection; 6 mentioned environmental elements of the project; 5 spoke positively about having a church in the neighborhood, religious freedom, or the right of Sufism Reoriented to build a church in the neighborhood where most of its members live; and 5 commented on the thoroughness of the draft EIR.

• 4 indicated they support the project, but with reservations. These included concerns about traffic at the Boulevard Way–Kinney Drive intersection (3 comments), and construction-related dust and noise. (One person checked this box but wrote only, “I think it will be very uplifting to the quality of the neighborhood.”)

• 2 indicated that they do not support the project. The reasons they gave were the size and location of the project; “visual not comparable to neighborhood”; “dewater with likely adjacent subsidence” related to excavation; “needed housing will be removed”; “glare study is not adequate”; “Saranap is not an easy access”; and concerns about construction-related emissions, dust, and damage to roads.

Signatures on file with the county. Signatures on letters of support and petitions in favor of the project on file with your office as of June 28 totaled 2,855; signatures on letters and petitions in opposition to the project totaled 564. This is a margin of five to one.

Other considerations. During the discussion leading up to the board’s vote on June 2, we took these additional factors into account:

• Churches are a permitted use in R-10 zones; the site of the proposed sanctuary is in an R-10 zone.

• The applicant is seeking no variances.

• The draft EIR on this project found “no significant unavoidable impacts.”

• Plans for the site include a landscaped garden park that would be open to neighbors. There are no other settings like this in the Saranap.

• The church has gone to great lengths to address the concerns of the neighborhood.

More than three years have passed since Sufism Reoriented announced plans to build a sanctuary on Boulevard Way. From the beginning, our process for evaluating this project has been open, inclusive, and transparent. We have stated publicly that our decision on the project would be a reflection of the views of the community as well as those of individual board members. Information we have at hand indicates that support for the project outweighs opposition to it by a very substantial margin.

While we respect the views of those who oppose the project, we agree with the majority opinion of our neighbors that this project would be a positive addition to the neighborhood, and thus we support Sufism Reoriented’s application to build a sanctuary on Boulevard Way.

Boulevard Way–Kinney Drive intersection. Also at our June board meeting, the SCA board discussed the three variants for this intersection described in the draft EIR for the Sufism
Reoriented project. This intersection has long been, and remains, a source of concern in the neighborhood. While we did not vote on the three options, two clear themes emerged from our discussion:

• We are opposed to any changes that would tend to encourage speeding along either Boulevard Way or Kinney Drive. Widening Boulevard Way without additional stop signs would obviously have this effect. Leaving the road and intersection as currently configured and moving the wall back from the edge of the Boulevard Way would have the same effect unless a stop sign were placed on this road in the northbound direction, as this would remove the major deterrent to speeding in this part of Boulevard Way, a blind curve.

• We believe that two or more stop signs should be added at this intersection to discourage speeding. This is a residential neighborhood. Adding one or more crosswalks would not only make the area safer, it would make it more pedestrian- and bicycle-friendly.

Regardless of the County's decision on the Sufism Reoriented LUPA, we strongly encourage the County to take measures to make this intersection safer.

Respectfully submitted,

Lee S. Schroeder, President
Saranap Community Association
April 21, 2009

Ms. Lashun Cross, Planner
Contra Costa County
Department of Conservation and Development
651 Pine Street
North Wing, Fourth Floor
Martinez, CA 94553-1229

Re: County Files LP08-2034 and SD08-9262
Sufism Reoriented Sanctuary Project

Dear Ms. Cross,

The Saranap Community Association (SCA) would like to go on record as stating that the letter (dated July 31, 2008) sent last summer by Dennis Collins, then President of the SCA, regarding the Sufism Reoriented Land Use Application, was neither a legal summarization of the existing board’s view, nor did it reflect the usual process followed by the SCA board in evaluating County submittal applications. A full board meeting was not convened, and board members were given virtually no time to evaluate or discuss this complex submission. This, in itself, is in violation of the California Corporations Code, especially since several board members did not waive proper notice. In summary, this was a unilateral action, not legally authorized by the board as a whole, and can only represent Dennis Collins’s personal view.

The SCA’s usual procedure, is to wait until it has a chance to carefully review a submittal and then to comment on it as a group. Mr. Collins’s hastily prepared letter contains many conjectures, and reflects the fact that there was no due diligence in asking the applicant, Sufism Reoriented, about issues such as storm water runoff, soil testing, parking, etc. There really is no factual basis for denying the application that comes from reading his letter. This reflects poorly on SCA’s usual approach for evaluating such submittals, and we feel harms the creditability of our organization. We believe that his letter simply represents a personal view, rather than being representative of our community association.

As you are probably aware, as part of our commitment of the SCA to get input from the Saranap community on this submittal, we have held two, of three, public meetings
regarding this LUA. The first meeting, in November 2008, was held to hear information from the County on its process, information from the applicant about their plans, and the Saranap community an opportunity to raise any concerns or questions they might have. The second meeting, in January 2009, provided an opportunity for the community to hear answers to questions raised in the first meeting, and ample time for further inquires and comments from the community. Both meetings were well attended by the Saranap community with between 100 and 150 people at each meeting. Questions and answers from these meetings can be found on our Website (www.SaranapOnline.org). We plan to hold a third and final meeting, as soon as the County publishes the Initial Study associated with the SR LUA. Only after the third meeting, and after collecting input from other meetings with County officials, meetings with consultants, and completing our board of director’s internal review process, will the SCA board, as a whole, put together its final assessment of this application, and send its recommendation to the County DCD.

We respectfully ask you and the DCD to view the previous letter from Dennis Collins as that of a personal comment from an individual resident and nothing more.

Sincerely yours,

Lee S. Schroeder, President
Saranap Community Association

1135 Juanita Drive
Walnut Creek, CA 94595
925-933-6880
July 31, 2008

Ms. LaShun Cross, Planner
Conservation and Development Dept.
Contra Costa County
651 Pine Street
Martinez, CA 94553-1229

RE: COUNTY FILE LPo8-/ MS080011
Request for Land Use Permit for Sufism Reoriented
Property address: Combining seven R-10-zoned residential properties (in unincorporated Walnut Creek) at:

1354 Boulevard Way  1366 Boulevard Way
1360 Boulevard Way  1384 Boulevard Way
1364 Boulevard Way  11 White Horse Court
(The seventh address not specified in application packet)
Walnut Creek (Saranap Area of Contra Costa County), CA 94595

Dear Ms. Cross,

The Saranap Community Association has received your Agency Comment Request, dated July 3, 2008, with comments requested back to you by August 1, 2008.

Directors of the Saranap Community Association have reviewed the project and description for the Sufism Reoriented Sanctuary Project to be constructed on the combined properties listed above, generally between Boulevard Way and Warren Road, in the unincorporated portion of Contra Costa County between Walnut Creek, CA. and Lafayette, CA., south of State Highway 24.

SUMMARY

This Saranap Community Association (SCA) is opposed to the Sufism Reoriented sanctuary project as proposed. We are not opposed to the group nor to their continued use of their present facilities and site which were previously approved by the SCA. We are also not opposed to reasonable expansion within their current property sites at White Horse Court or 1300 Boulevard Way. However, structured as this proposal is, we ask that the application for the new sanctuary use permit be denied.

The proposed new sanctuary is a huge construction project, well beyond the needs of a neighborhood church with only 350 members in the neighborhood. Further, Sufism Reoriented claims no plans for future growth. The sanctuary proposed in the

"Dedicated to Preserving the Quality of Life in the Saranap Neighborhood since 1997"
Ms. LaShun Cross  
County File LPo8-/ MS080011  
July 31, 2008

Present application would overtake existing residential properties in the Saranap Area and convert them to non-residential uses, a serious encroachment into the Saranap’s precarious, semi-rural, residential nature.

Sufism Reoriented has been buying up properties around the present site, apparently in anticipation of this and future expansion of their facilities. The larger community has never been informed of their long-range plans, or given an opportunity to embrace or reject them. Sufism Reoriented claims to have no long range plans. Further, they claim they are not building a regional or national facility and have suggested they may need to sell some of their property holdings to pay for this sanctuary project. They have made no public commitment to limit their growth to a size that would be considered reasonable for a neighborhood church.

ALTERNATIVE APPROACH

The present compound at White Horse Court is, by itself, large enough to accommodate a sanctuary building sized more appropriately to a church in this neighborhood. The application for the currently existing compound was approved by the SCA years ago. It was then, and remains today, large enough to allow for the construction of additional buildings within the compound area to meet the reasonable needs of a growing neighborhood church whose membership, by their own claims, lives within walking distance of the present site.

We ask that the application for the new sanctuary use permit be denied as proposed. We ask the applicant to provide a reasonable long-range development plan for the benefit of the whole Saranap community. Last, we ask that the applicant scale the present sanctuary plan to one more appropriate to the immediate community environment and resubmit the application on that basis.

Whether the applicant downsizes his application or not, there are many concerns that the community wants to have resolved before any construction begins. These are described in the remaining paragraphs of this letter.

BACKGROUND

About November 2007, Sufism Reoriented (the applicant) requested a special board meeting of the SCA to make a presentation to the board members. A special meeting was scheduled for a week later, and Sufism Reoriented described their new, proposed sanctuary project. Only general information about the project was offered. No plans or descriptive information were given to the board at that time. The project was not well received by the board since it violated the basic mission and premise of the SCA which is to maintain the semi-rural residential nature of Saranap.

At that meeting it became clear that many board members shared the feeling that this sanctuary project was not suitable for the Saranap Area as it proposed to take as many as seven residential properties, destroying any existing homes thereon, and
converting those properties to non-residential uses if the County granted a land use permit for this purposes.

Saranap is a mature, residential community. There are few properties left for any major developments other than in-fill projects. The mission of the SCA has always been to work vigorously to maintain the semi-rural, residential nature of the Saranap Area. Any encroachment that is not residential, and even some higher-density housing projects, become a threat to this community, as each such encroachment erodes the community as a whole.

We were assured by the representatives of Sufism Reoriented that the County could not deny the use permit since the applicant was a “church,” presumably referring to the so-called RELUPA law. While that law does provide for reasonable growth of an established church in a residential neighborhood, it does not pro forma require the community to grant any approval for unlimited growth and expansion of this scope, especially to uses well beyond the reasonable needs of a church congregation.

Within a few weeks of the special board meeting, the majority of the board members of the SCA made their opposition to the project known to me as President of the board and the Association. It was clear that the majority of the board (seven of eleven members) were opposed to the project; the remaining four members who were not opposed are members of Sufism Reoriented.

THE SITE

The project design, as proposed, will overtake seven residential lots. The majority of the Saranap homeowners want the area to remain as a semi-rural, residential area. This sanctuary project will replace existing residential lots even though there is more than ample space on the existing property currently used by the church.

We did expect some growth for this church and believed that such growth could easily be accommodated within the current compound on White Horse Court which now houses the home of the Sufism Reoriented spiritual leader. We still feel that that property is more than adequate, even for a sanctuary. Since that compound was built, Sufism Reoriented has been buying more and more properties around their present site.

Owning so many properties in such a concentrated area would lead any reasonable person to “connect the dots,” and recognize that the properties owned are perfectly situated for a much larger, more ambitious, campus or enclave. Sufism Reoriented has claimed they would “probably” sell many of the properties to pay for construction of the sanctuary. This may or may not be true but in spite of many public opportunities to do so, they have made no promise to this community that expansion or construction would stop at this project.

Sufism Reoriented membership is cited as about 350 people, most of whom live within walking distance of the present church. Despite assurances from Sufism
Ms. LaShun Cross  
County File LP08- MS080011  
July 31, 2008

Reoriented that they think this project would accommodate all their needs for the future, we strongly suspect this project is just one more growth increment of a larger, regional plan leading to a major regional or national campus. It has been up to now, and all evidence points in that direction. Such growth will attract more Sufism Reoriented members to an increasingly expanding enclave. This would lead to devastation of the present Saranap Community.

ARCHITECTURAL DESIGN

The design, as proposed, is not suitable for this residential neighborhood. While the architect’s design is elegant and would fit well in a commercial setting, these domed buildings are an intrusion into a neighborhood of conventional single-family homes. To claim the domes represent the lines of the nearby hills yet won’t be visible from the street is disingenuous at best.

Based on the property holdings of the applicant, we expect to see growth of the compound as the congregation continues to grow – which, as pointed out earlier, it is bound to do with this larger facility. Again, we are not opposed to the church or its congregants. We are, however, vigorously opposed to any overtaking and conversion of any residential properties to accommodate this sanctuary, to the unsuitable architecture, and the likely future expansion into this older, quiet, residential neighborhood.

TRAFFIC

Sufism Reoriented claims there will be no increase in traffic. This certainly cannot be true at all for the construction phase, and we are concerned about the traffic of the occupancy phase, once the book store is opened and the sanctuary is available to its members. Despite assurances that church members will walk to church, we are sure that enough vehicular traffic will use the driveway opening onto Boulevard way to create a hazard. The driveway to this new and enlarged facility is proposed to be located at a point northbound on Boulevard Way after the sharp bend in the roadway at the Kinney Drive intersection. This intersection is already treacherous, requiring that drivers slow down to about 10 MPH in order to “look” around the bend for oncoming traffic before they can safely make a turn onto Kinney Drive. Furthermore, when turning into a driveway, they must do so rapidly to minimize the possibility of being rear-ended by northbound traffic on Boulevard Way that does not see the slowing vehicle until it’s too late. Increasing site distances may help, as could removing the proposed six-foot wall, but the reality is that accidents are going to occur.

BOOKSTORE IS A COMMERCIAL ENTERPRISE

Once built, the sanctuary building would hold a bookstore open to the public. Such a bookstore, even with its narrow interest, constitutes a commercial enterprise, and is definitely not suitable for a residential neighborhood. This would be true even if sales were limited to internet customers, as book deliveries and shipments will add
directly to the traffic burden near the treacherous intersections of Boulevard Way, Kinney Drive, Garden Court, and Iris Lane. Should this project be approved, we ask that the bookstore be disallowed.

COMPOUND WALL

Next, we object to a six-foot wall, or fence, around this compound. Granted, years ago we did not object to the present six-foot brick and stucco wall around the present White Horse Court compound, but in retrospect we see it clearly conveys a sense of exclusion and isolation to our Saranap visitors, neighbors, and passers-by. It is very institutional in form, and certainly not pleasant. And, by adding more, similar walls, the area will become an uninviting enclave resembling a penal institution.

ENVIRONMENTAL

We also have a number of concerns about the environmental impact of this project, both during construction phase and the later occupancy phase.

(1) SOILS: We are very much concerned about the condition of the deeper soil on the site and the disposal of excavation spoils. Since the plan is to build an underground complex over an acre in size (four times the size of a typical Saranap residential lot) and to a depth of greater than one story, we feel that before any soil is removed, the soil must be chemically sampled for contaminants by an independent, State-certified laboratory. Samples should be taken over the entire site at close intervals, at several levels, and to a depth of at least 20 feet. If any contaminants are found, a remediation plan must be developed and approved by the County before any soil removal begins.

A major portion of this site was previously the McGeehon Construction Company's corporation yard. Much of that yard was unpaved and heavy construction equipment repairs were done over the unpaved yard, year round, for many years— at a time when no one was concerned about the effects of dumping oils, solvents, or fuels into the ground. The existing facility on what is now White Horse Court did not reach as deep into the soil, compared to this new project. We expect a chemical analysis of deep soils will reveal diesel fuel and gasoline spills, asbestos, and hydraulic oils (a common source of Poly-Chlorinated Biphenyls (PCBs), a known cancer-causing agent (and banned by the State of California), ethylene glycol, and possibly elemental mercury from broken, high-current starter-contactor-relays used on diesel engines. The County’s experience with this type of site could suggest checking for other hazardous compounds, including lead-based paints.

(2) GROUNDWATER: During the 1990s, the State of California required that the oxidizing additive MTBE be included in gasoline. Later, MTBE was found to quickly contaminate soils around the stations dispensing this fuel, spreading much further than gasoline alone and contaminating water supplies long distances away from the source. Its use was discontinued by mandate of the State of California. However, the MTBE
plume remains in the soils and is still spreading. Cleanup is difficult if not impossible because of the mobility and nature of the MTBE compound itself. There are numerous groundwater springs in this area and a relatively high water table. It is more than likely that ground and/or ground water on or near this property has been contaminated.

(3) DRAINAGE: Any plan to develop this sanctuary, whether reduced in size or not, must include a comprehensive plan to accommodate any storm runoff safely. The Saranap Area has had continual problems with rain runoff and with storm drainage. Many homes face water damage during every winter during rainstorms. The properties directly across Warren Road have had severe erosion damage in recent years which has not been corrected by any agency.

We are also concerned that some of the chemicals mentioned in the previous paragraphs, as well as others, may be carried off the property, especially toward Las Trampas Creek which is located directly to the south of the proposed site. While the applicant has proposed interlocking pavers for their hardscape surfaces, ground saturation will allow hydrocarbon soil contaminants to float to the surface and be transported downhill. Should this new facility be approved, we would want a storm drain plan be prepared and implemented capable of handling 100-year storms without the runoff carrying chemicals off the site.

(4) LIGHTING: We are a “dark skies” neighborhood. We have no street lights and have resisted their installation. There are a number of amateur astronomers in the Saranap Area. In recent years, their numbers have reduced some due to light pollution, even in our semi-rural residential area. The applicant’s plan to illuminate the domes and the grounds, to heights of 33.5 feet above grade, will create a very objectionable sky-shine, seriously reducing the sensitivity of any astronomer’s instruments. Light pollution is “visible noise” and will mask the light of weaker stars otherwise visible on a dark, clear night, especially on more humid nights.

We object to any night lighting anywhere on or around this project. The Hidden Oaks project in nearby Lafayette agreed to this condition, and our night skies are reasonably free of scattered light from local sources that will impair and obscure night viewing. We do not wish to see any security or other lighting because this project should not impact our neighborhood astronomers.

(5) ENERGY IMPACT: While water fountains are lovely, we are well past the stage of being wasteful of water and electrical energy, especially in a state such as California where drought is a persistent problem. Water losses due to the increased evaporation of mist and the electrical energy needed to circulate the volume of water are a demand that should be eliminated to minimize the overall energy impact of this project.
NOTICING

We ask that you please notify us of any actions or hearings on this application and any projects related to this application, at the address above.

PUBLIC HEARING REQUEST

And finally, we request that a public hearing be held on this application with sufficient advance notice so that interested parties will be able to attend.

We appreciate the opportunity to comment upon the subject application for a land use permit on the multiple properties in question (parcel numbers 184-450-006, 184-450-007, 184-450-012, 184-450-031, 184-450-032, 184-450-033, and 184-450-034). Thank you for your consideration.

Sincerely,

\[Signature\]

SARANAP COMMUNITY ASSOCIATION
Dennis G. Collins, President

cc: The Honorable Gayle B. Uilkema
Contra Costa County Board of Supervisors
651 Pine Street, Room 108A
Martinez, CA 94553
TO: Ira G. Deitrick  
1300 Boulevard Way  
Walnut Creek, CA 94595  

RE: Parsonage for Sufism Reoriented  
11 White Horse Court  
Walnut Creek, CA 94595  

DATE: APRIL 26, 2010  
CCCFPD Project No. 113925-ALT  

The following is a response to your request for alternate methods approval concerning the above project. Your request to allow emergency vehicle access from Warren Road with approximately 104 feet of access being reduced to as low as 13 feet 6 inches in width has been approved based on the following conditions:

1. The existing fire sprinkler system in the Parsonage building shall be modified to include full protection without the omissions provided in Sections 6.8.2 through 6.8.6 of NFPA 13D 2002 Edition. The installing contractor shall submit three (3) sets of plans to this office for review and approval prior to installation.

2. Access from Warren Road to the Parsonage building (with the exception of the approved 104-foot portion stated above) shall have a minimum unobstructed width of 20 feet.

3. An approved fire truck turnaround shall be provided at the Parsonage building.

4. Emergency vehicle access, including the turnaround, shall have a paved surface capable of supporting an apparatus loading of 37 tons.

5. Signage shall be provided on Warren Road at the entrance to the private lane indicating the addresses for the residences that are accessed from this roadway.

6. "No Parking" signage shall be provided throughout the private access roadway.

7. Trees shall be trimmed and maintained to preserve a minimum vertical clearance of 13 feet 6 inches.

8. If the property at 2438 Warren Road (APN 184-450-022) is ever purchased by Sufism Reoriented, the private access roadway width at this location shall be increased to a minimum unobstructed width of 20 feet.

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT THE UNDERSIGNED.

Lewis Broschard - Acting Fire Marshal

File: 113925-alt
I FD.041 EXISTING PARSONAGE
* TYPE V-N CONSTRUCTION
* SPRINKLERED
* 2" WATER LINE
* EMERGENCY GENERATOR

I FD.011 MINIMUM 20' WIDE ACCESS ROAD WITH CONCRETE OR "GRASSPAVE2" ALL WEATHER DRIVING SURFACE; CAPABLE OF SUPPORTING IMPOSED LOADS (37 TONS) OF FIRE DISTRICT APPARATUS. NOTE: ACTUAL DRIVEWAY MAY BE WIDER

I FD.021 ACCESS ROAD MINIMUM OUTSIDE RADIUS OF 45'

I FD.031 ACCESS ROAD MINIMUM INSIDE RADIUS OF 25'

I FD.041 UPGRADE EXISTING FIRE SPRINKLER SYSTEM AT PARSONAGE TO FULLY COMPLY WITH NFPA 13D WITH NO OMISSIONS.

I FD.051 FIRE DEPARTMENT CONNECTION (FDC) AND POST INDICATOR VALVE (PIV) PROVIDED WITHIN 8' OF FIRE ACCESS ROAD AND WITHIN 40' OF FIRE HYDRANT

I FD.061 FIRE DEPARTMENT HYDRANT; PROVIDE A MAXIMUM OF 300' ON CENTER AND NOT MORE THAN 150' FROM ALL PROPERTY FRONTAGES; EAST BAY TYPE WITH ONE 4-1/2" AND ONE 2-1/2" OUTLETS AND MINIMUM FIRE FLOW IN ACCORDANCE WITH TABLE A-III-A-1 OF THE CFC

I FD.071 BUILDING ADDRESS SHALL BE ILLUMINATED, OF SUFFICIENT SIZE AND LOCATED TO BE READILY VISIBLE FROM THE STREET AND CONTRAST WITH THEIR BACKGROUND

I FD.081 TRIM AND MAINTAIN ALL TREES ON FIRE ACCESS ROAD WITH A MINIMUM VERTICAL CLEARANCE OF 13'-6".

PROPOSED NEW GARAGE
(E) GARAGE TO BE REMOVED

I FD.091 FIRE DEPARTMENT ACCESS POINT TO WITHIN 150' OF ALL PORTIONS OF THE NEW CHURCH

20' ACCESS & UTILITY ESMT PER 2003-0184165 (PCL FOUR) & 1996-0297536 (PCL THREE) & 1993-0316096

I FD.101 292' BETWEEN TWO ACCESS POINTS (300' MAX)

I FD.111 FIRE DEPARTMENT T-TURN TURNAROUND; MIN 100' LONG "T", R=32' AND MIN 20' WIDTH

I FD.121 FIRE DEPARTMENT SHUNT TURNAROUND; R=28' AND MIN. 20' WIDTH

I FD.131 PROVIDE AND INSTALL "NO PARKING - FIRE ACCESS ROAD" SIGNS PER CODE ON ACCESS ROAD FROM WARREN ROAD.

I FD.141 PROVIDE 20 FOOT WIDE FIRE ACCESS ROAD (WITH ALLOWANCE FOR APPROXIMATELY 104 FEET OF ACCESS ROAD THAT IS 13'-6" WIDE TO 15'-6" WIDE) FROM WARREN ROAD TO PARSONAGE.

I FD.151 PROVIDE FULL FIRE TRUCK TURN-AROUND AT PARSONAGE.

I FD.161 FIRE ACCESS ROAD SHALL BE AN ALL-WEATHER ROAD THAT SUPPORTS FIRE APPARATUS WEIGHING UP TO 37 TONS.

I FD.171 PROVIDE AND INSTALL SIGNAGE ON WARREN ROAD OF ADDRESSES FOR RESIDENCES ACCESSED BY FIRE ACCESS ROAD.
Dear Mr. Cross:

We have reviewed the revised development plan and land use permit application to combine seven parcels into one parcel and construct a 20,000 square foot sanctuary with 10,000 square feet below grade at the subject location. The following is required for Fire District approval in accordance with the Health and Safety Code, the 2007 California Fire Code (CFC), the 2007 California Building Code (CBC), and County Ordinances:

1. Access as shown on Sheet P3.0, dated 6/12/09, does not comply with Fire District requirements.

   Although access for the proposed sanctuary building meets minimum requirements, adequate access to the parsonage building has not been provided. Currently, the existing parsonage building meets minimum access requirements. The proposed sanctuary project eliminates the conforming access from Boulevard Way to the parsonage building and proposes that access be provided by a non-conforming roadway from Warren Road. The existing access from Warren Road is only twelve (12) feet wide. If this roadway is to provide access to the parsonage building, it is required to have a minimum clear width of twenty (20) feet throughout.

2. The turnaround for the parsonage building as shown on Sheet P3.0, dated 6/12/09, does not comply with Fire District requirements.

   Plastic cell systems, such as Grass Pave2, are not permitted for this application, however, the Fire District has approved concrete cell paving systems for turnarounds provided that the civil engineer of record for the project provides the Fire District with a stamped analysis that the proposed product and subgrade is capable of supporting a vehicle loading of 37 tons with a maximum of one-fourth-inch deflection. Additionally, porous paving systems are required to be delineated by a minimum six-inch wide concrete edging strip with reflective markers spaced at 25-foot intervals for emergency response identification.

3. Access roadways of less than 28-feet unobstructed width shall have signs posted or curbs painted red with the words "NO PARKING – FIRE LANE" clearly marked. 22500.1 CVC, (503.3) CFC

4. The developer shall provide one hydrant of the East Bay type. Hydrant location will be determined by this office. (C103.1) CFC

5. The developer shall submit three (3) copies of site improvement plans indicating all existing or proposed fire apparatus access for review and approval prior to construction. (501.3) CFC

6. Emergency apparatus access and hydrant shall be installed, in service, and inspected by the Fire District prior to construction or combustible storage on site. (501.4) CFC
7. Access gates for Fire District apparatus shall be a minimum of twenty (20) feet wide and swing inward or slide horizontally. Electrically operated gates shall be equipped with a Knox Company key-operated switch. Manually operated gates shall be equipped with a noncase-hardened lock or approved Fire District lock. Contact the Fire District for information on ordering the key-operated switch. (D103.5) CFC

8. The developer shall provide an adequate and reliable water supply for fire protection with a minimum fire flow of 1500 GPM. Required flow shall be delivered from not more than one hydrant flowing for the duration of 120 minutes while maintaining twenty (20)-pounds residual pressure in the main. (608.1), (B105) CFC

9. The building as proposed shall be protected with an approved automatic fire sprinkler system complying with the 2002 Edition of NFPA 13. Submit three (3) sets of plans to this office for review and approval prior to installation. (903.2) CFC

10. The sanctuary building and the existing parsonage shall be addressed from the roadway in which it is served. Premises identification shall be provided. Such numbers shall contrast with the background and be a minimum of six (6) inches high with one(1)-inch stroke or larger as required to be readily visible from the street. (505.1) CFC, (501.2) CBC

11. The developer shall submit three (3) complete sets of plans and specifications of the subject project, including the following required built-in fire protection systems, to the Fire District for review and approval prior to construction to ensure compliance with minimum requirements related to fire and life safety. Plan review fees will be assessed at that time. (901.2) CFC, (108.4.1) CBC

- Building construction plans
- Private underground fire service water mains
- Fire sprinklers
- Fire alarm

Our preliminary review comments shall not be construed to encompass the complete project. Additional plans and specifications may be required after further review.

Please provide this office with a copy of the conditions of approval as set forth by your Planning Division. If you have any questions regarding this matter, please contact the undersigned at (925) 941-3547.

Sincerely,

Ted Leach
Fire Prevention Technician

TL/cm

c: Christopher Martin
1300 Boulevard Way
Walnut Creek, CA 94595

Soga + Associates
657 Mission Street, Suite 408
San Francisco, CA 94105

Philip Johnson – Alan Ritchie Architects
4 Columbus Circle, Fifth Floor
New York, NY 10019

File: 109876 – Boulevard Way, Walnut Creek ltr
AGENCY COMMENT REQUEST

We request your comments regarding the attached application currently under review.

Please submit your comments as follows:

Project Planner: Jasmin Cross

Countty File Number: MS090008

Prior To: July 17, 2009

We have found the following special programs apply to this application:

- No Redevelopment Area
- No Active Fault Zone
- Flood Hazard Area, Panel #
- 60 dBA Noise Control
- No CA EPA Hazardous Waste Site
- Traffic Zone
- No CEQA Exempt
- Categorical Exemption Section

Please indicate the code section of recommendations that are required by law or ordinance. Please send copies of your response to the Applicant & Owner.

No comments on this application.

Our comments are attached.

Comments:

Signature

Agency

Date

RECEIVED
JUL 07 2009

CONTRA COSTA FIRE DISTRICT
109876
Subject: Sanctuary for Sufism Reoriented; MS08 0011
184-450-006, 007, 012, 031, 032, 033, 034
Boulevard Way, Walnut Creek
CCCFPD Project No.: 109876-PL

We have reviewed the development plan and land use permit application to combine seven parcels into one parcel and construct a 20,000 square foot sanctuary with 10,000 square feet below grade at the subject location. The following shall be included as part of the conditions of approval in accordance with the Health and Safety Code, the 2007 California Fire Code (CFC), the 2007 California Building Code (CBC), and other applicable regulations:

1. Access as shown on Sheet P3.1B, dated 5/12/08, does not comply with Fire District requirements. Although access for the proposed sanctuary building meets minimum requirement, adequate access to the parsonage building has not been provided. Currently the existing parsonage building meets minimum access requirements. The proposed sanctuary project eliminates the conforming access from boulevard Way to the parsonage building and proposes that access be provided by a non-conforming roadway from Warren Road. The minimum required width for roadways providing access to more than two homes is 20 feet. The existing access from Warren Road is only 12 feet and would serve four residences. In addition, access roadways exceeding 150 feet in length require provisions for the turning around of Fire District apparatus, which has not been provided in this proposal.

The developer shall provide an emergency apparatus access roadway with an all-weather driving surface of not less than 20-feet unobstructed width, and not less than 13 feet six inches of vertical clearance, to within 150 feet of travel distance to all portions of the exterior walls of every building. Access roadways shall have a minimum outside turning radius of 45 feet, and must be capable of supporting the imposed apparatus loading of 37 tons. (503) CFC
2. Dead-end emergency apparatus access roadways in excess of 150 feet in length shall be provided with approved provisions for the turning around of Fire District apparatus. Contact the Fire District for approved designs. (503.2.5) CFC

3. Access of less than 28-feet unobstructed width shall have NO PARKING – FIRE LANE signs posted or curbs painted red with the words NO PARKING – FIRE LANE clearly marked. 22500.1 CVC

4. The developer shall provide one hydrant of the East Bay type. Hydrant location will be determined by this office. (C103.1) CFC

5. The developer shall submit three copies of site improvement plans indicating all existing or proposed fire apparatus access for review and approval prior to construction. (501.3) CFC

6. Emergency apparatus access roadways and hydrant shall be installed, in service, and inspected by the Fire District prior to construction or combustible storage on site. (501.4) CFC

Note: Gravel is not considered an all-weather roadway surface for emergency apparatus access. The first lift of asphalt concrete paving shall be installed as the minimum subbase material and capable of supporting the designated gross vehicle weight specified above.

7. Access gates for Fire District apparatus shall be a minimum of 20-feet wide. Access gates shall swing inward and be setback from public right-of-way by a minimum of 30 feet. Electrically operated gates shall be equipped with a Knox Company key-operated switch. Manually operated gates shall be equipped with a noncasehardened lock or approved Fire District lock. Contact the Fire District for information on ordering the key-operated switch. (D103.5) CFC

8. The developer shall provide an adequate and reliable water supply for fire protection with a minimum fire flow of 1500 GPM. Required flow shall be delivered from not more than one hydrant flowing for the duration of 120 minutes while maintaining 20-pounds residual pressure in the main. (508.1), (B105) CFC

9. The building as proposed shall be protected with an approved automatic fire sprinkler system complying with the 2002 edition of NFPA 13. Submit three sets of plans to this office for review and approval prior to installation. (903.2) CFC

10. The proposed sanctuary shall be addressed from Boulevard Way, whereas the existing parsonage building shall maintain addressing from Warren Road.

11. Premises identification shall be provided. Such numbers shall contrast with their background and be a minimum of four inches high with ½-inch stroke or larger as required to be readily visible from the street. (505.1) CFC, (501.2) CBC
12. The developer shall submit three complete sets of plans and specifications of the subject project, including the following required built-in fire protection systems, to the Fire District for review and approval prior to construction to insure compliance with minimum requirements related to fire and life safety. Plan review fees will be assessed at that time. (901.2) CFC, (108.4.1) CBC

- Building construction plans
- Private underground fire service water mains
- Fire sprinklers
- Fire alarm

*The above-referenced CCCFPD Project Number shall be required in all correspondence or communication with the Fire District.*

Our preliminary review comments shall not be construed to encompass the complete project. Additional plans and specifications may be required after further review.

Please provide this office with a copy of the conditions of approval as set forth by your Planning Division for our files.

If you have any questions regarding this matter, please contact this office at 925.941.3300.

Sincerely,

Ted Leach
Fire Prevention Technician

TL/mm

c: Christopher Martin
1300 Boulevard Way
Walnut Creek, CA 94595

Soga + Associates
657 Mission Street, Suite 408
San Francisco, CA 94105

Philip Johnson – Alan Ritchie Architects
4 Columbus Circle, 5th Floor
New York, NY 10019

File: 109876 – Boulevard Way, Walnut Creek ltr
AGENCY COMMENT REQUEST

We request your comments regarding the attached application currently under review.

DISTRIBUTION

- ✔ Building Inspection/Grading Inspection
- ✔ HSD, Environmental Health, Concord
- ✔ HSD, Hazardous Materials
- ✔ P/W - Flood Control (Full Size)
- ✔ P/W - Engineering Svcs (Full Size)
- ✔ Date Forwarded
- ✔ P/W Traffic (Reduced)
- ✔ P/W Special Districts (Reduced)
- ✔ Comprehensive Planning
- ✔ Redevelopment Agency/Housing
- ✔ Historical Resources Information System
- ✔ CA Native Amer. Her. Comm.
- ✔ CA Fish & Game, Region
- ✔ US Fish & Wildlife Service
- ✔ Fire District
- ✔ Sanitary District
- ✔ Water District
- ✔ City
- ✔ School District
- ✔ Alamo Improvement Association
- ✔ El Sobrante Plg. & Zoning Committee
- ✔ MAC
- ✔ DOIT - Dep. Director, Communications
- ✔ CAC R-7A Alamo
- ✔ CDD-GIS
- ✔ LAFCO

Community Organizations

- ✔ Parkmead comm. Assoc.
- ✔ D. Myers - Geologist
- ✔ Transportation Planning

Please submit your comments as follows:

- Project Planner: Lashun Cross
- County File Number: 508-2034/MS080011
- Prior To: August 1, 2008

We have found the following special programs apply to this application:

- ✔ Redevelopment Area
- ✔ Active Fault Zone
- ✔ Flood Hazard Area, Panel #
- ✔ 60 dBA Noise Control
- ✔ CA EPA Hazardous Waste Site
- ✔ Traffic Zone
- ✔ CEQA Exempt

Categorical Exemption Section

Please indicate the code section of recommendations that are required by law or ordinance. Please send copies of your response to the Applicant & Owner.

- ✔ No comments on this application.
- ✔ Our comments are attached.

Comments: To be designed

Signature: 7/21/08

Agency

Date
July 17, 2008

Lashun Cross, Project Planner
Contra Costa County
Community Development Department
651 Pine Street
4th Floor, North Wing
Martinez, CA 94553

re: LP08-2034, MS080011 / 2428 Warren Road, Walnut Creek / Christopher D. Martin

Dear Lashun Cross:

Records at this office were reviewed to determine if this project could adversely affect cultural resources. Please note that use of the term cultural resources includes both archaeological sites and historical buildings and/or structures. The review for possible historic-era building/structures, however, was limited to references currently in our office and should not be considered comprehensive.

Previous Studies:
XX This office has no record of any previous cultural resource studies for the proposed project area.

Archaeological and Native American Resources Recommendations:
XX The proposed project area has the possibility of containing unrecorded archaeological site(s). A study is recommended prior to commencement of project activities.

XX We recommend you contact the local Native American tribe(s) regarding traditional, cultural, and religious values. For a complete listing of tribes in the vicinity of the project, please contact the Native American Heritage Commission at 916/653-4082.

Built Environment Recommendations:
XX The 1948 USGS Concord 15' quad depicts seven buildings in the proposed project area. Since the Office of Historic Preservation has determined that any building or structure 45 years or older may be of historical value, if any of these structures are still standing, it is recommended that prior to commencement of project activities, a qualified architectural historian familiar with Contra Costa County history conduct a formal CEQA evaluation.

If archaeological resources are encountered during the project, work in the immediate vicinity of the finds should be halted until a qualified archaeologist has evaluated the situation. If you have any questions please give us a call (707) 6640880.

Sincerely,

Jillian E. Guldenbrein
Researcher I

cc: Christopher D. Martin
Sufism Reoriented
1300 Boulevard Way
Walnut Creek, CA 94595
AGENCY COMMENT REQUEST

We request your comments regarding the attached application currently under review.

DISTRIBUTION

- Building Inspection/Grading Inspection
- HSD, Environmental Health, Concord
- HSD, Hazardous Materials
- P/W - Flood Control (Full Size)
- P/W - Engineering Svs (Full Size)
- Date Forwarded
- P/W Traffic (Reduced)
- P/W Special Districts (Reduced)
- Comprehensive Planning
- Redevelopment Agency/Housing
- Historical Resources Information System
- CA Native Amer. Her. Comm.
- CA Fish & Game, Region
- US Fish & Wildlife Service
- Fire District
- Sanitary District
- Water District EBMUD
- City Walnut Creek
- School District
- Sheriff Office - Admin. & Comm. Svs.
- Alamo Improvement Association
- El Sobrante Plg. & Zoning Committee
- MAC Saravo
- DOIT - Dep. Director, Communications
- CAC R-7A Alamo
- CDD-GIS
- LAFCO

Community Organizations

- Parkmead Comm. Assoc.
- D. Myers - Geologist
- Transportation Planning

Please indicate the code section of recommendations that are required by law or ordinance. Please send copies of your response to the Applicant & Owner.

- No comments on this application.
- Our comments are attached.

Comments:

Please submit your comments as follows:

- Project Planner: Lashun Cross
- County File Number: 2008-2034/MS080011
- Prior To: August 1, 2008

We have found the following special programs apply to this application:

- No Redevelopment Area
- No Active Fault Zone
- Flood Hazard Area, Panel #
- 60 dBA Noise Control
- No CA EPA Hazardous Waste Site
- Traffic Zone
- No CEQA Exempt
- Categorical Exemption Section

Signature: [Signature]
Agency: [Agency]
Date: [Date]
Interoffice Memo

TO: Lashun Cross, Senior Planner, Department of Conservation and Development

DATE: August 7, 2008

FROM: Teri E. Rie, Associate Civil Engineer, Flood Control

SUBJECT: LP 08-2034/MS 08-0011 — 30-Day Comments

FILES: 92-2034-08 & 1003-0011-08

MESSAGE:

We have reviewed the Land Use Permit (LP) and Minor Subdivision (MS) applications and Preliminary Site Plan for Sufism Reoriented located along Boulevard Way (APN 184-450-006, -007, -012, -031 through -034). The submittal was received by our office on July 30, 2008, and we offer the following comments:

1. The proposed project is located in Drainage Area 121, an unformed drainage area. Therefore, there are no drainage area fees due at this time.

2. According to our records, there was a complaint against APN 184-450-032 on January 19, 2001, regarding the 8-feet tall concrete wall built abutting APN 184-450-017 at that time. Complainant was concerned that the wall may impede the natural, historic drainage for his son’s property (APN 184-450-017). Complainant also asked about public comment period for the construction of the wall because he was unaware of one. We are not sure if the Complainant received a copy of Notice of Intent to Render Administrative Decision, dated January 11, 2001.

3. The developer should be conditioned to design and construct storm drain facilities to adequately collect and convey stormwater entering or originating within the development to the nearest adequate man-made drainage facility or natural watercourse, without diversion of the watershed, per Title 9 of the County Ordinance Code.
4. The applicant should be required to submit hydrology and hydraulic calculations to the Engineering Services Division of the Public Works Department that prove the adequacy of the in-tract drainage system and the downstream drainage system.

5. It appears that this development will create higher density than the zoned R-10 use, which may contribute more runoff than originally anticipated into Las Trampas Creek. The applicant should be required to submit hydrology and hydraulic calculations to the Engineering Services Division of the Public Works Department, showing how the 50-year design storm plus freeboard and the 100-year design storm affects Las Trampas Creek.

6. The applicant should be required to comply with the current NPDES (National Pollutant Discharge Elimination System) requirements under the County Stormwater Management and Discharge Control Ordinances and the C.3 Guidebook. We support the State's goal of providing best management practices to achieve the permanent reduction or elimination of stormwater pollutants and downstream erosion from new development. The Contra Costa County Flood Control & Water Conservation District is available to provide technical assistance for meeting these requirements under our Fee-for-Service program.

If you have any questions, please call Jane Kao at (925) 313-2179 or me at (925) 313-2363.
TO: Lashun Cross, Senior Planner, Department of Conservation and Development

DATE: August 5, 2008

FROM: Laurie Sucgang, Staff Engineer, Engineering Services Division

SUBJECT: PERMIT LP 08-2034/SUBDIVISION MS 08-0011 ADDITIONAL COMMENTS – BOULEVARD WAY (Sufism Reoriented/Boulevard Way/Walnut Creek/APN 184-450-006, -007, -012, -031 through -034)

FILE: LP 08-02034

As indicated in our previous memorandum, dated July 22, 2008, additional comments from our Transportation Engineering Division would be forwarded upon receipt. The following are additional comments from our Transportation Engineering Division:

**Boulevard Way**

- The Site Plan and Tentative Map, received by your office on July 3, 2008, were not consistent with the 'Revised Precise Alignment Study for Boulevard Way' (Study). The Study was distributed to the applicant's representative and engineer at a meeting on December 19, 2007, and is attached to this memorandum for your use and distribution.

- The applicant will be required to widen and improve Boulevard Way along the project frontage to provide a pavement half width of 24 feet and a right-of-way half width of 34 feet. The alignment shall be in accordance with the Study (see attached). Any future submittal of the Site Plan and Tentative Map shall clearly show the required right-of-way dedications and roadway improvements in accordance with the Study.

LS:ms
G:\EngSvc\Land Dev\LP\LP 08-2034, MS 08-0011\transp comments.docx

Attachment

cc: G. Huisingh, Engineering Services
S. Gospodchikov, Engineering Services
M. Sen, Engineering Services
J. Caldwell, Transportation Engineering
Sufism Reoriented (w/ attachment)
Attn: Christopher D. Martin
1300 Boulevard Way
Walnut Creek, CA 94595
REVISED PRECISE ALIGNMENT FOR

BOULEVARD WAY

FROM SARANAP AVENUE TO OLYMPIC BLVD.
APPROX. LENGTH 3.150'- 0.60 MILES
ROAD NO. 3851

INDEX TO SHEETS
Sheet No.
1 Title Sheet
2, 3 Right of Way

LEGEND

 Existing R/W
 Proposed R/W
 Proposed centerline
 Existing centerline

BEARINGS, DISTANCES AND COORDINATES SHOWN ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM ZONE #CCS 271.
TO OBTAIN GROUND DISTANCES, MULTIPLY GIVEN DISTANCES BY 1.0000685

NOTE: SEE PRECISE ALIGNMENT FOR BOULEVARD WAY, FILE NO. PA3851-69, RECORDED APRIL 28,1969 IN BOOK 5662 OF OFFICIAL RECORDS AT PAGE 420.
ADDITIONAL RIGHT OF WAY MAY BE REQUIRED FOR CHANNELIZATION AT EXISTING OR NEW ROAD INTERSECTIONS.

BOULEVARD WAY
FROM SARANAP AVENUE TO OLYMPIC BLVD.
Lashun Cross, Senior Planner  
Contra Costa County  
Conservation & Development Department  
651 Pine Street, 2nd Floor, North Wing  
Martinez, CA 94553

Subject: Geologic Hazard Review – 30-Day Comments  
LP08-2034 / Sufism Reoriented  
APN 184-450-006, -007, -012, -031, -032, -033 & -034  
Saranap Area, Contra Costa County  
DMA Project # 3084.08

Dear Lashun:

Based on your authorization we have reviewed the application materials for the proposed religious facility. The property fronts on the southeast flank of Boulevard Way, just north of the Warren Road intersection. The materials reviewed included a project description, along with a geotechnical report.

Approach

We reviewed pertinent geologic literature, the Safety Element of the County General Plan, and 1973 aerial photographs. With this background we evaluated potential geologic and seismic impacts and mitigation measures. We then reviewed the geotechnical report.

Background

1. Graymer, Jones & Brabb

The most recent geologic map of Contra Costa County is a digitized bedrock geology map issued by the U.S. Geological Survey. This map, which was published in 1994, is based on compilation of previous mapping and thousands of hours of field mapping to resolve geologic problems. This map classifies all valley bottom and esturine deposits as “Undivided Quaternary Deposits” (Qu). According to this map, the proposed Sufism Reoriented property is mapped as Briones formation (Tbr).

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With respect to geologic structure, the site is bracketed to the east and west by north-northwest trending faults (possible ancestral branches of the Calaveras fault). In areas underlain by alluvium, these traces are represented by black dotted lines (see Figure 1). This symbol indicates that the fault is not known to offset Quaternary deposits, and the location of the fault traces is not accurately located. By interpolation from nearby measurements of bedding, the site is inferred to be near the axis of a northwest-trending anticline.

2. Bedrock Geology

Perhaps the most detailed geologic map of Walnut Creek area is a color, bedrock geology map published by the California Division of Mines and Geology in 1973 (see Figure 2). This map was published at a scale of 1:12,000, and is based on field geologic mapping, along with photointerpretation and literature review. According to this map, the site is located on the floor of a narrow valley. The valley bottom area that is mapped as "Quaternary terrace deposits" (Qt), which are locally overlain by a thin accumulation of younger alluvial deposits described as "Slopewash" (Qsw). These are Holocene colluvial and alluvial fan deposits. Exposed in the banks of Las Trampas Creek approximately 300 feet south of the site, Saul indicated that bedrock of the Rodeo Formation (Tr) and Briones Sandstone (Tbs) are exposed. With regard to geologic structure, a northwest-trending trace of the ancestral Calaveras fault is mapped passing approximately 1/2 mile east of the site. This fault is not considered active by the U.S. Geological Survey (USGS). No faults cross the property but the axis of a northwest-trending anticlinal fold which is in the bedrock crosses the site. No landslides are mapped in the site vicinity. The nearest active Concord fault is mapped approximately 5 miles northeast of the site.

3. Quaternary Deposits

The project is located in the central portion of Contra Costa County, on the floor of the Las Trampas Creek Valley. Most published geologic maps interpret the site as being underlain by Quaternary alluvium (undifferentiated). However, in 1997 the U.S. Geological Survey issued a surficial deposits map of Contra Costa County and adjacent area that divides Quaternary deposits into nine categories. Briefly summarized, the map shows three types of Quaternary deposits in the general vicinity of the site: Alluvial fan and fluvial deposits (Holocene) - Qpaf; Alluvial fan and fluvial deposits (Pleistocene) - QpaP; and undifferentiated gravel deposits (Pliocene and Pleistocene) - QTu.

Table 1 provides data on the age, texture, depositional environment and engineering significance. According to this map the site is mapped as QTu. The upland areas that flank the valley floor are mapped as bedrock (br). The nearest bedrock outcrop is approximately 500 feet northwest of the site.

<table>
<thead>
<tr>
<th>QUATERNARY DEPOSITS OF THE SITE VICINITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qpaf</td>
</tr>
<tr>
<td>QTu</td>
</tr>
</tbody>
</table>

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4 Graymer, Saul, R.B., 1973 Geology and Slope Stability of the SW 1/4 of the Walnut Creek Quadrangle, Contra Costa County, California, CDMG (now California Geological Survey) Map Sheet 16.

In 1975 the U.S. Geological Survey issued photointerpretative maps of landslides and other surficial deposits of Contra Costa County at a scale of 1 inch = 2,000 feet. This map set is included in the Safety Element, where it is used as screening criteria to determine if there are potential landslide hazards on sites proposed for subdivision or development. Figure 3 shows the site and vicinity. It indicates that the site is within an area mapped as “bedrock” (r), with “colluvial deposits” mapped along the Boulevard Way frontage of the property.

4. Seismicity

There are no Alquist-Priolo Earthquake Fault Zones in the Saranap area. The active Concord fault is mapped 5 miles northeast of the site. North of the Town of Danville the Calaveras fault is not considered active by the USGS or CGS because there is no confirmed evidence of surface fault rupture during Holocene time (i.e., within last 11,000 years before present). However, this fault system is a potential seismic source, and a 1998 report prepared by Geomatrix found evidence of activity during the Late Quaternary on this fault system within the Walnut Creek area (minor offset with a right-normal-oblique sense of displacement). The alluvium that was offset was dated 31,410 radio-carbon years before present. The active Hayward fault is mapped 8 miles southwest of the site.

5. Liquefaction Potential

With regard to liquefaction potential, the Safety Element of the General Plan divides Contra Costa County into three categories: “generally high,” “generally moderate to low,” and “generally low.” According to this map, the site is in the “generally moderate to low” category. The Safety Element includes a number of policies indicating that at-risk areas require evaluation of liquefaction potential and effective mitigation of the hazard posed to new development. Operative General Plan policies are presented in Table 2.

This map is used as a “screening criteria” by Contra Costa County during the processing of land development applications. The County requires rigorous evaluation of liquefaction potential in areas of “high potential,” and less comprehensive investigations are demanded in the “moderate to low” category. The classification “generally high” liquefaction potential does not imply the presence of liquefiable

<table>
<thead>
<tr>
<th>Table 2</th>
<th>GENERAL PLAN LIQUEFACTION POLICIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-18</td>
<td>This General Plan shall discourage urban or suburban development in areas susceptible to high liquefaction dangers and where appropriate subject to the policies of 10-20 below, unless satisfactory mitigation measures can be provided, while recognizing that there are low intensity uses such as water-related recreation and agricultural uses that are appropriate in such areas.</td>
</tr>
<tr>
<td>10-19</td>
<td>To the extent practicable, the construction of critical facilities, structures involving high occupancies, and public facilities shall not be sited in areas identified as having a high liquefaction potential, or in areas underlain by deposits classified as having a high liquefaction potential.</td>
</tr>
<tr>
<td>10-20</td>
<td>Any structures permitted in areas of high liquefaction damage shall be sited, designed and constructed to minimize dangers from damage due to earthquake-induced liquefaction.</td>
</tr>
<tr>
<td>10-21</td>
<td>Approvals to allow the construction of public and private development projects in areas of high liquefaction potential shall be contingent on geologic and engineering studies which define and delineate potentially hazardous geologic and/or soils conditions, recommend means of mitigating these adverse conditions, and on proper implementation of the mitigation measures.</td>
</tr>
</tbody>
</table>

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sands on a parcel. The map attempts to be conservative of the side of safety, and where geologically recent alluvial and esturine deposits are shown on soils maps of the County, the map considers the property to be in the "generally high" category. Site specific investigations are needed to determine if liquefiable sands are present and to provide stabilization measures where liquefiable sands are confirmed. Because the site is in the "generally moderate to low" category, rigorous evaluation of liquefaction potential is not required.

6. Soils

According to the Soil Survey of Contra Costa County, the soil on the site is Tierra loam, 9 to 15 percent slopes (TaD). This is a soil which forms on alluvial fans and flood plains. It is a Class IV (i.e., non-prime) agricultural soil. With regard to its engineering properties, it has low strength when wet, a moderate to high shrink-swell potential, and a moderately slow permeability, and high corrosivity.

DCM Engineering

1. Purpose

The purpose of the geotechnical investigation was to provide specific criteria and standards for the geotechnical aspects of the project. DCM Engineering (DCM) estimates that excavations for building construction will be on the order of 20 feet (east side) and 30 feet (west side).

2. Subsurface Investigation

DCM logged six borings on the 3.1-acre site during 2007. The borings ranged from 33 to 40 1/2 feet in depth. The location of the borings are shown in Figure 2 of the geotechnical report. Boring B-4 was located near the center of the proposed sanctuary building, and the other five borings were positioned near the corners of the building. Table 3 provides a summary of the borehole data. The logs indicate that the site is underlain by alluvial deposits that are 23 to 30 feet thick in the borings. The alluvium consists of clay and silty clay interbedded with poorly sorted sand and gravel. Typically sieve testing found the sands to be 30 to 60 percent matrix material (clay and silt). The bedrock is described as siltstone/claystone which is severely weathered with a 20% ± moisture content. The lithologic description is consistent with the Rodeo Shale bedrock.

Two generally east-west cross-sections were prepared by DCM. One section is near the north wall of the sanctuary, and the other near the south wall of the sanctuary. They indicate that the excavations for the structure will not extend into bedrock. The excavation for the sanctuary will penetrate up to

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Table 3

<table>
<thead>
<tr>
<th>Boring No.</th>
<th>Total Depth (ft)</th>
<th>Depth to Bedrock (ft)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1</td>
<td>33</td>
<td>23</td>
<td>Groundwater at 23 ft.</td>
</tr>
<tr>
<td>B-2</td>
<td>37½</td>
<td>27</td>
<td>Groundwater at 24 ft.</td>
</tr>
<tr>
<td>B-3</td>
<td>32½</td>
<td>27½</td>
<td>Groundwater at 15 ft.</td>
</tr>
<tr>
<td>B-4</td>
<td>39 ½</td>
<td>29</td>
<td>Groundwater at 27 ft.</td>
</tr>
<tr>
<td>B-5</td>
<td>38</td>
<td>27</td>
<td>Groundwater at 20 ft.</td>
</tr>
<tr>
<td>B-6</td>
<td>40 ½</td>
<td>30</td>
<td>No free groundwater</td>
</tr>
</tbody>
</table>

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Page 5

5 feet of undocumented fill that is underlain by interbedded clayey sediments and gravelly/sandy soils. The elevation of the building lower floor is anticipated to be at or below the water table.

3. Geologic Hazards

DCM indicates that a detailed hazards assessment was not included in their scope of work. Nevertheless, preliminary comments are provided (see Table 4).

5. DCM Conclusions

The geotechnical constraints influencing design, construction and long-term performance of the sanctuary include a) shoring and dewatering during construction to protect existing improvements, b) excavation base stability (heave, boiling, pumping), c) differential depth to bedrock below lower floor level of sanctuary building, d) bedrock corrosivity, e) foundation subgrade (bearing capacity/settlement), f) structure backfill (engineering properties/compaction criteria), and g) seismic design parameters (2007 California Building Code) are not included.

6. Recommendations

The DCM report provides specific criteria and standards for grading, drainage, foundations, temporary support of construction walls, and other geotechnical aspects of the project. It also identifies the required geotechnical monitoring and construction observation.

DMA Evaluation

1. Geologic Setting & Potential Hazards. The subsurface data is consistent with the project site being underlain by 23 to 30 feet (or more) of Plio-Pleistocene alluvium (QTu). Beneath the alluvium the borings of DCM encountered clayey bedrock that can be inferred to be Rodeo shale. The soils are likely to be at least moderately expansive, and the bedrock is reported by DCM to be very highly corrosive, which will affect the concrete mix and specifications for steel in the project. The data provided indicate that the risk of landsliding, liquefaction and surface fault rupture are less-than-significant.

2. Findings. In our opinion the report is adequate for the processing of the land use permit application. However, the construction of the project must be based on the 2007 California Building Code. DCM should provide the project architects and engineers with seismic parameters from that code (not the 1997 UBC). It should also be recognized that the Building Official may have other requirements or require further geotechnical analysis prior to issuance of construction permits.

Table 4

DCM HAZARD ASSESSMENT

- Faults and Fault Rupture: No active faults are shown trending beneath the site.
- Seismic Shaking: DCM provides an overview of seismic setting of the site. The report provides 1997 UBC seismic parameters. (Compliance with the building code criteria and standards does not indicate risk of structural damage can be avoided, but codes are intended to mitigate damage potential.)
- Liquefaction: The liquefaction potential of the materials penetrated in the borings was rated “nil” by DCM due to their density and clay content.
- Expansive Soils: The clayey alluvial deposits are considered to be moderately expansive.
- Corrosivity: The bedrock resting indicated that the weathered bedrock is very corrosive.
Limitations and Purpose

It should be recognized that the purpose of our review was to provide a professional opinion on the documents provided by the applicant. Specifically, we provide technical advice to assist the Department of Conservation & Development with discretionary permit decisions. Our services have been limited to review of the referenced reports. Our opinions and conclusions are made in accordance with generally accepted principles and practices of the engineering geology profession.

We trust this letter provides the evaluation and comments that you requested. Please call if you have any questions.

Sincerely,

DARWIN MYERS ASSOCIATES

Darwin Myers, CEG 946
Principal

cc: Gary Faria, Grading Division, DCD
DCM Engineering
Applicant
Surficial Deposits
Qu - Undivided Quaternary deposits

Assemblage II
Tus - Unnamed sedimentary and volcanic rocks
Tn - Neroly Formation - blue sandstone
Tbr - Briones Formation, undivided
Tr - Rodeo shale

Assemblage IV
Tes - Escobar Sandstone
Tmr - Muir Sandstone
Tlj - Las Juntas Shale
Tljl - Lower Las Juntas Shale - sandstone member
Tv - Vine Hill Sandstone

Assemblage V
Tgvt - Green Valley / Tassajara Group

Figure 1
U.S.G.S. Geologic Map
source: Open File Report 94-622
Artificial fill or cut
Slopewash
Soil and rubble
Alluvium
Terrace deposits
Gravel, sand, silt and clay.
Locally capped by gravel (Qig).

Orinda Formation
Generally soft sandstone, siltstone, and claystone,
some hard sandstone and conglomerate units.
Top = Pinole member
Typ. half breccia and indurated sediments.
Top = Moraga Basalt member
Fissile and dense non-vesicular basalt.

Neroly Formation
Sandstone and shales grading upward to increasing proportion of shales and some conglomerate.
sh denotes two main shale units.

Cerrito Sandstone
Massive to well bedded, fine to coarse grained,
abundantly fossiliferous sandstone.

Briones Formation
Tbs = Shale member
Clay shale and shaly siltstone. Plant/foraminifera sandstones with
neither parallel mapped.
Tbs = Sandstone member
Mostly fine to coarse grained sandstone, interbedded with shaly siltstone and mudstone.

Rodeo Formation
Shale, plant/foraminifera fissile and friable
mudstone, argillaceous siltstone and shaly
fine-grained mudstone, sandstone.

Figure 2
Saull Geologic Map
source: CDMG Map Sheet 16
Landslide Deposit. Arrows indicate general direction of downslope movement. Queried where uncertain.

Qa1 Alluvial Deposit
Qa2 Alluvial Terrace Deposit. Queried where uncertain
Qaf Colluvial Deposit and/or Small Alluvial Fan Deposit
Qaf Artificial Fill
Qaf Bedrock. Queried where identification uncertain

Figure 3

Landslide & Other Surficial Deposits Map

source: Nilsen (1975)
Exhibit F

October 3, 2011
Zoning Administrator
Determination on Adequacy of EIR
Transcript
Two Letters Received
PAT ROCHE: First up, we have Marie Cooper with the applicant’s law firm.

MARIE COOPER: Good afternoon. My name is Marie Cooper. I’m with the law firm of Perkins Coie and I represent the applicants, Sufism Reoriented. We started this project back in 2008. It’s been well over three years of study. We’ve done more study than would normally be required for a project this size. County has a rule saying traffic studies are not required if you’re going to generate less than 100 trips during peak hours. We none the less agreed to do a traffic study. We requested the County to prepare an EIR even though every study we had showed that a mitigated negative dec would be appropriate. The County has studied this extensively. It’s been a very long, very expensive process and we have a full comprehensive document before us. The only issue that I can see in there is a practical one, not a legal one, and that it was difficult to find where the revisions to text in the Final EIR had been made. I submitted a chart to the County where we went through and detailed where you could find each of those revisions to text in the Final EIR. We urge that you recommend certification of this document is adequate and completed in compliance with CEQA. I would like to reserve any time at the end in case there are questions.

PAT ROCHE: Thank you. The next speaker is Patricia O’Leary.

PATRICIA O’LEARY: My name is Patricia O’Leary and I live at 1305 Boulevard Way in Walnut Creek. As a member of Sufism Reoriented, I coordinate large sewing projects like making gowns for the singers in our performing chorus, smocks for the teachers at the Meher school or dancewear for performers in our devotional programs. We have no room for these activities in our current church building, so for several years we’ve had the living room of my home entirely filled with sewing machines and tables of sewing equipment. I will be very grateful for this new building and its adequate space for activities like sewing that support the ways that we express our devotion. It’s a relief to me to see the EIR rejected the alternative of a smaller building because I know our need for space. I want to say thank you to the County for recognizing this.

PAT ROCHE: The next speaker is Tom Smith.

TOM SMITH: My name is Tom Smith. My wife and I live at 27 Camino Posado Court on the south side of Warren Road above the creek. Our home is on the creek. Many of my neighbors were concerned about the exasperation possibly of erosion along the hillside above the creek so I was pleased to see the thorough and scientific investigation that the EIR took to this issue of vibration from excavation and construction activities. That is very reassuring.
PAT ROCHE: The next speaker is Ivy Summers.

IVY SUMMERS: I’m Ivy Summers and I live in apartment 311 at 1336 Boulevard Way. My apartment is an end unit right next to the sanctuary site. My bedroom and my living room face Boulevard Way and I’ve been thinking about how the noise of construction and trucks coming to the site will affect me. I understand that there is always disruption during periods of construction and that’s a necessary cost for a neighborhood to bear to benefit from long term improvements. From the mitigations described in the EIR, it looks like construction noise will be kept to a minimum and will be well within normal working hours. I’m sure that everyone wishes that the building could just appear on site without going through a construction phase, but obviously that is not possible. I appreciate that the EIR sets clear limits on the noise that will be generated by the project. I think this is one of those tradeoffs where there is a short period of inconvenience and then there is the reward of a beautiful sanctuary. Thank you.

PAT ROCHE: Thank you. The next speaker I have is Lorraine Granite.

LORRAINE GRANITE: My name is DR. Lorraine Granite. I live at 1312 A Boulevard Way, Walnut Creek and I also have a psycho therapy office on Boulevard Way. I managed Sufism Reoriented’s Traffic Management Plan which limits the number of cars parking at the church. Four years ago, we set a limit of 71 cars for our regular meetings with the exception of one night within the first few nights of inception. We have met that goal for every regular meeting every year. To do that, one half our members walk and others carpool. Even though our TDM plan is not a CEQA topic, I am pleased to see that the EIR writes about our TDM plan in a very knowledgeable and positive way. The County has gained a good understanding of the benefits of our plan and that speaks well of a plan like ours and that speaks well for the quality of this entire EIR. Thank you.

PAT ROCHE: Thank you. The next speaker I have is Ken Hastings.

KEN HASTINGS: My name is Ken Hastings. I live at 1310 A Boulevard Way in Walnut Creek. I was concerned about the possible problem of increased traffic in the neighborhood, so I was pleased to hear that that was addressed. I have grandchildren in the area and it means a lot to me to be able to walk in the neighborhood with my grandchildren. I’d like to praise the EIR and the County for addressing this traffic question. I was relieved to read that there will be no significant increase. Thank you to the County for this evaluation. Thank you.

PAT ROCHE: Thank you. The next speaker I have is Terry Hogan-Johnson.

TERRY HOGAN-JOHNSON: My name is Terry Hogan-Johnson and I live across the street. My husband and I both live across the street for the proposed driveway entrance to the new sanctuary and we fully support the project. I was heartened especially to learn and impressed with the consideration that was given to the night-time lighting. I just
really wanted to thank the County for the thorough report that they had done and giving consideration to the issues that were of concern to my neighbors. Thank you.

PAT ROCHE: The next speaker I have is J. David Dacus.

David Dacus: My name is David Dacus and I live and work at 1308 C Boulevard Way, Walnut Creek and that’s a few hundred yards from the project site. I’m a board member and chairperson of the application review committee of the Saranap Community Association. I’m an architect and planner in private practice in the Saranap and I’ve written design guidelines for all building types on projects as large as a 45,000 person community and as small as individual offices and homes. I’ve served on design review committees and design consistency review boards for city and county building authorities and I’m currently under contract to both types of planning authorities to perform design review services to residential, commercial and civic projects. I’m very familiar with EIRs and the CEQA process and have followed with interest several projects that have required their preparation in the Saranap area and in other areas of California. I can whole-heartedly say that I have not seen one that is more thorough than this project before you and it is not for a building complex or a whole town, but rather for a single neighborhood worship facility. Our community association has followed the proceedings for almost four years as preliminary designs were prepared and shared with our association and then formally submitted to the Department of Conservation and Development in July of 2008. The SCA has held three open and advertised public meetings on this project to allow neighbors to share their opinions and concerns and we have had representatives of the DCD such as yourself and the applicant speak at our meetings. We have spent many hours reviewing this project and discussing it with DCD staff, our members, and our elected board of directors. Results of these public meetings have each time been presented to the DCD to inform your process that you followed prior to and during the development of the Draft EIR. The result of the public meetings have been utilized in scoping for the Draft EIR and in meetings presenting the Draft EIR. The results have also been utilized in official letters from the SCA boards recommendations to the DCD regarding the project. We have been consistently heartened by the balanced and respectful treatment of all views expressed by our members and neighbors who have attended our meetings to make their views known. Those views on this project, whether in favor or opposed, have been met with care and diligent attention by the County staff. This is reflected in the final product of the revised Draft EIR, the comments and responses and the mitigation and reporting documents before you today. The SCA application review committee has not had a single disappointment about the thoroughness and completeness of this document. Having read all the revised draft, the responses to comments and the mitigation and reporting program, we are assured of both the completeness of this document in every aspect and in the painstaking care in which the County’s EIR consultants have examined the CEQA sections and made their decision in each case. We have found no area of concern unexamined and examined in thorough and even frequent ways. We are grateful to those outside independent consultants who have evenly examined the work in such detail and we are also grateful to the applicant and their support team who have answered every question we have posed and who have lent themselves to our review process in an open and helpful way. The SCA board and an
impressive majority of our membership and neighbors are in support of the conclusions of the revised Draft EIR. We urge your certification of it today on behalf of the whole Saranap community; we thank you and the County DCD staff for your efforts and for your diligence and professionalism.

PAT ROCHE: With that, I’m going to call the next speaker, Wayne Fettig.

WAYNE FETTIG: My name is Wayne Fettig. I live at 178 Kendall Road in Walnut Creek. I am here on behalf of the Saranap Homeowners Association. I am the president. I have here a letter from our legal counsel that is too lengthy to read in front of you so I will just submit this and I’ll sit down. Thank you.

PAT ROCHE: For the record, the Department did also receive that letter from Mr. Flash. The next speaker that I have is Marvin Rassmassen.

MARVIN RASSMASSEN: Good afternoon. I’m Marvin Rassmassen. I live at 2434 Warren Road, Walnut Creek, California. My house is adjacent to the building, the parsonage and adjacent to the property of the proposed construction area. I object to the construction for the removal of approximately 58 trees and the evacuation of the soil that’s going to cause noise pollution and diesel pollution of the neighborhood. Another thing I want to address is the verging of seven lots into one parcel to create 3.12 acre lots and the use of a driveway off of Warren Road which was meant for three or four single family residences. This driveway through legal is for them to use, but I object to the use of that driveways since they are combining seven lots together. The driveway was never meant for that. They have a parsonage which is 11 Whitehorse Court and the other six are all off of Boulevard Way. The accesses are all off of Boulevard Way and I would ask the County to ensure that the parsonage and all buildings built on the property have access from Boulevard Way and no access from Warren Road. Thank you very much.

PAT ROCHE: Thank you. The next speaker I have is Tim Lynch.

TIM LYNCH: Good afternoon. My name is Tim Lynch. I live at 2735 Acacia Road which is two blocks from the proposed project. I want to address the parking and traffic that I don’t think was addresses fully in the EIR. The Sufis are now using the parking lot for the office building next door to the current center for their regular events as well as the lot in their center. Both lots were filled to capacity for many events as well as overflow parking on Boulevard Way and neighboring residential side streets. The Sufis propose to use their Mayher School parking lot with shuttle service for their special events. The school is owned by the Lafayette School District and leased to the Sufis. The neighborhood swim club directly across the street from the school has used this parking lot for years numerous times for their swim needs. On the days of their meets, the entire lot is full as well as parking on both sides of the streets for a five to eight block area around the school. The school parking lot was also used for parking when the athletic fields are being used by the Lafayette sports leagues. The overflow of parking at the school will double up on the days when the Sufis have a special event and other groups are parking in the school lot and the surrounding neighborhood. How many
vehicles are going to be used for parking for the Sufis for the special events off site? Is that figure in the EIR? How many times per month or per year is my neighborhood going to be impacted by vehicles and shuttles traversing from their proposed project through our neighborhoods to the school? How many blocks of my neighborhood will be impacted with the Sufi which leases the school refuse to allow the swim club or the Lafayette athletic teams on games day to use their lot? How many blocks of parking would be needed to accommodate all these vehicles on the same day? I urge you to carefully consider these facts and others presented to you in determining whether this proposed project is contusive with our neighborhood and if all these matters have been adequately addressed by this EIR. Thank you.

PAT ROCHE: Thank you. The next speaker I have is Patricia Perry.

PATRICIA PERRY: Patricia Perry. 30 Meek Place, Lafayette, California. When I first heard about this project, I said so what’s the problem? Then I found out it wasn’t going to be located right near the existing facility but down the street at the corner and that was when I knew our neighborhood had a problem. I commented on the EIR and I’m here now because I could give you 50 reasons why I think the EIR is not adequate. I only have three minutes. What I wanted to point out is what I learned in my professional life is that the assumptions frame everything. What the County has done is assumed the lowest possible impact of this project. They’ve assumed the parking can be 71 spaces, even though the County ordinance specifically says, assembly halls without fixed seats one space for each 40 square feet of gross area. Other cities and counties have different ordinances, but that is Contra Costa’s ordinance. So what does Contra Costa say in the FEIR? They say well we don’t typically follow or ordinance, this is how we do it. We interpret it other than the exact wording of the ordinance. That is an example of what’s happened all the way throughout this project. There is a tree ordinance. The tree ordinance talks about preserving heritage trees, but because they can only fit 71 spaces and I don’t call it 72 because I don’t count the parsonage space, because they will do anything to have it down to that corner where it’s unsafe everything else is being excused away. By the way, I’ve lived there 33 years and I decided in about the first month of living there that that was an unsafe corner before the sanctuary was ever proposed. Thirty three years of using that corner and knowing it’s unsafe. Sufism says themselves in the statement they submitted that they intend to have events and as I’ve pointed out, the County has assumed away everything. They assumed that the EIR can be based on exactly what’s happening now in a much smaller facility. I don’t know if you’re familiar with the Lafayette Park Hotel, but things do change over time. I’m actually mixing two points here. I asked the staff in the city of Lafayette, how did you ever approve the Lafayette Park Hotel with that much parking? They said they hoodwinked. Now I’m not suggesting that the Sufis are hoodwinking the County but I am suggesting that it was City of Lafayette’s responsibility to look into how much parking a facility of that size needed and we are talking about a 66,000 square foot facility that’s going to be there in perpetuity, let’s hope for they’re sake. Anyway, as someone who grew up in Oakland I have seen many churches change hands over the years and I think the County has neglected its responsibility to give an analysis of the probably impact of the 66,000 square foot facility by assuming away and assuming its going to be the same as a 5 or
10,000 square foot facility. I’m sorry I don’t know the square footage. Thank you for your time.

PAT ROCHE: With that, I have two more remaining speaker cards. If anyone is intending today, please fill out the green speaker card. The next person I have listed here is Matt Isaacs.

MATT ISSACKS: Hello my name is Matt Isaacs. My wife and I live at the corner of Boulevard Way and Kinney Drive and 2691 Kinney Drive. We are thrilled with what a complete job the County has done in considering the potential environmental impacts and providing mitigations that will lessen all impacts to less than significant. We are especially pleased that the new plantings designed by Sufism Reoriented architects will created not only an interesting and artistically arranged palate of 100’s of trees but that a new view of Mount Diablo will be opened for those approaching Boulevard Way along Kinney Drive. Thank you.

PAT ROCHE: My last speaker card, Teresa Montgomery Huffson. I hope I pronounced that correctly.

TERESA HUFFSON: My name is Teresa Huffson. My husband and I recently bought the house at 2471 Warren Road which is adjacent to the south side of the sanctuary site. We were pleased to see that the EIR thoroughly addressed the issues of the stormwater runoff. It was wonderful to learn that there would actually be less water runoff after the construction than there is now. We are grateful for the extensive use of pervious materials in the driveways and parking lots. Thank you.

PAT ROCHE: That’s the end of the speakers that I have green cards for. I also want to acknowledge for the record we have two other letters that have come in response to the Final EIR. We have received a letter from a person by the name of Joyce Coleman who lives at 7081 Hilton Road in Walnut Creek and I will submit that for the record for purposes of the hearing today. Also, we have received a letter from the law firm representing the applicant, Perkins Coie from Marie Cooper. I just want to acknowledge that we have received those two letters also in addition to the letter from Mr. Flashman. As I noted at the outset, the purpose for the Zoning Administrator hearing is on the adequacy of the Environmental Impact Report. It is not on the merits of the project. That will be the subject of a hearing before the County Planning Commission which is coming up here in the month of October. I’m sure all of you will be aware of that when that meeting is finally noticed for the public hearing. I have completed my review of both the Draft EIR and the Final Environmental Impact Reports. Both volumes I and II including all appendices referenced therein for the project entitled New Sanctuary for Sufism Reoriented. The project entails the County approval of a land use permit and minor subdivision to construct a new 66,074 square foot sanctuary building on a 3.12 acre site at the 1300 block on Boulevard Way in the Saranap neighborhood. I find that this EIR has been prepared with a sufficient degree of analysis to provide the County decision-makers with information about the project’s physical effects in order to make a decision about the overall project. The EIR meets the requirements of the California
Quality Act otherwise known as CEQA in that it identifies significant effects on the environment of the proposed project. It evaluated a reasonable range of alternatives to the proposed project and it identifies feasible mitigation measures to mitigate or avoid significant effects of the proposed project. As required by CEQA, the Final EIR Volume II includes a response to comments submitted on the Draft EIR. The response to comments portion of the Final EIR is thorough providing master responses to comments to the many letters with common underlying themes and individual responses to more specific comments in comment letters. The responses provide a reasoned analysis addressed significant environmental issues raised in the comments and importantly explained why certain suggestions about the projects environmental effects are being rejected and for proceeding with the project despite the environmental effects. Volume I of the Final EIR includes the entirety of the Draft EIR with boldface underline and strike-out to where the text and one figure have been revised. I would note that these revisions primarily relate to new information to clarify existing information and do not constitute substantial change to the analysis and/or conclusions in the final EIR. It is for these reasons that I am recommending certification of the EIR to the next hearing body which would be the County Planning Commission. As a final note, I would recommend that Volume I of the Final EIR include a note that clearly indicates to the reviewer that the Draft EIR has been printed in its entirety with changes to the text that are signified by strikeout where text has been removed and by underlining bold text where the new text is added. I am normally accustomed to reviewing Final EIRs where it’s just the portion of the Draft EIR that’s been revised. In this case, our consultant chose to provide the entirety of the text of the Draft EIR. With that, I’m also recommending that the staff provide a table as a simple guide to enumerate by chapter where the text changes have occurred to make it simpler for decision makers and/or other reviews to track where these changes have occurred. With that, that concludes the Zoning Administrator’s hearing. The next step in this process is the hearing before the County Planning Commission. Thank you.
October 3, 2011

Hearing Officer
Contra Costa County Dept. of
Conservation & Development
651 Pine Street, 4th Floor – North Wing
Martinez, Ca 94553


Dear Hearing Officer,

I am writing on behalf of my client, the Saranap Homeowners Organization, to comment on the Final Environmental Impact Report ("FEIR") for the above-referenced project (hereinafter "Project"). While my client appreciates the time and effort that the County and its consultants have put into preparing the FEIR, We must protest the proposed certification of the FEIR as being adequate under the California Environmental Quality Act ("CEQA"). As explained more fully below, the FEIR fails to fully document the Project's potentially significant impact. Further, contrary to the FEIR's conclusions, the proposed mitigation is not sufficient to reduce all potentially significant project-associated impacts to a level of insignificance. Finally, especially because the FEIR cannot demonstrate, based on substantial evidence, that all project impacts can and will be mitigated to a level of insignificance, the FEIR is inadequate in its consideration of project alternatives. Each of these points will be explained in greater detail below.

THE FEIR FAILS TO IDENTIFY ALL POTENTIALLY SIGNIFICANT IMPACTS

I, and others, submitted numerous letters during the scoping of this EIR identifying potentially significant project impacts. When the Draft EIR was released, many comment letters, including one that I wrote on behalf of my client, were submitted. Both the scoping and comment letters identified potentially significant impacts beyond those the County identified in its Notice of Preparation and in the DEIR. Nevertheless, the FEIR has refused to acknowledge the additional potentially significant impacts, and has therefore failed to consider how these impacts might be mitigated or avoided. Potentially significant impacts that the FEIR failed to acknowledge include the following:

- Visual and aesthetic impacts
- Public services (fire protection) impacts
- Land use impacts

In terms of visual impacts, the FEIR claims that the large white domes making up the project will have no significant visual or aesthetic impact, other than a potentially significant night time impact as a source of glare. The FEIR fails to consider the Project's visibility and the inconsistency of the proposed architectural style and scale of the facility with the surrounding architectural style and scale. The FEIR also underestimates the visual impact of the Project buildings due to their scale and incongruous style, which will combine to make them "stick out like a sore thumb."
Unlike *Bowman v. City of Berkeley* (2004) 122 Cal.App.4th 572, 589-590, this project is not being placed in the midst of a highly-urbanized city center. Rather, it is being placed in the context of an existing residential community made up almost entirely of small, single-family homes. The proposed complex of large domed buildings, plus the very long, six-foot high white barrier wall surrounding the property, will be entirely out of keeping with the visual style and scale of the surrounding structures. Based on this, the EIR should have identified a potentially significant visual impact and should have considered, in its alternatives section, alternatives that might reduce that impact, including a project made up of structures with a reduced maximum height or with an architectural style more harmonious with the surrounding structures, as well as the proposed “campus” alternative that would reduce the Project’s visual impact by spreading it through the community, rather than concentrating it at one site. As it stands, the Project fits in about as well as a modern office building would in historic Williamsburg.

As to public services impacts, it was pointed out in my DEIR comment letter that the proposed emergency vehicle access (“EVA”) would use a driveway that is subject to a private easement. The FEIR points to a letter from the County fire marshal indicating that the proposed EVA would be acceptable from a fire protection standpoint so long as certain conditions were met. (FEIR Appendix C.) However, that letter does not address the question of whether the use of the driveway is feasible from a property impacts standpoint. As noted in my comment letter, extending the existing mutual private driveway easement, intended to service four private dwellings, to service a large religious complex would overburden the easement and be objectionable on that basis. The FEIR provides no evidence to indicate that the easement has been modified by the written and recorded mutual consent of all the participating property owners to allow its expansion to an EVA for the Project. Without that, the proposed EVA, in violation of the existing easement, cannot be considered feasible. The fire marshal’s letter did not address the question of whether the Project would be acceptable without this EVA or an alternative EVA, but the implied answer (given his insistence on required conditions on the EVA) is that it would not. Thus, barring evidence showing use of the EVA would be feasible from a property rights standpoint, there is an unacknowledged significant fire protection impact.

Finally, as to land use impacts, the County’s zoning ordinance specifies findings that must be made in order to grant the required use permit. In particular, the DEIR failed to address the non-religious uses that would be included within the Project and whether those uses would satisfy the requirements for a use permit. The failure to address these questions not only violates CEQA, it leaves the Planning commission without the necessary information to consider whether to grant the requested use permit.

**THE PROPOSED MITIGATION MEASURES ARE INADEQUATE**

For those uses identified as potentially significant, the FEIR sets forth mitigation measures which it claims will suffice to reduce Project impact to a level of insignificance. However, many of these mitigation measures are either inadequate on their face or include insufficient details or requirements to assure the mitigation of significant Project impacts. The mitigation measures need to be revisited or revised to assure that potentially significant Project impacts will be adequately mitigated.
Aesthetics (light & glare)

While the FEIR identifies the need to ensure that night time lighting of the domes does not result in significant light and glare, it does not identify how that mitigation measure will be monitored or enforced. Nor does it identify clear, objective, and enforceable standards for the mitigation that would assure mitigation of the Project’s night time glare impacts\(^1\). These need to be identified in the EIR and included in the Mitigation Monitoring and Reporting Program (“MMRP”). The monitoring and enforcement needs to be such that it will continue to be effective in the long-term, (i.e., monitoring and compliance cannot be limited to assuring compliance prior to issuance of an occupancy permit, because the type of lights used and the timing of the lights turning on and off could be changed at a later time) and independent of County budget cutbacks.

Air Quality

During construction, either excavated soil should not be allowed to be stored on-site, or any on-site soil storage areas must be watered twice daily and covered to avoid creating dust. This mitigation measure needs to be added to those identified in the FEIR.

Geology & Soils

The mitigation measure requiring the applicant to repair or correct any damage caused to surrounding buildings due to soil shifting, subsidence, groundwater changes, or construction-related vibrations cannot be relied upon unless a sufficient bond is provided to assure that money will be available to make necessary repairs. The size of the bond should be identified through a licensed professional’s consideration of the potential costs to repair the structures on lots close enough to the Project site to have a significant risk of structural damage due to any of the above-referenced project-related impacts. The bond should be held for a minimum of one year after the finish of construction to take into account the potential for delayed or latent damages.

Hydrology

The EIR notes that the Project will decrease impermeable surface coverage of the Project site, and assumes this, plus the SCP for the Project, will mitigate any groundwater impacts. As pointed out in my comment letter, both the pervious pavers and the SCP are intended to reduce surface stormwater run-off from the site. The presumption is that once stormwater goes below the surface and becomes groundwater, it is no longer of concern. This is incorrect. It is well known that, depending on the subsurface hydrology, groundwater can resurface elsewhere at a lower elevation as springs or seeps and re-enter the surface water system, potentially contributing to downstream flooding. This potential is neither considered nor analyzed. The FEIR includes no analysis of off-site groundwater flows and makes the unwarranted assumption that the additional stormwater run-off shunted underground through the use of pervious pavers will not have any significant impact on groundwater or surface water flows off-site. The analysis needs to be revised to explain what will happen to

\(^1\) The FEIR identifies loss of night sky visibility as the only significant impact to be mitigated. Night time visibility and visual obtrusiveness should also have been identified. Brightly lit monuments may be appropriate in Washington D.C., but they do not fit in a suburban residential community.
stormwater flows that are diverted underground, and provide assurance, especially with the disturbance in groundwater flows introduced by placement of the large underground foundation, that there will be no off-site impacts from increased or diverted groundwater flows.²

Traffic

The FEIR’s analysis of the Project’s potential traffic impacts was conducted under the assumption that the project’s proposed TDM Program as well as on the location of most of the Project sponsor’s members walking to and from activities occurring at the Project. However, there is no long-term requirement that members of the Project sponsor continue to walk to and from activities at the Project. A condition of approval needs to be added as a mitigation measure requiring that the Project sponsor demonstrate, on an annual basis, that the number of members driving to and from Project activities on a regular basis not exceed 200 during any peak hour period. Violation of this condition would require re-evaluation of the Project sponsor’s TDM program and the imposition of additional requirements and incentives designed to reduce the number of vehicles entering or leaving the Project during peak hours. Incentives should include the potential to require paid parking for onsite parking spaces, at least during peak hours, with the proceeds to be used to promote alternative travel modes in the area.

ADDITIONAL ALTERNATIVES SHOULD HAVE BEEN CONSIDERED

Given the Project’s significant visual and aesthetic impacts (see above), at least one alternative should have been considered that would have decreased these impacts. In particular, an alternative that reduced the maximum height of the Project’s building and/or required that the Project buildings be redesigned to be less obtrusive in their architecture (e.g., building shape and color) should have been considered and discussed. As also noted above, a campus alternative should also have been discussed, rather than just being dismissed as not achieving all of the Project sponsor’s objectives. Just because an alternative does not achieve all the project sponsor’s objectives does not make it infeasible and is not a sufficient reason, in itself, for refusing to consider an alternative. (CEQA Guidelines §15126(d)(1); Friends of the Eel River v. Sonoma County Water Agency (2003) 108 Cal.App.4th 859, 873; Citizens for Responsible Government v. City of Albany (1997) 56 Cal.App.4th 1199, 1222.)

Given the potential infeasibility of the current proposed EVA, an alternative should have been added that looks at an alternative EVA or other way of mitigating the Project’s potentially significant impact on fire safety and fire protection.

CONCLUSION

The current FEIR fails to meet CEQA’s mandate of providing a good faith effort at full disclosure of significant project impacts and how they could feasibly be mitigated or

² It should be noted that comments from nearby neighbors indicate that there are already problems with basement flooding from existing subsurface flows. These problems are likely to be exacerbated if the project increases those flows. In addition, increased subsurface flows could increase slope instability, leading to the potential to foundation damage or even slides. These risks should have been investigated and discussed in the EIR.
avoided. The EIR should be rewritten to address the flaws identified in this letter and the revised EIR recirculated for additional public comments.

Most sincerely,

Stuart M. Flashman
October 2, 2011

Ms. Catherine Kutsuris  
Director, Department of Conservation and Development  
Contra Costa County  
651 Pine Street  
North Wing, 4th Floor  
Martinez, CA 94553

Subject: Proposed 66,074 sq. ft. Sanctuary Project in Contra Costa County, County File #'s LP082034 and MS090008

Dear Ms. Kutsuris:

This letter requests the County Zoning Administrator to not certify the current version of the Final EIR, for the above-reference proposed Sanctuary Project, because the off-street parking requirement is inadequate based on the following reasons:

1. Page 2-26 of the Final EIR, Volume II, Master Response 7, states, "At about 5,000 square feet in area (including the space between pillars as well as the space encompassed by the pillars), the prayer hall would thus trigger a requirement of 125 parking spaces under County Code Section 82-16.018. This application of County standards represents the manner in which the County typically applies and interprets its requirements, including the interpretation of "gross floor area" to encompass only the prayer hall space. County practice is not to include space that does not comprise part of the assembly area, such as hallways, foyers, or the ambulatory surrounding the prayer hall." [Emphasis Added]

I take exception to the typical application of Contra Costa County (CCC) Code Section 82-16.018 with regard to the Prayer Hall because this proposed building is not typical. It is highly unusual for an assembly area to be surrounded by such a large continuous areas (termed foyers in this instance) that is not being counted toward gross floor area in order to determine required off-street parking. The FEIR incorrectly claims that the Prayer Hall building only triggers a parking requirement of 125 spaces under CCC Code Section 82-16.018. I call into question the validity of following what was said to be the "typical" application of CCC County Code Section 82-16.018 in this particular instance where the foyers are a continuous part of the assembly area and amount to an additional 6,848 sq. ft. of assembly hall space (four continuous foyers at 1,737 sq. ft. each that are continuous with each other and are a part of the "assembly area"). Please refer to the photo below labeled Figure 1. Contra Costa County should not follow their stated "typical" application of the off-street parking code because the foyers are continuous and together dwarf the limited 5,000 sq. ft. of Prayer Hall "assembly area" space that CCC is using to calculate required off-street parking spaces for this project. When CCC is dealing with an "assembly hall" with no fixed seating, how many times have they encountered such large multiple foyers continuous with each other and a part of the "assembly area"? Contra Costa County Code Section 82-16.018, which is very clear about the off-street parking requirement, states: "Assembly halls without fixed seats: One space for each forty square feet of gross floor area" [emphasis added]. This CCC code makes no exception for hallways, foyers, or ambulatory surrounding area.
If CCC feels the design of the proposed sanctuary prayer hall is typical, I request CCC to provide an example of a religious facility where a continuous foyer, larger than the "calculated assembly area," was not included in the final calculation to determine required off-street parking places. I suggest that, in this particular case, the proposed prayer hall pillar design does not separate the continuous foyers from the assembly area adequately to qualify for what CCC says is a "typical" application of CCC Code regarding foyers. Based on CCC code, using the continuous gross floor area of the assembly area would require 246 off-street parking places instead of the 125 required off-street parking places stated as required with this FEIR. While someone may be able to understand or accept a minor exception to the CCC off-street parking code, it is not acceptable to evaluate parking requirements based on 5,000 sq. ft. of an "assembly area" when 11,948 sq. ft. of continuous and usable "assembly area" exists for planned events at the facility (such as weddings as mentioned in paragraph 2 below).

2. Page 2-7 of the Final EIR, Volume II, Master Response 3, states, "The Draft EIR evaluates the environmental effects of the project based on the program of uses presented in Table 3-1. Based upon historical use of the existing facility at 1300 Boulevard Way as well as uses in the surrounding neighborhood, this program of activities represents a reasonable forecast of the use of the new facility. The project does not include a large outdoor spring event. Such events, if proposed, would be subject to the County’s Temporary Events Ordinance (Chapter 82-44). The comments proposing that activities may change or that membership may increase are not relevant to the significance of the environmental impacts of this project. The streets have sufficient capacity that even a theoretical, several-fold increase in membership would not cause traffic to exceed the established Level of Service Standard. Such a theoretical event would affect the need for parking, but as explained below, the need for parking is not an impact under CEQA." [Emphasis Added]

This FEIR statement, in Master Response 3, explains that an event mentioned in the Comments to the DEIR (that is not currently listed in historical or surrounding uses within Table 3-1 of Volume I of the FEIR) would affect the need for parking. Regardless of this fact, CCC continues to limit its FEIR evaluation of required parking spaces to uses listed within Table 3-1 (historical use at 1300 Boulevard Way and uses in the surrounding neighborhood). Regarding the need for adequate parking at the proposed facility, CCC must consider planned usage information (which is not theoretical) provided by the applicant that was included on page 8-8 of Appendix B to the DEIR which states the proposed facility "will also be used for special occasions, such as weddings, bazaars, the Meher Schools graduation dinners, and so forth." Also, on May 22,
2011, the applicant held a "Children's Spring Party" open to the general public at their current parsonage on Boulevard Way that was advertised to the general public via a large sign on the outside wall of their current sanctuary and could be read by all Boulevard Way drivers (approx. 4,500 Average Daily Traffic). At a minimum, Contra Costa County is required to take these types of events into account when calculating the required parking spaces for the proposed off-street parking lot. The uses I have mentioned above are historical SR activities or planned uses of the proposed facility and cannot be ignored when determining the appropriate number of spaces for the proposed off-street parking lot.

For the above reasons, the FEIR, as is, should not be certified.

Sincerely,

Joyce A. S. Coleman
781 Hilton Road
Walnut Creek, CA 94595
925-408-4638

cc: County Counsel Sharon L. Anderson
Fax: 925-646-1078

Hon. Gayle B. Uilkema
Contra Costa County Board of Supervisors
Fax: 925-335-1076

Ms. Lashun Cross
Senior Planner
Fax: 925-335-1250

County Zoning Administrator
Department of Conservation and Development
Fax: 925-335-1250
September 27, 2011

VIA E-MAIL

Lashun Cross
Senior Planner
Contra Costa County
Department of Conservation and Development
651 Pine Street, 4th Floor, North Wing
Martinez, CA 94553-1290

Re: Final EIR
SCH No. 2010032038
County File Nos. LP082034 and MS090008
Client-Matter No. 76921-0001

Dear Ms. Cross:

Thank you for publishing the comprehensive Final EIR. It appears that alternatives is one of the more commonly-raised issues for this project. The Final EIR clearly explains why off site and reduced density alternatives (including the no project alternative) would not be feasible. This discussion reveals why the impacts associated with grading and excavation cannot feasibly be avoided, and why any archeological or historic artifacts discovered during excavation cannot feasibly be preserved in place. We appreciate the County’s thorough review of alternatives.

The Final EIR includes the entire Draft EIR redlined to show revisions to text. We have compiled a chart that indicates where in the Draft EIR the redlined pages can be found. We suggest making this letter, including its chart, part of the Final EIR so that the public and decisionmakers have this information handy.
New Sanctuary For Sufism Reoriented Project
Edits made to the Draft EIR in the Final EIR

<table>
<thead>
<tr>
<th>FEIR Page Number(s)</th>
<th>Section Number (Unless Otherwise Noted)</th>
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<tbody>
<tr>
<td><strong>Chapter 1 Introduction</strong></td>
<td></td>
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<tr>
<td>This chapter contains edits that merely reflect the substitution of references to the Final EIR for references to the Draft EIR</td>
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<tr>
<td><strong>Executive Summary</strong></td>
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<td>(Edits to this chapter are duplicative of edits to the text that is summarized)</td>
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<td>2-4</td>
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<td>5-20</td>
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</tbody>
</table>

Thank you for your attention to these matters.

Very truly yours,

Marie A. Cooper

cc: Robert Carpenter
Sanford M. Skaggs
w/ encl., via email
Arlington County Commuter Services. “Transportation Demand Management for Site Plans,”
Arlington County Commuter Services. Transportation Demand Management Benefits SP #249 NRECA Phase 1 Office 4301 Wilson Boulevard.
You are entitled to benefits required by Arlington County to be provided by the owners of the building in which you live or work. Those benefits are:

**NRECA Employees:**

- Secured bicycle storage areas.
- Registered carpools and vanpools of two (2) or more persons park for free.
- Carpool and vanpool parking is located convenient to garage entrances and the elevators serving the building.

**Tenant Employees:**

- Secured bicycle storage areas.
- Registered carpools and vanpools of four (4) or more persons park for free.
- Registered carpools and vanpools of three (3) or more persons park at half the monthly rate.
- Carpool and vanpool parking is located convenient to garage entrances and the elevators serving the building.
- Ask your employer to set up a pre-tax employee transit benefit program to facilitate distribution of transit benefits. This will save you and your employer money.
- Ask building management about the transit subsidy program for new tenants ($45 per month per employee for a six-month period).

**Contact building management for details.**

For more commuting information visit our website: [www.CommuterPage.com](http://www.CommuterPage.com)

For information on getting around the Ballston area: [http://www.carfreediet.com/pages/arlingtons-urban-villages/ballston/getting-around/](http://www.carfreediet.com/pages/arlingtons-urban-villages/ballston/getting-around/)
Transportation Demand Management (TDM) is the establishment of measures to influence travel behavior by mode, frequency, time, route, or trip length in order to achieve a maximally efficient use of transportation facilities.

Arlington’s TDM policy focuses on workplace commuter travel and looks to reduce peak hour work travel by achieving a reduction of single occupant vehicle trips. It seeks this goal by encouraging (or, if necessary, requiring) the use of transit, ridesharing, biking, walking or travel outside of peak hours by individuals going to or from workplace centers. The County pursues land use and zoning policies which reduce vehicle trips by promoting proximity of housing and employment.

TDM in Arlington is planned and carried out as a cooperative endeavor of transportation system users, employers, developers, builders, building complex management’s, residents and county government. Its objectives are consistent with and help support those of the County’s Master Transportation Plan, including achievement of major street and intersection level of service goals.

The key elements in TDM in Arlington include:

- A TDM plan for each development site plan consistent with the TDM Matrix.
- A standard site plan condition to implement the TDM Matrix.
- In-building parking provisions that extend preference to vanpools, carpools and bicycles.
- The encouragement by employers of employee travel to and from the work place by modes of travel other than single occupant automobile through various educational and incentive measures.
- Coordination and cooperation on such measures among employers, building owners and management companies of an employment area through transportation management associations TMAs or districts.
- Arlington County encouragement to TDM planning in its roles as developer of public buildings and as employer.

The County also works through its planning and zoning activities with developers and neighborhoods to achieve the Arlington 2000 goal of workplaces and living places built in close “urban village” proximity to each other.
Major components of carrying out a TDM program for Arlington include (1) ridesharing promotion, (2) parking management, (3) transit promotion, (4) on-site construction measures, (5) mutually agreed off-site provisions or contributions, (6) lease agreements, and (7) monitoring and compliance. The demand management program distinguishes the intensity of the strategies and the impact of the development on the transportation system. The greater the impact, the more intense the mitigation measures to be sought. The categories and density thresholds are described in the following matrix.

The Arlington TDM program seeks to achieve the following results, which may be employed as evaluators of the success of the program. The results sought in Arlington’s program are:

1. Maintain peak hour level of service at major intersections at or preferably above Level of Service D.
2. Limit single occupancy vehicle trips generated by development.
3. Reduce vehicle-generated air pollution.
4. Maximize transportation alternatives while minimizing single occupancy travel.
5. Utilize transportation facilities efficiently.
6. Encourage efficient, cost effective modes of transportation that focus on moving people, not vehicles.
7. Improve transit information and dissemination so people will be able to make the most efficient and friendly use of the system.
8. Utilize public transportation effectively and efficiently, through improved system information, frequencies, routing, connections, transfers; innovative technologies are encouraged.
9. Configure mass transportation to provide access to, through, and around employment centers.
10. Encourage innovative technologies that move people between home and work the most efficient and effective way.
11. Maximize convenience of intermodal transfers between the commuter rail system and feeder/distributor systems.
12. Encourage group riding and shared parking arrangements through parking management plans.
13. Minimize or eliminate barriers to group riding.
14. Review transportation management plans during the site development process.

1990 MATRIX TRANSPORTATION DEMAND MANAGEMENT PROGRAM (2008 dollars*)

Standard County policy is set forth in the TDM matrix. However, upon showing of clear and convincing evidence that particular elements of the TDM matrix may be inappropriate for a particular project, the developer may propose substitution of other elements which provide equivalent value.

<table>
<thead>
<tr>
<th>STRATEGIES</th>
<th>LAND USE CATEGORY</th>
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<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>I. Ridesharing Marketing</td>
<td></td>
</tr>
<tr>
<td>a. information dissemination</td>
<td>x</td>
</tr>
<tr>
<td>- distribute/display brochures, posters</td>
<td></td>
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<tr>
<td>- conduct employee transportation surveys</td>
<td>x</td>
</tr>
<tr>
<td>b. operate a vanpool program</td>
<td>x</td>
</tr>
<tr>
<td>c. subsidize vanpool program</td>
<td></td>
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<tr>
<td>- match State subsidy program</td>
<td>x</td>
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<tr>
<td>- double State subsidy program</td>
<td></td>
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<tr>
<td>- backup, reserve maintenance vehicle</td>
<td>x</td>
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<tr>
<td>d. employee transportation coordinator</td>
<td>x</td>
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<tr>
<td>- designate a part-time ETC</td>
<td>2</td>
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<tr>
<td>- designate a full-time ETC</td>
<td>x</td>
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<tr>
<td>- on-site ride matching</td>
<td>x</td>
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<tr>
<td>e. contribute to a transit store or TMA</td>
<td></td>
</tr>
<tr>
<td>- $5,000 ($8,369) per year</td>
<td>2</td>
</tr>
<tr>
<td>- $10,000 ($16,739) per year</td>
<td>x</td>
</tr>
<tr>
<td>- $15,000 ($25,108) per year</td>
<td>x</td>
</tr>
<tr>
<td>f. locate/operate a transit store</td>
<td></td>
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<tr>
<td>g. emergency ride home (taxi, bus)</td>
<td>3</td>
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<tr>
<td>II. Preferential Parking Management</td>
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<tr>
<td>a. unlimited reserved rideshare parking</td>
<td>x</td>
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<tr>
<td>b. market rates for single occupant vehicles</td>
<td>x</td>
</tr>
<tr>
<td>c. lease agreements reserved parking space</td>
<td>x</td>
</tr>
<tr>
<td>d. deserved vanpool parking space</td>
<td>x</td>
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<tr>
<td>- one-half market rate</td>
<td>x</td>
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<td>e. variable rate parking for carpools (2+ employees)</td>
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<tr>
<td>- market rate</td>
<td>x</td>
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<tr>
<td>- one-half market rate</td>
<td>x</td>
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<tr>
<td>- free, no cost</td>
<td>x</td>
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<tr>
<td>III. Transit Programs</td>
<td></td>
</tr>
<tr>
<td>a. contribute to operation of an employer shuttle bus</td>
<td></td>
</tr>
<tr>
<td>- $5,000 ($8,369) per year</td>
<td>2</td>
</tr>
<tr>
<td>- $10,000 ($16,739) per year</td>
<td>3</td>
</tr>
<tr>
<td>- $15,000 ($25,108) per year</td>
<td>3</td>
</tr>
<tr>
<td>b. operate an employer shuttle bus service</td>
<td></td>
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<tr>
<td>c. fare media subsidy(100 percent is $100/month)</td>
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<tr>
<td>- 25 - 50 percent</td>
<td>x</td>
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<tr>
<td>- 50 - 75 percent</td>
<td>x</td>
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<tr>
<td>- 75+ percent</td>
<td>x</td>
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</table>
### IV. On-Site Construction
- Bike lockers, racks .................................. x x x x
- Shower facilities .................................... x x x x
- Van accessible garage ............................... x x x x
- Off-street delivery loading facility .......... x x x x
- Roadway improvements adjacent to site ....... x x x x

### V. Off-Site Construction
- Pedestrian systems (SKYWALK).................. x x x x
- Direct connections to Metro
  - Existing knockout panels to stations ........ x x x x
  - New connections (elevator, escalator, tunnels) .......... x x
- Intersection improvements (i.e. turn lane) ..... x x
- New facility construction ........................ x
- New Metrorail Station ............................. x

### VI. Lease Agreements: Progressive Employee Policies
- Flex time, variable work hours ............... x x x x
- Telecommuting .................................... x x x x
- Trip generation restrictions ................... x x
- Transportation management organization ...... x x x x

### VII. Monitoring and Compliance
- Monitoring Contribution
  - $1,000 ($1,673) / Year ....................... 2 1 1 1
  - $5,000 ($8,369) / Year ....................... 3 2 2 2
  - $10,000 ($16,739) / Year .................... 3 3 3
- Performance Guarantees ........................ x
- Zoning Compliance Fines ....................... x x x x
- Contingent Phasing ............................. x x

### Land Use Category Code
- A. GLUP consistent, no forecast traffic problem
- B. GLUP consistent, forecast traffic problem
- C. GLUP amendment requested, no forecast traffic problem
- D. GLUP amendment requested, forecast traffic problem

### Footnotes
1. Less than 100,000 sq. ft. gross floor area
2. 100,000 - 200,000 sq. ft. gross floor area
3. More than 200,000 sq. ft. gross floor area

http://www.bls.gov/cpi/home.htm
Category A includes development proposals which are consistent with the General Land Use Plan in terms of both land use type and density (i.e., office, mixed use, 3.0 floor area ratio (F.A.R.) and is located in an area not forecast to have a traffic congestion problem. Mitigation strategies are tied to the size of the development and include strategies that are basic to promoting group riding.

Category B includes development which is consistent with the General Land Use Plan and is located in an area that is forecast to have a traffic congestion problem. The intensity or range of required mitigation strategies would be related to the degree of the traffic problem. For example, if a proposed improvement which is scheduled for construction would improve the situation, the strategy might be required until the time that the improvement is completed.

Category C includes development which is inconsistent with the General Land Use Plan in terms of either land use or density (or both) and is located in an area not forecast to have a traffic congestion problem. Like Category B strategies, the intensity of the strategies would be related to the degree of the development’s inconsistency. The inconsistency would be measured in terms of a comparison of the trip generation factors, for by-right, planned, and proposed development.

Category D includes development which is inconsistent with the General Land Use Plan in terms of either land use or density (or both) and is located in an area forecast to have a traffic congestion problem. Like Categories B and C, the intensity of the strategies would be related to the degree of inconsistency. Being both inconsistent and located in a traffic congestion area, a comprehensive program coordinating a combination of several strategies at the highest level of participation would be required.

A second and third level of stratification are included in the categorical program to incorporate the density of the development and its location with respect to transportation facilities, such as proximity to a Metrorail Station or other public transport system or high occupancy vehicle facility with the cost of implementing specific mitigation strategies. The additional levels of stratification reflect economies of scale and program effectiveness with respect to size and location. Three density thresholds are used for grouping developments by size. The thresholds are detailed below.

Footnotes
1. Less than 100,000 sq. ft. gross floor area
2. 100,000 - 200,000 sq. ft. gross floor area
3. More than 200,000 sq. ft. gross floor area

F.A.R. - The ratio of floor area is an expression of density allowed on a specific parcel of land. A 3.0 FAR on a 10,000 square-foot site would allow 30,000 square feet of gross floor area of development.
Following is a brief description of various strategies of transportation demand management.

Strategies

I. Ridesharing Marketing

a. Basic to the success of any TDM program are employee education and information dissemination. At a minimum, developments are required to work with the County Ridesharing Program in promoting group riding to persons employed within the development. Strategies include transportation fairs, distribution of ridesharing marketing material to tenants and employees, displaying information material, such as posters, brochures, etc., in common areas, including hallways, elevators, restrooms, water fountains, building management offices.

In order to set objectives and monitor performance, employee transportation surveys should be conducted on an annual basis. Surveys are useful in determining commuting patterns, mode split, average commute distance and travel times, employee attitudes, needs, and willingness to switch modes. The data is useful in developing successful transportation programs, such as transit subsidies, and car and vanpool programs.

b. The results of the employee transportation survey may indicate the applicability of operating a vanpool program. Depending upon site location, the program may entail a shuttle bus system operating between the site and a Metrorail Station or company vans which provide transportation from the suburbs to the site. The uniqueness of the program is commensurate with the need to reduce vehicle trips to the site.

c. Vanpools generally need to operate at full occupancy (14 riders) to cover their operating expenses. To assist new or potential operators a number of state and local governments provide startup seed money to vanpool drivers. The programs include interest free loans for a specified period of time and passenger subsidies. Developer assistance includes additional loan programs, outright purchase, matching or doubling passenger subsidy programs and backup vehicles.

d. The success of an employer TDM program is greatly assisted if implemented through an Employee Transportation Coordinator (ETC). An ETC is an employee of the building management team and is responsible for implementing the developer’s TDM program. The ETC tailors the TDM program in response to employee transportation survey results. The ETC can be either a part time or full time employee, depending upon the number of employees on-site and the complexity of the TDM program (which may be a function of the degree of impact associated with the development). ETC duties include: TDM program implementation; conducting transportation surveys; managing a preferential parking and transit subsidy programs; and promoting group riding to development tenant employees.
e. Transportation information stores (referred to as “transit stores”) and transportation management associations (referred to as “TMAs”) are proposed to be located throughout the Metrorail development corridors. The transit stores and TMAs provide in one convenient location a resource of employee commuter information. Transportation information, such as Metrorail and Metrobus route, schedule and fare information, commuter bus operations, rideshare matching applications, vanpool subsidy programs, is provided to the public on a walk-in basis. Depending upon the category of development, a contribution to a Metrorail Station area transit store may be required if one presently exists or is planned for the area in the future. Three levels of participation are identified - $5,000, $10,000, and $15,000 per year. The term of participation may range from 10 years to as long as the operation exists and should include provisions for adjusting the contributions annually by the Consumer Price Index (CPI) to account for inflation.

f. In Metrorail Station areas where a transit store has yet to open or in areas not conveniently served by an existing transit store, proposed developments may be required to dedicate commercial area to a new transit store operation. The transit store may be required to be dedicated for as long as the development exists on the site or until a more central and convenient location is dedicated in a future site plan. Transit store contribution obligations provided for in i.e. above go towards operation of the transit store on a collective basis to cover lease costs, staffing and program development.

g. A reason often cited to not participate in ridesharing arrangements is the need to have a personal vehicle at hand for emergency situations. A number of innovative programs have been developed which provide emergency transportation to one’s home or child’s school, daycare, etc. Programs include a limited taxi/bus fare subsidy, relaxed company vehicle policies.

II. Preferential Parking Management

a. Preferential parking programs involve reserving conveniently located parking spaces for car and vanpools. Within multi-story parking garages convenient location is defined as near the elevators and close to the entry/exit points to reduce travel time and distance in the parking garage. The spaces are to be clearly marked “Reserved for car and vanpools.” The number of spaces set aside shall be unlimited. At a minimum, 10 percent of the parking supply shall be accessible to vans by providing a vertical clearance of 86 inches.

b. To encourage group riding, the preferential parking program shall include a parking rate agreement charging market rates for single occupant vehicles. Annual parking surveys shall be conducted to determine local area price structures for determining “market rates” to be charged.
c. To ensure that parking rates will reflect true market conditions in a competitive environment, lease agreements with parking garage operators are encouraged. Although a set number of spaces may be reserved for a tenant, the cost of an individual parking space is not controlled by the tenant and subsidies are prevented from being passed along to specific persons.

d. Parallel to charging full market parking rates, subsidies are

e. encouraged to promote group riding by both car and vanpools. Depending upon the category of development and the need to reduce single occupant vehicle trips to the site, parking rates for car and vanpools may range from market rate, half-market rate, to no cost (full subsidy).

III. Transit Program

a. To improve access between Metrorail Stations, office, residential developments, and commercial businesses, many developers have proposed to operate local area shuttle buses. As a larger number of developments in the Metrorail Station areas are constructed and occupied the density required to sustain such transportation operations increases, improving the likelihood of the service being successful. Depending upon the category of development contributions to support the operation of local area shuttle buses may be required, such as the Arlington Trolley. Three levels of participation are identified - $5,000, $10,000 and $15,000 per year. The TMP should also include provisions for adjusting the contributions annually by the CPI to account for inflation.

b. Depending upon the category of development, a development may be required to operate an employer shuttle bus service. The shuttle bus system would provide improved pedestrian connections between a Metrorail Station and the site. The route and fare structure may be modified over time to include other development sites whose financial participation is obligated by III.a. above.

c. In addition to increasing the cost of commuting to work in a single occupant vehicle (through charging market based parking rates), subsidizing an employees transit costs can often make the monetary difference required to cause a mode shift in an employees commuting habits. Transit subsidy programs may include the regional Metrorail/Metrobus system, state commuter rail and commuter bus systems. Depending upon the category of development various transit program subsidies may be required. Three levels of subsidy are provided - 25-50 percent, 50-75 percent, and 75+ percent.
IV. On-Site Construction

All developments may be required to dedicate on-site easements to the County and to construct associated roadway improvements adjacent to the site, such as additional travel and turn lanes. “On-site” shall be deemed to include the site itself and all adjacent areas related to the site, consistent with established practice in the County.

a. All site plan development is required to provide secure bicycle storage facilities in a location convenient to office, commercial or residential development areas. The facilities shall be highly visible to the intended users and protected from precipitation. Additional requirements cover the minimum number to be provided by type (Class I, II, III) and location.

b. Depending upon the category of development, shower facilities may be required to be provided within the development as an amenity promoting bicycle or walking commuting by employees to the site.

c. All developments shall be required to provide parking facilities designed in such a way as to ensure access by vanpools. At a minimum, 10 percent of the parking capacity shall be accessible to vans by providing a minimum vertical clearance of 86 inches from the street to the parking areas and to the garage exit onto the street.

d. Site plans should incorporate into the design adequate short term off-street parking space for delivery vehicles.

V. Off-Site Construction

Whereas the previously discussed strategies may be associated with typical site plan review approval and would be included in part in virtually all site plan reviews, strategies which deal with off-site construction must be viewed as unique and must be addressed on a case-by-case basis. There will be instances where it will be mutually beneficial for the community and the developer to pursue off-site construction. The following strategies are put forth as guidelines which may be discussed as a part of the site plan negotiations dependent upon the scale of development and its relationship to the adopted General Land Use plan.

a. To improve pedestrian access between the site, Metrorail and other development, proposed developments may find it desirable to enhance the pedestrian system by widening Metrorail corridor sidewalks or providing connections or extensions of a elevated pedestrian skywalk system.

b. Pedestrian enhancements, such as direct tunnel connections, new station entrances and elevators to the Metrorail System to improve passenger access, protect passengers from inclement weather, and reduce overall travel time by transit, making transit commuting more enjoyable.
Some Metrorail Stations were designed with knock-out panels to facilitate tunnel connections between the system and high density development. Where applicable, all development is encouraged to utilize the knock-out panels which have been incorporated into the Metrorail Station areas. Depending upon the category of development and where appropriate, other system access improvements may be considered.

c. Local area circulation patterns and intersection levels of service are affected by new development as local traffic enters and exits the street network and merges with through traffic. In addition to constructing improvements adjacent to the site, other desirable improvements may be proposed by the developer depending upon the category of development, including, median closures or openings, signal system upgrading, and intersection geometric alignments.

d. Depending upon the category of development, substantial new facility construction may be desirable and could be proposed to increase arterial capacity in conjunction with unplanned trip growth. Improvements which could be negotiated as a part of the site plan revision process may include interchange reconstruction, improved entrance/exit ramp designs, and new grade separated intersections.

e. Depending upon the category of development new Metrorail Station(s) may be proposed by the developer to provide the necessary transit system enhancements to ensure an acceptable level of service to the adjacent street network.

VI. Lease Agreements: Progressive Employee Policies

a. Alternative work schedules, such as flex time, variable work hours and the compressed work week have been successful in spreading peak hour traffic volumes over the peak period and to reduce traffic volumes two days of the week. Flex time includes staggered and flexible work hours which allows employees to arrive or leave before or after the normal congested commuting period. The flexible working arrangements increases the opportunity of prospective rideshare employees having similar core period working hours. The compressed work week includes working four 10-hour days (4/10), or nine days over the two week period (5/4/9). Generally, with the 5/4/9 plan, employees are off every other Friday or Monday. Depending upon the category of development, developers might require tenants to support innovative work scheduling which limits peak period vehicle travel.

b. Recent advances in electronics and the vision of the future portrays a substantial growth in telecommuting, decreasing the number of employees who must commute to the site on a daily basis. The “smart” office building of the future will be constructed to facilitate telecommuting by development tenants.

c. Depending upon the category of development, trip generation restrictions may be incorporated into the development’s
approval as site plan conditions. Trip generation restrictions limit the number of vehicle trips allowed to enter or exit the development during a specified period of time, such as during the morning and evening peak hour of the adjacent street. Vehicle trips are monitored on an as needed basis to monitor conformance and a set of fines may be imposed for repeated violations.

d. A number of business development areas are formulating plans to develop transportation management associations (TMAs). TMAs are partnerships between businesses and local government, created to help solve transportation problems. TMAs provide a unified voice and forum for discussing local transportation issues and priorities, and enable developers and employers to pool resources and address problems on a joint basis. All developments are encouraged to become an active member of an area TMA should one be developed. It is the County’s goal to promote the development of transpiration management associations, representing the following areas: Crystal City, Columbia Pike, Pentagon City/Pentagon areas, National Airport, Shirlington/Four Mile Run areas, Rosslyn/Courthouse areas and the Clarendon-Virginia Square-Ballston areas.

VII. Monitoring and Compliance

a. Staff needs to monitor the transportation management plans to insure compliance. Without staff capability, the County will be unable to determine compliance with its requirements for transportation actions. The amounts listed represent private sector contributions to supervising the implementation and operation of the plans.

b. The county must be able to assure that transportation management plans are actually carried out. For Category D projects, developers will provide a performance guarantee to assure continuing performance. The performance guarantee will be determined by the County Board at the time of site plan approval. The performance guarantee will be in force for at least three years. At that time, if the County certifies compliance with the strategies, the County will not require that the performance guarantee be renewed.

c. Compliance will also be enforced through the Zoning Ordinance.

d. Contingent Phasing ties compliance to building permit approvals relating to the phasing of construction for the entire project. Subsequent phases of the project will not be approved unless compliance with the traffic mitigation program is demonstrated.
TO: The County Board of Arlington, Virginia

FROM: Ron Carlee, County Manager

APPLICANT: National Rural Electric Cooperative Association (NRECA)

BY: Nan E. Terpak, Attorney
Walsh, Colucci, Lubeley, Emrich and Terpak
2200 Clarendon Boulevard, 13th Floor
Arlington, Virginia 22201

SUBJECT: SP #249  MAJOR SITE PLAN AMENDMENT to increase the west office building (Phase Two) GFA by approximately 25,000 square feet and modifications of use regulations for density, parking, and exclusions from GFA; premises known as 4301 and 4401 Wilson Blvd. (RPC #14-051-351, -352)

RECOMMENDATION: Approve the major site plan amendment request to increase the GFA in the Phase Two office building by 19,311 square feet, with modifications of use regulations for bonus density, compact parking and density exclusions, subject to all previous conditions, including previously approved Conditions #53, 54, 62, 63, 65 through 67, and 72 which are contained in the staff report and apply to the Phase Two building, amended Condition #68 of the previously approved conditions, and new Conditions #1 through 70 which apply to the Phase Two building only.

ISSUE: None.

SUMMARY: The applicant is proposing to construct the second building of the two-building NRECA development. The applicant is requesting a total
of .087 FAR of additional density. In exchange for the additional density, the applicant has agreed to construct a building that would achieve the US Green Building Council’s LEED Green Building Rating at the Certified level, with 27 credits. The additional density would result from expanding the building footprint and above-grade floor plates. The applicant would maintain the approved building design and façade treatment which would mirror the design and height of the existing Phase One building. Staff supports the proposed site plan amendment, not only because it would result in a LEED Certified building, but also because the proposed building design would improve the streetscape, create a strong street wall, and conform to the County’s urban design standards for the Rosslyn-Ballston Corridor. The applicant has also agreed to the recommended Transportation Demand Management (TDM) Program and an acceptable Housing Reserve Fund (HRF) contribution.

BACKGROUND: The proposed major site plan amendment request is to add 19,311 square feet of gross floor area (GFA) to the Phase Two office building. The original Ellipse at Ballston mixed use residential and office site plan was approved in 1987, and also includes The Jefferson elderly housing development, and the office building located at 4300 Fairfax Drive.

History of the NRECA Development: The following bullets outline the history of the NRECA development.

- The two-building NRECA development was approved in 1993. At that time, the developer was granted .04 FAR of additional office/commercial density for provision of funds for public street improvements to a portion of the site area required for public right-of-way. Both buildings were approved with equal building heights of 11 stories or 158.3 feet.

- The Phase One office building (NRECA 1, 4301 Wilson Boulevard) was completed in 1995.

- In 1999, a major amendment was approved for the Phase Two building to allow an expansion of the typical floor plate by 2,400 square feet (to a total of approximately 22,422 square feet) to make it more marketable by the then-current standards, resulting in an additional increase in the site plan’s office/commercial density of .10 FAR. The applicant was required to provide an amenities package in exchange for the additional density, including pedestrian safety improvements (construction and maintenance of two brick/concrete paver crosswalks, construction and maintenance of a new raised median in Wilson Boulevard, street realignment along the site’s Wilson Boulevard frontage, common entrance and shared drive aisle with the adjacent Arlington Gateway.
site plan) and enhancements to the existing conference facility in the phase one building (including enhanced audio-visual equipment to accommodate recorded programming by Arlington County Channel 31 cable TV).

- In 2001, a minor amendment was approved for the Phase Two building to allow 4,055 square feet of GFA on the P1 level of the garage for mailroom, storage space and computer room, resulting in an additional office/commercial density of .01 FAR.

- The total approved office/commercial density for the Ellipse at Ballston Site Plan is 3.158 FAR. The maximum permitted density under the “C-O-A” district is 3.0 FAR.

The following provides additional information about the site and location:

- **Site:** The site is Phase Two of the two-building NRECA development, which is part of the Ellipse at Ballston Site Plan. The site plan is located in the Ballston Sector Plan area, in the block bounded by Wilson Boulevard, Glebe Road, Fairfax Drive, and North Taylor Street.

- **Zoning:** The site is zoned "C-O-A", Commercial, Office and Apartment Zoning District.

- **Land Use:** The site is designated "Coordinated Mixed Use Development District" (High density mixed use district with actual density determined by site size. Allows up to 6.0 FAR with office not more than 3.0 FAR) on the General Land Use Plan.

- **Neighborhood:** The site is located within the Ballston-Virginia Square Civic Association.

**Proposed Development:** The following table sets forth the statistical summary for the major site plan amendment.
## Density and Uses

The proposed major site plan amendment would increase the total office/commercial density by .087 FAR, to 3.245 FAR. At the time of the proposal’s original filing, the applicant proposed additional GFA that would be incorporated into a new 12th floor. The proposal has been revised to eliminate the 12th floor and expand the building footprint to generally line up with the below grade garage wall. The expanded building wall would continue through the 11th floor. The additional GFA totals 19,311 square feet, including 1,475 square feet of computer and cable equipment space located on the P1 level of the garage that staff is recommending to be excluded from the density calculation through a modification of use regulations. This space would support the building’s communication and technology operations. With the

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1. Parking ratio based on GFA of 242,514 s.f. (does not include 5,000 s.f. retail/restaurant credit & 4,500 s.f density exclusion).
2. Parking ratio based on total GFA of 684,238 s.f. Does not include residential building retail.
3. Parking ratio based on GFA of 258,926 s.f. (does not include proposed 1,475 s.f. density exclusion).
4. Parking ratio based on total GFA of 711,574 s.f. Does not include residential building retail.
recommended density exclusion, the net total office/commercial density would be 3.238 FAR.

To support the additional GFA, the applicant proposes to expand the P5 level of the garage and construct a partial P6 level. The approved garage design, including the lay-out of columns and stalls, would generally remain the same. Each level would slightly expand to accommodate the building columns of the expanded building wall. Approximately 60 compact parking stalls have been reconfigured and have widths varying in size to up to 8 feet, and lengths varying to up to 18 feet. The approved P1 connection between the phase one and two garages, as well as the entry points adjacent to North Taylor Street and the shared access drive, would be retained. Since the garage design was approved prior to the Zoning Ordinance Amendment to the parking requirements, the applicant is requesting a modification of use regulations to permit compact parking space sizes to remain as generally approved (7.5'x15' instead of the current standard of 8'x16'), and a compact parking ratio of approximately 36 percent for the site plan's total office/commercial development (instead of the required 20 percent). A compact parking ratio of approximately 48 percent was previously approved for the site plan's total office and commercial development.

- **Site and Design:** At the request of staff, the applicant agreed to revise its proposal to eliminate the 12th floor addition and instead expand the building footprint and above-grade floor plates. By expanding the footprint and floor plates, the applicant was able to recapture the additional space without compromising the original design concept of the NRECA approval, which was for a mirror-image design of the two buildings. The proposed expansion results in a building that creates a stronger street wall and lines up with the Phase One building.

As a part of the 1999 site plan amendment, the applicant agreed to redesign and construct improvements to the site's Wilson Boulevard frontage consistent with the recommendations of the Ad Hoc Committee for Glebe Road Pedestrian Safety. Extending the curb and narrowing the Wilson Boulevard and Glebe Road intersection resulted in a 29- to 62-foot wide sidewalk along that frontage. The expanded building footprint would narrow the sidewalk, resulting in an 18- to 26-foot wide sidewalk. The applicant would also relocate the garage's intake and exhaust vents out of the public sidewalk to the service drive.

- **LEED Scorecard:** The applicant proposes to construct sustainable design elements in the Phase Two building and to achieve the LEED Certified award under the U.S. Green Building Council's LEED Green Building Rating System. Under the County's expanded Green Building Incentive Program, the density incentive has been expanded to include the full range of LEED awards (including certified, silver, gold and platinum) and would award an appropriate amount of
density to the project (ranging from .15 FAR for Certified projects to .35 FAR for platinum projects). The applicant proposes a modification of use regulations to permit the proposed .075 FAR of bonus density (16,761 square feet of GFA) in exchange for achieving the LEED Certified award with 27 credits. This request is discussed further in the Modifications of Use Regulations section of the report.

- **Affordable Housing:** The applicant has proposed to make a contribution to the Housing Reserve Fund of $75,600, based on the current policy of 2% of the construction cost times the total increased density approved for the Phase Two building (45,788 square feet) since the initial site plan approval in 1993.

**Transportation:** The subject site is located on the north side of Wilson Boulevard at the North Glebe Road/Wilson Blvd. intersection. The Master Transportation Plan classifies Wilson Blvd. and North Glebe Road as principal arterial streets.

- **Trip Generation:** A Traffic Impact Analysis (TIA) submitted by the applicant, prepared by Wells & Associates, dated August 14, 2003, assessed the impacts of the development on the adjacent street system. The total peak trips for NRECA are estimated to be 523 (272 AM and 251 PM peak trips). The proposed 19,311 square foot addition will generate 32 peak hour trips (17 AM and 15 PM peak trips). The TIA analyzed six (6) intersections in the vicinity of this project. Two (2) intersections are controlled by traffic signals and the remaining four (4) are controlled by stop signs. An overall intersection level of service (LOS) was derived for the signalized intersections and the critical movements at the intersections controlled by stop signs were analyzed. The table below depicts the findings.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Existing LOS</th>
<th>Total Future LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak</td>
<td>PM Peak</td>
</tr>
<tr>
<td>Fairfax Dr./N. Glebe Road</td>
<td>E</td>
<td>D</td>
</tr>
<tr>
<td>Fairfax Dr./Utah St./Site Exit Drive (northbound)</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>N. Glebe Rd./Wilson Blvd.</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Wilson Blvd./N. Taylor St. (EBLT)</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>N. Taylor St./NRECA Driveway (EBLR)</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>N. Glebe Rd./Site Driveway (westbound)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1 This intersection will be created through construction of this project.

EBLT ~ eastbound left and through
EBLR ~ eastbound left and right

- **Access and Parking:** Access to the development’s parking garage is available from an existing driveway entrance from North Taylor Street and a proposed shared driveway from North Glebe Road. The 21.5 foot wide shared driveway can accommodate turning movements for a 30 foot wide single unit vehicle;
however larger tractor trailer unit movement cannot be accommodated. The applicant’s loading dock management plan indicates that the larger vehicles will park in the shared driveway and use the loading dock accordingly.

The applicant is seeking a modification through the site plan process to allow a larger compact parking space ratio and smaller compact parking dimensions than permitted under the current Zoning Ordinance provisions. The applicant is providing 388 parking spaces on six (6) underground levels (10 handicap spaces, 265 full size spaces, 53 compact spaces at 7.5 ft. x 15 ft., and 60 compact spaces at 7.5 - 8 ft. x 15 - 18 ft.

- **Streets:** The existing street cross-sections are as follows:
  - Wilson Blvd., as it exists today is approximately 79 feet from face of curb to face of curb and is generally constructed with a raised median and four (4) travel lanes.
  - North Glebe Road, as it exists today is approximately 91 feet from face of curb to face of curb and is generally constructed with a median and six (6) travel lanes.

The applicant proposes to change the existing street cross-sections to reflect the following:
  - Wilson Blvd. will be modified to include two (2) parking lanes, a raised median, and five (5) travel lanes.
  - North Glebe Road will remain a six lane roadway with a median.

- **Transportation Demand Management (TDM) Program:** Consistent with site plan development and the County’s adopted Transportation Demand Management (TDM) Policy, staff recommends that the applicant implement a TDM Program to discourage single occupant vehicle commuting to the site to lessen the impact of the development on the local transportation system. The applicant has agreed to a revised TDM program that includes elements such as:
  - A transportation kiosk or information display to provide transportation-related information.
  - A commuter benefit program which includes, pre-tax employee contributions and/or Metrochek contributions of at least $65.00 per month.
  - SmarTrip cards for office building employees in the amount of $5.00 (one time contribution).
  - A contribution of $19,311.00 to the Commuter Assistance Program to sustain direct and indirect on-site and off-site services in support of TMP activities.
  - Reserved spaces for employee carpoolers and vanpoolers.
  - Establishment of monthly parking rates for single occupancy vehicles (SOV) consistent with comparable Arlington County office buildings.
Free parking for vanpools and parking subsidy for carpools.

- **Pedestrian Access:** The streetscape for Wilson Blvd. consists of a planting strip, which is consistent with the existing NRECA building, and sidewalks varying in width from 18 to 26 feet. The existing sidewalk along North Glebe Road will not change as a result of this development.

- **Pedestrian Safety:** Two (2) pedestrian crosswalks are proposed with this project, across Wilson Blvd. and across North Glebe Road. The crosswalks will be 20 feet wide with ADA compliant pedestrian ramps.

- **Bicycle Access:** Staff is recommending that the applicant provide 51 bicycle parking/storages spaces (35 for office building employees, 13 office building visitor spaces, one (1) retail employee space, and two (2) retail customer spaces).

- **Public Transit:** This site has access to Arlington Transit (ART) bus service, Metrobus service, and Metrorail service. ART bus route 51 and 52 provides access to the Ballston Metro Station, Metrobus Routes 1 B,C,D,E, and Z; 2 B,C and G; 10 B; 22 A,B,C and F; 23 A and C; 24 M and P, 25 A,B,F and J, and 38 B all serve the Ballston Metro Station.

**Utilities:** The utilities serving this site are designated to be placed underground per the County Board adopted Underground Utility Plan. The developer has contributed to the Utility Undergrounding Fund as part of their previous approval.

**DISCUSSION:** Staff supports the redesigned building. It would achieve desired urban design standards for the site and the Rosslyn-Ballston Corridor, as well as sustainable green building technology consistent with the recently expanded Green Building Incentive Program.

**Site Plan Issues:**

- **Modification of Use Regulations:** The applicant has requested modifications of use regulations for 1) bonus density in exchange for a LEED Certified building, 2) exclusion of computer and cable equipment space from the density calculations, and 3) substandard compact parking space size and ratio.

  1) **Bonus Density:** The applicant has requested a total of .087 FAR of additional density (19,311 square feet of GFA) in return for the provision of LEED-certified green building technology at the Certified level. The applicant has committed to 27 LEED credits. Under the County's expanded Green Building Incentive Program, the County Board can approve varied amounts of bonus density to reflect the range of LEED awards, from .15 FAR for the Certified award to .35 FAR for the Platinum award. The Certified award is for buildings which achieve...
between 26 and 31 LEED credits. The applicant proposes a number of sustainable elements, which would be implemented consistent with the requirements contained in new Condition #65. Staff recommends that the proposed .087 FAR of additional density be approved in exchange for the provision of a LEED Certified building. The sustainable elements proposed for this building include:

i. **Sustainable Site** objectives, including alternative transportation and stormwater management;

ii. **Water Efficiency** objectives, including water efficient landscaping;

iii. **Energy and Atmosphere** objectives, including optimizing energy performance through the use of efficient and environmentally sensitive systems;

iv. **Materials and Resources** objectives, including utilizing local and regional building materials and certified wood; and,

v. **Indoor Environmental Quality** objectives, including carbon dioxide monitoring and use of low-emitting materials, such as paints, adhesives, carpets and composite wood.

2) Density Exclusion: The applicant has proposed to exclude from the density calculation a total of 2,550 square feet of GFA located on the P1 through 11th floors. The proposed computer and cable equipment space would support the building's communications and technical support operations, providing the backbone for these operations. The space located on the P1 level of the garage (1,475 square feet) would not add to the bulk and mass of the building. In contrast, the space located on the first through 11th floors would be located within the exterior faces of the building's exterior walls and, by definition, is required to be counted as GFA. This space should be treated no differently than other above-grade mechanical spaces when calculating density. Section 36.H.5 of the Zoning Ordinance allows the County Board to modify the uses permitted and use regulations in harmony with the general purposes and intent of the Zoning Ordinance. The density exclusion for computer and cable equipment space located on the garage level would not be inconsistent with Section 36.H.5 of the Zoning Ordinance; however, the exclusion of such spaces located on the first through 11th floors would be. The County Board has previously approved density exclusions for printing and other similar uses on the P1 garage level of the Phase One building. For these reasons, staff recommends that 1,475 square feet of the requested 2,550 square feet be excluded from the density calculation, but included in the total GFA for the building.

3) Compact Parking: The applicant has proposed a modification of use regulations
to permit a smaller compact parking space size (7.5'x15') and a larger overall compact parking ratio for the site plan's total office/commercial development (approximately 36%), both of which do not conform to the current Zoning Ordinance standards for space size (8'x16') and ratio (20%). At the time of the 1993 and 1999 approvals, the compact parking space sizes were consistent with the Zoning Ordinance standards in effect at that time. Also, the County Board approved an overall compact parking ratio of 48%. While the garage would be slightly expanded to accommodate the relocated building wall, generally the same garage design and lay-out that was approved in 1999 would be retained, including the location of columns and the connection between the phase one and two garages. The approved 48% compact parking ratio would be reduced to approximately 36%. The applicant was able to reconfigure approximately 60 of the Phase Two building’s compact spaces to have widths varying in size to up to eight (8) feet and lengths varying in size from 15 feet to 18 feet. Staff supports the proposed modification of use regulations for compact parking. With the exception of the reconfigured compact spaces, the proposed parking is generally consistent with the 1993 and 1999 approvals for this site plan. Therefore, staff recommends that the modification of use regulation be approved.

- Affordable Housing: Staff and the applicant are in agreement on the proposed HRF contribution, as recommended in Condition #60.

- Community Amenities: The applicant has proposed the following community amenities:
  - Streetscape and street presence consistent with the urban design standards for the Rosslyn-Ballston Corridor.
  - Provision of a LEED Certified green building.
  - Decorative roof treatment.
  - Maintenance of the landscaping in the Wilson Boulevard median in perpetuity.
  - Provision of, or financial contribution toward, public art consistent with WALKArlington.
  - Provision of parking to the public after standard office hours on weekdays, weekends and holidays.
  - Provision of permanent public access easements over the open space and plaza areas in the site plan.
  - A Housing Reserve Fund contribution of $75,600.
  - As a part of the Transportation Demand Management Program, a contribution of $19,311 to the Commuter Assistance Program.

**Community Process:** The applicant has attended one Site Plan Review Subcommittee meeting. A Planning Commission meeting is scheduled for November 24, 2003.
• **Transportation Commission**: The Transportation Commission considered this major site plan amendment request at its meeting on November 19, 2003. The Commission voted to support the major site plan amendment request, subject to the following provisions:
  o That the TDM elements that staff has identified be discussed and given further consideration for inclusion in the TDM Program proposal.
  o That serious consideration be given to the developer contributing $20,000 toward improvements to the near-by Ballston Metro Station.

Staff has worked with the developer to address the outstanding TDM elements. The developer has agreed to revise the proposed TDM to include a contribution of $19,311 to the Commuter Assistance Program (Condition #47).

• **Planning Commission**: The Planning Commission considered this major site plan amendment at its meeting on November 24, 2003. The Commission voted to approve the major site plan amendment request, pending approval of the TDM Program and the Housing Reserve Fund contribution.

**CONCLUSION:** Staff supports this major site plan amendment. The additional density created from relocating the building wall and eliminating the originally requested 12th floor results in a much-improved streetscape and street presence which conform to the urban design standards for the Rosslyn-Ballston Corridor. The applicant has proposed a HRF contribution and TDM Program that are supported by staff. Staff supports the proposed modification of use regulations, which allow the additional density through achievement of a LEED Certified green building. The applicant has agreed to comply with the current standard conditions for the Phase Two building only, as well as the previous conditions of approval. Staff recommends that this major site plan amendment be approved, subject to all previous conditions, including previously approved Conditions #53, 54, 62, 63, 65 through 67, and 72 which apply to the Phase Two building, amended Condition #68 of the previously approved conditions, and new Conditions #1 through 70 which apply to the Phase Two building only:

• **The following conditions were approved on August 17, 1999 and apply to the Phase Two office building, including recommended amended Condition #68:**

54. The developer agrees to provide a shared service drive as outlined in condition #65 below. The service drive, which shall be located between the phase-two office building and the west property line, shall be one-way only and shall provide ingress from Wilson Boulevard and egress from two locations: from The Jefferson service drive onto Fairfax Drive and from the east office building’s garage exit adjacent to North Taylor Street. The width of the paved area of the
Major Site Plan Amendment Request
SP #249

service drive shall be 20 feet. A nine-foot brick paver walkway shall be constructed between the service drive and the phase-two building, extending from the 9th Street Greenway connection/crosswalk to North Glebe Road. The service drive and the walkway shall be shown on a revised final site development and landscape plan, which shall be reviewed and approved by the County Manager or his designee before the issuance of the first building permit for the phase-two office building.

65. The developer agrees to submit documentation to the Zoning Administrator of its agreement with the developer of the Arlington Gateway Site Plan (SP # 331) on shared use of the consolidated curb cut at the approximate location of the intersection of Wilson Boulevard and North Glebe Road adjacent to the frontage of the Arlington Gateway Site Plan, as well as expansion and/or shared use of the Ellipse Site Plan’s access drive, prior to the issuance of the Excavation/Sheeting and Shoring Permit for the NRECA phase-two office building. The access drive located adjacent to the west property line shall be extended across the property line onto the Arlington Gateway Site Plan and shall include a nine-foot brick paver sidewalk adjacent to the NRECA building linking the 9th Street Greenway with the sidewalk adjacent to Wilson Boulevard and North Glebe Road. The developer agrees to submit final site engineering plans which show the access to the site from the consolidated curb cut and extension of the access drive across the west property line. While the Arlington Gateway Site Plan is under construction, or in the event the developers of the two site plans are unable to follow through with the aforementioned agreements, then access to the western entrance of the NRECA phase-two office building garage shall be from the originally approved curb cut on the NRECA frontage adjacent to Wilson Boulevard. The final site engineering plans, including the shared use of the consolidated curb cut and access drive, shall be reviewed and approved by the Department of Public Works prior to the issuance of the Excavation/Sheeting and Shoring Permit for the NRECA phase-two office building.

66. The developer agrees to submit documentation to the Zoning Administrator of its agreement with the developer of the Arlington Gateway Site Plan (SP # 331) on establishing a minimum of 15 feet setback from each side of the shared property line by both parties (west property line of NRECA phase-two building) prior to the issuance of the Excavation/Sheeting and Shoring Permit for the NRECA phase-two office building. The developer agrees that the phase-two office building shall be set back no less than 15 feet from the west property line, and that no reduction in the setback may be made except through approval of a site plan amendment by the County Board.

67. The developer agrees to construct and maintain brick and/or concrete paver crosswalks approximately 15 feet in width, in North Taylor Street adjacent to Wilson Boulevard, and in the access drive adjacent to the west property line. Such crosswalks shall be constructed prior to the issuance of the first Certificate PLA-3425
of Occupancy for the NRECA phase-two office building. The crosswalk in the access drive shall provide a connection between the elements of the 9th Street Greenway as approved in the Ellipse Site Plan (Ellipse Park) and the Arlington Gateway Site Plan (SP #331). The crosswalks shall be distinctively designed to fit in with the Ballston streetscape, and the designs shall be reviewed and approved by the County Manager or his designee as a part of the final site development and landscape plan.

68. The developer agrees to construct a raised median in Wilson Boulevard, from North Taylor Street to North Glebe Road, as shown on the approved final engineering plan dated June 15, 1999 and titled Wilson Boulevard Median Design, and install and maintain landscaping in the raised median for a period of 23 years in perpetuity, which shall be reviewed and approved by the County Manager or his designee as part of the final site development and landscape plan. The raised median shall be constructed, and the landscaping shall be planted, prior to the issuance of the first Certificate of Occupancy for the NRECA phase-two office building.

72. The developer agrees to cooperate with the County on a redesign of the site’s Wilson Boulevard frontage. The streetscape improvements, including curb and gutter alignment and landscape improvements, shall be determined and approved as a part of the final engineering plan for the NRECA phase-two office building. The frontage alignment will remove the free-flow right-turn lane and island; construct new curb and gutter, and sidewalk and streetscape; and fund the cost of relocating the traffic signal equipment from the island to the new alignment location.

The following conditions were approved on July 10, 1993 and apply to the Phase Two office building:

53. If the developer constructs the west office building and desires to construct a pedestrian bridge to connect the east and west office buildings, then the developer shall request a site plan amendment for the pedestrian bridge which shall be reviewed by the Site Plan Review Committee and approved by the County Board.

62. The developer agrees to provide residential unit owners located in The Jefferson residential building access to parking spaces located within the areas designated for commercial/office uses on weekends and from 5:00 p.m. to 8:00 a.m., weekdays.

63. The plaza areas shall be open for public access 24 hours a day.

The following new conditions are recommended for the Phase Two office building only:

PLA-3425
The following Conditions of site plan approval (#1 through #11) are valid for the life of the site plan and must be met by the developer before issuance of the Clearing, Grading and Demolition Permit.

1. The developer (as used in these conditions, the term developer shall mean the owner, the applicant and all successors and assigns) agrees to comply with the standard conditions set forth below and as referenced in Administrative Regulation 4.1 and the revised plans dated November 10, 2003 and reviewed and approved by the County Board and made a part of the public record on December 6, 2003, including all renderings, drawings, and presentation boards presented during public hearings, together with any modifications proposed by the developer and accepted by the County Board or vice versa.

   This site plan approval expires three (3) years after the date of County Board approval if a building permit has not been issued for the first building to be constructed pursuant to the approved plan. Extension of this approval shall be at the sole discretion of the County Board. The owner agrees that this discretion shall include a review of this site plan and its conditions for their compliance with then current County policies for land use, zoning and special exception uses. Extension of the site plan is subject to, among other things, inclusion of amended or additional site plan conditions necessary to bring the plan into compliance with then current County policies and standards together with any modifications proposed by the owner and accepted by the County Board or vice versa.

2. The developer agrees to conduct a pre-construction meeting, and to coordinate participation in the pre-construction meeting by relevant County staff, including staff from DCPHD (Planning, Zoning, Inspection Services), DPW, DPRCR, DES and others as necessary, prior to the issuance of any permits for the site plan. The purpose of the pre-construction meeting is to discuss the requirements of the site plan conditions.

3. **Intentionally Omitted** Tree Protection and Replacement

   a. The developer agrees to complete a tree survey, which shows existing conditions of the site and locates and identifies all trees which are four inches in caliper and larger. The survey shall include any tree on adjacent sites whose dripline extends onto the subject site.

   b. The developer agrees to file and implement a tree protection plan for any trees proposed to be saved by the developer or specified to be saved by the approved site plan and shown on any filing in connection with this case. This plan shall include any tree on adjacent sites whose dripline extends onto the subject site. The tree protection plan shall be developed by a certified arborist or other horticultural professional with a PLA-3425.
demonstrated expertise in tree protection techniques on urban sites and shall be submitted and approved, and found by the County Manager or his designee to meet the requirements of this site plan, before the issuance of the Clearing, Grading and Demolition Permit. At a minimum, this plan shall include:

(1) A site grading plan at two (2) foot intervals, including the location of all proposed improvements and utilities.

(2) Detailed specifications for any tree walls or wells proposed.

(3) A description of how and where building materials and equipment will be stored during construction to ensure that no compaction occurs within the dripline of the trees to be saved.

(4) Identification of tree protection measures and delineation of placement of tree protection.

(5) Any tree required to be saved which dies (any tree which is 25% or more dead shall be considered to have died) within two (2) years of the issuance of the master certificate of occupancy shall be removed and replaced by the developer at his expense with the number of major deciduous and evergreen trees whose total calipers equals the caliper of the tree to be replaced and which meet the minimum size and other requirements of Condition #13 below.

c. The developer also agrees to replace all trees, as shown on the Tree Survey, that are removed as a result of the new construction in accordance with the Arlington County, Virginia Tree Replacement Guidelines. The developer shall prepare a tree replacement plan, developed with assistance of the County’s urban forester, to plant replacement trees on site or on County owned land. The developer agrees to submit and obtain approval of this plan by the County Manager or his designee as part of the final site development and landscape plan.

4. The developer agrees to produce a photographic record of development, starting with a record of the site as it appears before demolition is begun, including photographic records during construction, and ending with a photographic record of the development as it appears after completion of construction. These photographs shall comply with the following specifications:

All photographic records shall be taken using black and white film. Submission of a photo contact sheet and 8" x 10" prints on photographic paper shall be the minimum acceptable standard. Color photographs on compact disc must be
submitted in addition to black and white photographs and the photo contact sheet at the end of the project prior to the issuance of the Master Certificate of Occupancy.

The photographic record shall include the following:

a. **Before Clearing, Grading and Demolition of the site** (shall be submitted before issuance of the Clearing, Grading and Demolition Permit)–Views of north, south, east and west facades, as location permits, of buildings to be demolished, as well as at least one photo of the site before any clearing or grading including the existing physical relationship with adjacent buildings and streets. The photographic record shall also include all historic aspects of the facades of the building to be demolished, consistent with the requirements described in Condition #50 below.

b. **Site Clearance** (shall be submitted before issuance of the Footing to Grade Permit)–Views of cleared site facing north, south, east and west, as location permits, with adjacent buildings and streets included.

c. **Construction Phase** (shall be submitted before issuance of the Shell and Core Certificate of Occupancy Permit)–At a minimum, views of the site: during excavation, upon completion of the first floor above grade, at topping out, and during the exterior cladding phase.

d. **Site Completion** (shall be submitted before issuance of the Master Certificate of Occupancy)–North, south, east and west facades of completed building or buildings, as well as at least one view of completed project in context of adjacent buildings and streets.

The photographic record of the site as it appears before demolition shall be delivered to the Zoning Administrator prior to the issuance of a clearing, grading or demolition permit. The remaining records, including the completed compact disc with the entire photographic history, shall be delivered to the Zoning Administrator, before the issuance of a Master Certificate of Occupancy, for placement in the County archives.

If the developer uses the "Fast Track" Permit Process, the Site Clearance and Construction Phase photographs shall be submitted before the issuance of the Footing to Grade Structure Permit, or the first Building Permit, whichever comes first. The Construction Phase photographs, showing any construction to grade, shall be submitted before the Final Building Permit. The Construction Phase photographs showing all construction above grade and the Site Completion Photographs and completed compact disc showing the entire photographic history of the site shall be submitted before issuance of the Master Certificate of Occupancy.

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5. **Intentionally Omitted** In addition to funding and constructing the utility undergrounding work, the developer agrees to contribute in the amount specified in Site Plan conditions to the County utility fund before the issuance of the Building Permit or prorated consistent with an approved phasing plan for the development. The total utility fund contribution for this site is $___________ ($50,000 x ___ acres). These funds may, but need not, be used by the County for the purpose of providing the undergrounding of utilities along the properties which are not redeveloping in this undergrounding district. If the area of the site plan is subdivided, the contribution to be made by each owner shall be based proportionally on the amount of site area allocated to each subdivided parcel. The contribution, if not obligated by the County to pay for utility undergrounding projects within 10 years from the date of payment, will be refunded without any accrued interest to the development owners of record at the time of any refund.

6. The developer agrees to develop a plan for temporary pedestrian and vehicular circulation during construction. This plan shall identify temporary sidewalks, interim lighting, fencing around the site, construction vehicle routes, and any other feature necessary to ensure safe pedestrian and vehicular travel around the site during construction. The developer agrees to submit this plan to, and obtain approval of the plan from, the County Manager or his designee as meeting these standards, before the issuance of the Clearing, Grading and Demolition Permit. The County Manager may approve amendments to the plan, if consistent with this approval.

7. **Intentionally Omitted** The developer agrees to coordinate with the Arlington County Relocation Program Coordinator in order to provide each rental household living in either an apartment unit or a single-family dwelling which is displaced by the construction of this site plan, except those who sign initial leases for a unit in the project after the date of this site plan approval, with at least the following:

   a. A minimum of 120 days written notice to vacate;
   
   b. Relocation payments, in accordance with the *Arlington County Tenant Relocation Guidelines* adopted by the County Board and in effect on ________, a copy of which are attached to the report of the County Manager for this site plan approval;
   
   c. Relocation services in accordance with the *Arlington County Tenant Relocation Guidelines* adopted by the County Board and in effect on ________.

If the developer decides to limit relocation benefits to persons who executed initial leases before adoption of the site plan, the developer agrees to notify, in
writing any tenant moving in after the date that the site plan is approved of his/her ineligibility for relocation payments and services. Any tenant who has not signed a waiver of rights to relocation assistance must receive the assistance. In cases where State law requires 120-day notice to vacate (displacement from multi-family buildings containing four or more units), notice cannot be waived, but may be reduced by mutual agreement in writing. Compliance with this condition shall be shown before the issuance of the Clearing, Grading and Demolition Permit.

8. **Intentionally Omitted** The developer agrees to coordinate with the Department of Economic Development in order to provide the following relocation assistance to all retail tenants under lease as of the date of the approval of the proposed site plan:

   a. The developer agrees to keep all retail tenants informed of the redevelopment schedule by providing periodic updates with regard to material changes in the development program for the site, including the phasing of the project, anticipated schedules for eviction, construction and occupancy, and any anticipated material impacts on the tenants while they remain on the site, such as test borings, construction signs and fencing, asbestos removal, disruptions to customer parking and pedestrian paths, and the like.

   b. The developer will assist the County to make available to all retail tenants, either directly or through the developer, information on available commercial space in the County, business counseling services and appropriate business courses.

   c. The developer agrees to cooperate with the retail tenants by referring tenants who so request to private sources of professional assistance in regard to lease negotiation (i.e., understanding lease terms, trends and negotiation strategy), space planning and other related sources of help.

   d. Except for provisions in any lease to the contrary, the developer agrees to maintain the site, structures and systems in good repair and in a businesslike appearance until the last retail tenant vacates or until the notice to vacate expires, whichever comes first.

   e. The developer agrees to show compliance with the terms of this condition before the issuance of the Clearing, Grading and Demolition Permit.

9. The developer agrees to comply with all federal, state and local laws and regulations not modified by the County Board's action on this plan and to obtain all necessary permits. The County also has the authority to take actions to
include issuance of a stop work order when the developer is not in compliance with the agreed-upon conditions.

10. The developer agrees to file three copies of a site plan and the tabular information form, and one digital copy on compact disc in JPEG, PDF, and DXF formats, which complies with the final approval of the County Board and with Administrative Regulation 4.1, with the Zoning Administrator within 90 days of the County Board approval and before the issuance of the Clearing, Grading and Demolition Permit.

11. The developer agrees to comply with the following before issuance of the Clearing, Grading and Demolition Permit and to remain in compliance with this condition until the Master Certificate of Occupancy is issued.

   a. The developer agrees to identify a person who will serve as liaison to the community throughout the duration of construction. This individual shall be on the construction site throughout the hours of construction, including weekends. The name and telephone number of this individual shall be provided in writing to residents, property managers and business owners whose property abuts the site, and to the Zoning Administrator, and shall be posted at the entrance of the project.

   b. Before commencing any clearing or grading of the site, the developer shall hold a meeting with those whose property abuts the project to review the construction hauling route, location of construction worker parking, plan for temporary pedestrian and vehicular circulation, and hours and overall schedule for construction. The developer agrees to provide documentation to the Zoning Administrator of the date, location and attendance of the meeting before a Clearing, Grading and Demolition Permit is issued. Copies of plans or maps showing the construction hauling route, construction worker parking and temporary pedestrian and vehicular circulation shall be posted in the construction trailer and given to each subcontractor and construction vehicle operator before they commence work on the project.

   c. Throughout construction of the project, the developer agrees to advise abutting property owners in writing of the general timing of utility work in abutting streets or on-site that may affect their services or access to their property.

   d. At the end of each work day during construction of the project, the developer agrees to ensure that any streets used for hauling construction materials and entrance to the construction site are free of mud, dirt, trash, allaying dust, and debris and that all streets and sidewalks adjacent to the construction site are free of trash and debris.
e. The developer agrees that construction activity, not including construction worker arrival to the construction site and indoor construction activity, will commence no earlier than 7:00 a.m. and end by 9:00 p.m. on weekdays; and no earlier than 10:00 a.m. and end by 9:00 p.m. on Saturdays, Sundays, and federal holidays; and no earlier than 10:00 a.m. and end by 9:00 p.m. on Sundays. Indoor construction activity, defined as activity occurring entirely within a structure fully enclosed on all sides by installed walls, windows, and/or doors, shall comply with the Noise Ordinance and must not exceed the noise levels established by the Noise Ordinance. The developer agrees to place a minimum of one sign per street front indicating the permissible hours of construction around the construction site and at all construction and construction trailer entrances, to place one additional sign within the construction trailer containing the same information, and to provide a written copy of the permissible hours of construction to all subcontractors.

f. Storage of construction materials, equipment and vehicles shall occur on the site or an approved off-site location, or as approved by the County Manager of his designee.

• The following Conditions of site plan approval (#12 through #31) are valid for the life of the site plan and must be met by the developer before issuance of the Excavation/Sheeting and Shoring Permit.

12. The developer agrees to submit and obtain the County Manager’s approval of a revised detailed final site development and landscape plan for the Phase Two office building, prior to issuance of the Excavation/Sheeting and Shoring Permit. The revised final site development and landscape plan shall be submitted at a scale of 1 inch = 25 feet, in conjunction with the final site engineering plan as required in Condition #15 below, as well as a vicinity map with major streets labeled. The developer further agrees that both the revised final site development and landscape plan and the site engineering plan verify by means of survey that there are no conflicts between the street trees and utilities. The developer shall obtain approval by the County Manager or his designee for both plans as meeting all requirements of the County Board's site plan approval and all applicable county laws and plans before the issuance of the Excavation/Sheeting and Shoring Permit. The plan shall be consistent with the conceptual plan approved as a part of the site plan, and, at a minimum, shall conform to the landscaping requirements in Condition #13 below; the Rosslyn-Ballston Corridor Streetscape Standards if applicable; the Sector Plans if applicable; the County's landscaping, planting, and sidewalk and driveway construction specifications; and/or other applicable urban design standards approved by the County Board. In order to facilitate comparison with the final site engineering plan, the landscape plan shall be at a scale of 1 inch = 25 feet;
the County may require more detailed plans appropriate to landscape installation at a larger scale (1/16 inch = 1 foot, 1/8 inch = 1 foot, or 1/4 inch = 1 foot). The County may permit minor changes in building, street and driveway locations and other details of design as necessitated by more detailed planning and engineering studies if such changes are consistent with the provisions of the Zoning Ordinance governing administrative approval and with the intent of the site plan approval. The landscape plan shall include a Street Tree Plan which shall be reviewed by the Department of Parks, Recreation and Community Resources and shall be accompanied by the site engineering plan. The installation of all plant materials shown on the final landscape plan shall take place before the issuance of the first Certificate of Occupancy, for the respective phase of construction. The final site development and landscape plan shall include the following details:

a. The location and dimensions of traffic signal poles and control cabinets, utility meters, utility vaults and boxes, transformers, mechanical equipment, fire hydrants, standpipes, storm water detention facilities, the location of all existing and proposed utility lines and of all easements. The location of traffic control cabinets shall be shown on the final site engineering plan and placed so as not to obstruct pedestrian travel or be visually obtrusive. Traffic control cabinets shall not be located in the public sidewalk. Transformers shall not be placed above grade in the setback area between the building and the street.

b. Intake and exhaust garage ventilation grates may not be located within public sidewalks or streets, or within areas between the street curb and any building which is used as a walkway. The developer agrees to provide drawings showing how the garage will be ventilated prior to submission of the post-County Board Administrative Regulation 4.1 drawings required in Condition #10 above. Ventilation grates shall be located and/or screened so as not to be visible from public rights-of-way. The developer shall obtain approval from the County Manager or his designee on the location and screening of all ventilation grates as part of the review of the final site engineering plan and the final site development and landscape plan before issuance of the Footing to Grade Permit.

c. The location, dimensions, and materials, and pavement pattern where applicable, for driveways and access drives, automobile drop-off areas, driveway aprons, service drives, parking areas, interior walkways, plaza areas and sidewalks, as well as for address indicator signs. Brick or a concrete unit paver shall be used on the access drives, automobile drop-off areas, plaza areas, and interior walkways. Interior walkways shall have a minimum width of four (4) feet. Plaza areas shall contain special paver treatments that coordinate in design, color and materials with the treatment of the public sidewalk. The materials and colors used are
subject to approval by the County Manager or his designee according to adopted Sector Plans or other urban design standards approved by the County Board as a party of review and approval of the final site development and landscape plan.

d. The location and types of light fixtures for streets, parking, walkway and plaza areas, and associated utilities, as contained in the lighting plan required in Condition #49 below.

e. Topography at two (2) foot intervals, and the finished first floor elevation of all structures, and top-of-slab elevation for any proposed underground structures.

f. Landscaping for plaza areas, raised planters, surface parking areas, and service drives, including a listing of plant materials; and details of planting, irrigation and drainage; and proposed furnishings for all areas, including but not limited to style(s), materials(s), finish(es) and manufacturer(s) of seating, bollards, trash receptacles, bike racks, arbors, trellises, and water features.

g. The location and planting details for street trees in accordance with Department of Public Works Standards and Specifications for planting in public rights-of-way and as shown on the approved final site engineering plan.

h. The limits of demolition and construction.

i. The developer agrees to submit a maintenance agreement which shall ensure that all plaza areas and other landscaped areas located on private property are kept in a clean and well-maintained condition after the expiration of the two year guarantee required in #13 below and to follow the terms of that maintenance agreement approved for that purpose by the Zoning Administrator, as required in Section 32A of the Zoning Ordinance.

j. Details of the decorative treatment of the roof area and the penthouse, to be consistent with the design and treatment of roof area and penthouse of the Phase One building.

k. Details of the landscape treatment for the final phase of the Ellipse Plaza, which is required to be implemented and the full Plaza completed prior to the issuance of the first Certificate of Occupancy for the Phase Two office building.
13. The developer agrees that all landscaping shall conform to Department of Public Works Standards and Specifications and to at least the following requirements:

a. Planting materials shall be of good nursery stock and a nursery guarantee shall be provided by the developer for two years including the replacement, as needed, and maintenance (to include but not be limited to pruning, feeding, spraying, mulching, weeding, and watering) of all landscape materials following the issuance of the Master Certificate of Occupancy.

b. Plant materials and landscaping shall meet the then-current American Standard for Nursery Stock, and shall also meet the following standards:

   (1) Major deciduous trees (shade or canopy trees such as Oaks, Maples, London Plane Trees, Japanese Zelkovas, etc.) other than street trees—a minimum caliper of 4 to 4 1/2 inches, except as indicated in Condition #17 below.

   (2) Evergreen trees (such as Scotch Pines, White Pines, Hemlocks, etc.)—a minimum height of 7 to 8 feet.

   (3) Ornamental deciduous trees (such as Cherries, Dogwoods, Serviceberries, Hornbeams, etc.)—a minimum caliper of 3 to 3 1/2 inches.

   (4) Shrubs—a minimum spread of 18 to 24 inches.

   (5) Groundcover—in 2 inch pots.

c. All new lawn areas shall be sodded; however, if judged appropriate by the County Manager or his designee, based on accepted landscaping standards and approved in writing, seeding may be substituted for sod. All sod and seed shall be state certified.

d. Exposed earth not to be sodded or seeded shall be well-mulched or planted in ground cover. Areas to be mulched may not exceed the normal limits of a planting bed.

e. Soil depth shall be a minimum of four (4) feet plus 12 inches minimum of drainage material for trees and tall shrubs and three (3) feet for other shrubs. This requirement shall also apply to those trees and tall shrubs in raised planters. Soil depth for raised planters shall be measured from the bottom of the planter to the top of the planter wall. The walls of raised planters shall be no higher than seat-wall height (2 1/2 feet, maximum) above the adjacent finished grade.
f. Finished grades shall not exceed a slope of three to one or the grade that existed before the site work began.

g. The developer agrees to maintain the site in a clean and well-maintained condition before the issuance of the Clearing, Grading and Demolition Permit and agrees to secure and maintain the site throughout the construction and phasing process. Further, the developer agrees to submit a maintenance agreement which shall ensure that all plaza areas and other landscaped areas located on private property are kept in a clean and well-maintained condition after the expiration of the two year guarantee required in #13a. above and to follow the terms of that maintenance agreement approved for that purpose by the Zoning Administrator.

h. The developer agrees to notify the Department of Parks, Recreation and Community Resources (DPRCR) Urban Forester at least 72 hours in advance of the scheduled planting of any street trees in the public right-of-way and to be available at the time of planting to meet with staff of DPRCR to inspect the plant material, the tree pit and the technique of planting. Soil used in the tree pit must meet the specifications for street tree planting available from the DPRCR Urban Forester.

14. The developer agrees to contact all utility companies, including the electric, telephone and cable television companies, and offer them access to the site at the time of utility installation to install their underground cables. In order to comply with this condition the developer agrees to submit to the Zoning Administrator copies of letters from the developer to the utility companies offering them access as stated above.

15. The developer agrees to submit final site engineering plans to the Department of Public Works. The plans shall be drawn at the scale of 1 inch = 25 feet and be 24 inches by 36 inches in size. Neither the Excavation/Sheeting and Shoring permit nor the first Building Permit shall be issued until final site engineering plans which agree with the approved final site development and landscape plans, and the sequence of construction, has been approved by the Department of Public Works, as consistent with all site plan approval requirements and all County laws. Upon completion of the construction of a project, the developer agrees to submit one (1) set of as-built mylar plans for sanitary, storm sewer and water main construction to the Department of Public Works for recording.

16. The developer agrees to show on the final engineering plans pavement, curb and gutter along all frontages of this site in accordance with the then-current Arlington County Standard for concrete curb and gutter and the then-current standards for pavement and according to the following dimensions. The
pavement, curb and gutter shall be constructed prior to issuance of the first Certificate of Occupancy.

a. Wilson Boulevard - Construct a raised median and new curb and gutter as shown on the plot and location plan entitled NRECA Phase II The Ellipse at Ballston, Sheet C-3 of 4, prepared by VIKA, Inc., dated August 1, 2003 and revised through November 10, 2003, and as shown on the final engineering plan approved by the County Manager or his designee.

b. North Glebe Road - Construct a raised median and new curb and gutter on the plot and location plan entitled NRECA Phase II The Ellipse at Ballston, Sheet C-3 of 4, prepared by VIKA, Inc., dated August 1, 2003 and revised through November 10, 2003, and as shown on the final engineering plan approved by the County Manager or his designee.

c. The developer agrees to construct a total of two (2) 10-foot wide brick paver crosswalks as shown on the final site development and landscape plan and approved by the county Manager and his designee at the following locations:

i. Across Wilson Boulevard, east of the Wilson Boulevard/North Glebe Road intersection, as shown on the final engineering plan approved by the County Manager or his designee.

ii. Across North Glebe Road west of the Wilson Boulevard/North Glebe Road intersection, as shown on the final engineering plan approved by the County Manager or his designee.

iii. The developer agrees to construct and maintain brick and/or concrete paver crosswalks approximately 15 feet in width, in North Taylor Street adjacent to Wilson Boulevard, and in the access drive adjacent to the west property line. Such crosswalks shall be constructed prior to the issuance of the first Certificate of Occupancy for the NRECA phase-two office building. The crosswalk in the access drive shall provide a connection between the elements of the 9th Street Greenway as approved in the Ellipse Site Plan (Ellipse Park) and the Arlington Gateway Site Plan (SP #331). The crosswalks shall be distinctively designed to fit in with the Ballston streetscape, and the designs shall be reviewed and approved by the County Manager or his designee as a part of the final site development and landscape plan.

d. The developer agrees to construct curb ramps at the ends of and aligned with the Wilson Boulevard and North Glebe Road crosswalks, as shown on
the final engineering plan approved by the County Manager or his designee.

e. The developer agrees to construct a median nose extension, approximately 24 feet in length, contiguous to the raised median in North Glebe Road, as shown on the final engineering plan approved by the County Manager or his designee.

The developer agrees to construct a median nose extension, approximately 24 feet in length, contiguous to the raised median in North Glebe Road, as shown on the final engineering plan approved by the County Manager or designee.

All improvements to curb, gutter, sidewalks and streets for pedestrian and/or vehicular access or circulation shall be in full compliance with the Americans with Disabilities Act (ADA) and any regulations adopted thereunder, as well as any other applicable laws and regulations. The developer further agrees that all improvements to curb, gutter, sidewalks, crosswalks, and streets for pedestrian and/or vehicular access or circulation shall be as determined by the County Manager or his designee on the final Site Development and Landscape Plan and on the final Site Engineering Plan, in accordance with the Rosslyn-Ballston Corridor Streetscape Standards or other applicable urban design standards in effect at the time of final Site Engineering Plan Approval; provided, however, that the provision of such improvements shall not increase the projected cost anticipated for such improvements as shown on the site plan drawings dated November 10, 2003 unless the County provides additional funding to offset such increased cost.

17. The developer agrees that the final sidewalk pattern/design and final selection of materials and colors to be used shall be as determined by the County Manager or his designee on the final site development and landscape plan and final engineering plan, in accordance with the Rosslyn-Ballston Streetscape Plan or other applicable urban design standards approved by the County Board and in effect at the time of the site plan approval. The developer further agrees to construct the sidewalk improvements detailed below prior to the issuance of the first Certificate of Occupancy for the site plan. The sidewalks along the street frontages of this development shall be paved with brick or an interlocking concrete paver and shall be placed on a properly-engineered base approved as such by the Department of Public Works. The sidewalk treatments shall continue across all driveway aprons for loading and garage entrances along all frontages of the site plan, and there shall be no barriers to impede the flow of pedestrian traffic. The sidewalks shall contain street trees placed in either tree pits, tree grates or planting strips, consistent with the Standards for Planting and Placement of Trees in Site Plan Projects, and as specified below. Placement, planting and root enhancement options shall be consistent with the Standards for Planting and Placement of Trees in Site Plan Projects, and as specified below.
Street trees shall not be placed within the vision obstruction area. All public walkways shall be constructed to County Standard. The developer agrees to maintain and replace the street trees and sidewalks for the life of the site plan. The sidewalk sections and street tree species shall be as follows:

**Wilson Boulevard** - A minimum 20-foot wide sidewalk measured from the back of curb, including the continuous four (4) foot wide planting strip with structured soil, planted with 4 ½ inch caliper Willow Oak street trees and such ground cover as liriope muscarii, hypericum, calycinum (Aarons Beard), or juniperius conferta (Shore Juniper), placed 28 to 32 approximately 30 feet apart on center.

The streetscape element shall include a paving treatment across driveway entrances and ramps located along with the public sidewalk area which is similar to the sidewalk in material, texture and color. This paving may include some differentiation from the public sidewalk for the purpose of public safety.

There shall be no obstructions within the public sidewalk, such as bollards, planters, kiosks, etc.

18. The developer agrees that in order to accommodate the subsurface requirements of utilities and streetscape elements (including street trees), the final design of the project shall provide a structure-free zone under the public sidewalk along all street frontages, as required in the *Standards for Planting and Placement of Trees in Site Plan Projects*. This zone shall be a minimum of five (5) feet deep and shall extend from the back of the street curb to the far edge of the public sidewalk (the sidewalk width shall be as defined in condition #17 above). No subterranean structures (such as parking garages) shall intrude into this five foot deep zone. Within the zone, underground utilities and utility vaults shall not be located in a manner that interferes with the appropriate spacing and replacement of street trees, consistent with the approved final site and development and landscape plan. Utility lines shall not be located beneath street trees. The location of all existing and proposed utility lines shall be shown on both the final landscape plan and the final site engineering plan.

19. The developer agrees that the location of the water services will be determined at the time of the review of the final engineering plan in accordance with the following standards: water meter installations shall be located behind and adjacent to the curb line in an area clear of driveways, a minimum of five (5) feet clear of other utilities and a minimum of 10 feet clear of structures; a clear space 15 feet wide by 20 feet long by 10 feet deep shall be provided for three (3) inch and four (4) inch meter installations, and 20 feet wide by 25 feet long by 10 feet deep for six (6) inch and larger meter installations; and the building walls shall be adjusted as necessary to provide these clearances.
20. The developer agrees that all sanitary sewers and water mains, including water services, shall have a minimum of ten (10) feet horizontal clearance from each other and five (5) feet clearance from all other utilities, and shall have a minimum of 10 feet horizontal clearance from buildings and other structures. Water mains 16 inch and larger, and mains placed more than 10 feet deep shall have a minimum of 15 feet horizontal clearance from buildings and other structures; and sanitary sewers 15 inches and larger, or sewers placed more than 10 feet deep shall have 15 feet minimum clearance from buildings and other structures. All water mains and sanitary sewers shall meet County Standard design criteria.

21. The developer agrees that no existing water main or fire hydrant shall be taken out of service or made inaccessible without the prior written approval of the Department of Public Works. This approval shall be obtained before the issuance of the Excavation/Sheeting and Shoring Permit.

22. The developer agrees to show, on the final engineering plans, water main improvements in accordance with the following. The water main improvements shall be constructed prior to the issuance of the Final Building Permit for the respective phases of construction.

23. The developer agrees to show, on the final engineering plans, and to construct sanitary sewer main improvements in accordance with the following. The sanitary sewer main improvements shall be constructed prior to the issuance of the Final Building Permit.

The two (2) buildings fronting Wilson Boulevard shall be sewered to the existing sanitary sewer in Wilson Boulevard, and the service connections shall be by means of manholes.

The County will TV-Inspect the sanitary sewer lines serving the site and shall identify any improvements that are necessary to adequately service the development. The developer agrees to repair or replace any sections or appurtenances of the sanitary sewer serving the development that are found to be deficient or damaged by the developer, as identified by County staff and as shown on the final engineering plan approved by the County Manager or his designee.

The developer agrees to submit and obtain approval from the County Manager or his designee of a sanitary sewer capacity study prior to approval of the site engineering plan.

24. The developer agrees to show, on the final engineering plan, horizontal standpipes or fire hydrants at intervals of not more than 300 feet in order to provide adequate fire protection. The County shall specify kind of service and
locations at the time of the final site engineering plan approval based on applicable safety standards. The horizontal standpipes or fire hydrants shall be installed prior to the issuance of the Final Building Permit.

The developer agrees to provide calculations to demonstrate the needed fire flow as defined in the Arlington County Department of Public Works Standards and Specifications. This information shall be clearly shown on the cover sheet of each plan set submitted.

25. The developer agrees to remove and replace any existing curb, gutter and sidewalk along the street frontages of this site which is in poor condition or damaged by the developer according to Arlington County standards and specifications, prior to the issuance of the first Certificate of Occupancy.

26. The developer agrees to show on the final engineering plans street lighting along all frontages of the site prior to the issuance of the Excavation/Sheeting and Shoring Permit. The developer agrees, at its cost, to purchase and install approved Arlington County street lighting along the frontages of the site prior to the issuance of the Shell and Core Certificate of Occupancy. In addition, the developer agrees to furnish and install all conduit and junction boxes necessary for the lighting system. All construction shall meet Virginia Power standards. Lighting shall be in accordance with the following:

The developer agrees to purchase and install double-globe Virginia Power "Carlyle" standard street lights along all frontages of the site in accordance with adopted County Lighting Policy. The developer agrees to pay the cost of installing additional standard thoroughfare lights at the adjacent intersections, should the County decide that they are necessary to provide adequate lighting for street safety purposes.

27. The developer agrees to remove or place underground all existing aerial utilities within or along the periphery of this site prior to the issuance of the final building permit, as shown on the final side development and landscape plan and the final engineering plan approved by the County Manager or his designee. Any utility improvements necessary to provide adequate utility services to this development or utility work necessary to provide a terminus to the underground facilities shall be paid for by the developer and shall not result in the installation of any additional utility poles, or aerial devices. All utility relocation shall be completed prior to the issuance of the Shell and Core Certificate of Occupancy.

28. The developer agrees to provide off-street parking for all construction workers without charge to the workers. In lieu of providing parking, the developer may provide a subsidy for the construction workers in order that they may use Metro, provide a van for van pooling, or use another established method of transportation to provide for construction workers to arrive at the site.

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Compliance with this condition shall be determined based on a plan which shall be submitted to the Zoning Administrator before the issuance of the Excavation/Sheeting, and Shoring Permit. This plan shall set forth the location of the parking to be provided at various stages of construction, how many spaces will be provided, how many construction workers will be assigned to the work site, and mechanisms which will be used to encourage the use of Metro, carpooling, vanpooling, and other similar efforts. The plan shall also provide for a location on the construction site at which information will be posted regarding Metro schedules and routes, bus schedules and routes, and carpooling and vanpooling information. If the plan is found to be either not implemented or violated during the course of construction, a correction notice will be forwarded to the developer. If the violation is not corrected within ten (10) days, a "stop work order" will be issued, and construction halted until the violation has been corrected.

29. The developer agrees to install address indicator signs on the site which comply with Section 27-12 of the Arlington County Code or successor provision in a location visible from the street and as shown on the final site development and landscape plan.

30. The developer agrees that the design of the facade treatment for the buildings and the materials to be used on the facades shall be consistent in design and treatment with the Phase One office building, as specified and shown on the submitted drawings dated November 10, 2003 and as presented to the County Board and made a part of the public record on December 6, 2003, including all renderings, drawings, and presentation boards presented during public hearings. The building facades shall be brick with precast concrete accents, and the penthouse facades shall be brick and/or precast concrete to match the color of the brick on the building and consistent with the treatment of the penthouse on the Phase One office building. The developer agrees to submit colored drawings and renderings, and material samples, for review by the County Manager or his designee prior to the issuance of the Footing to Grade Permit. The developer further agrees to obtain the approval of the County Manager or his designee of the facade treatment as being consistent with the County Board approval before the issuance of the of the Final Building Permit.

31. All required public easements and public dedications right-of-way agreements shall be submitted to the Department of Public Works prior to the issuance of the Excavation/Sheeting and Shoring Permit, and be approved and recorded among the land records of the Clerk of the Circuit Court of Arlington County, by the developer before the issuance of the Final Building Footing to Grade Structure Permit. The developer agrees that there shall be no building construction within the easement area without approval by the County Manager or the County Board. Dedications granted by the developer for street improvements shall be
dedicated in fee simple to the County. Dedications granted by the developer for sidewalk improvements may be dedicated by easement to the County.

- **The following conditions of site plan approval (#32 through #40) are valid for the life of the site plan and must be met by the developer before issuance of the Footing to Grade Structure Permit.**

32. The developer agrees to submit one (1) plat, drawn at the scale of 1 inch = 25 feet and 24 inches x 36 inches in size, of the excavated area showing spot elevations which confirm that the construction drawings are consistent with the average site elevation, and with the building’s ground floor elevation(s) at the building’s lowest level(s), as approved by the County Board and as indicated in the plans referenced in Conditions #1 and #10 above.

33. Upon approval of the final site engineering plan the developer agrees to submit a performance bond estimate for the construction or installation of all facilities (to include street trees and all landscape materials) within the public rights-of-way or easements to the Department of Public Works for review and approval. Upon approval of the performance bond estimate by the Department of Public Works, the developer agrees to submit a performance bond in the approved amount of the estimate and agreement for the construction or installation of all these facilities (to include street trees and all landscape materials) within the public rights-of-way or easements to the Department of Public Works and this bond shall be executed by the developer in favor of the County before the issuance of the Above Grade Building Permit.

Prior to the release of the public improvement bond, the Developer agrees to submit as-builts for all underground utilities (water, sanitary sewer, and storm sewer) that will be maintained by Arlington County.

34. The developer agrees that all new electrical transformers shall be placed underground in vaults which meet Virginia Power standards. These vaults may be placed in the street right-of-way or in driveways if approved by the County on the final site engineering plan. Ventilation grates may not be located within public sidewalks or streets, or within areas between the street curb and any building which is used as a walkway. The locations of the vaults shall be coordinated with other utility locations so as to have a minimum clearance of five (5) feet to conduits and manholes and a minimum clearance of 10 feet to water mains and sanitary sewers unless otherwise approved by the owner of that utility. The developer shall obtain approval from the County Manager or his designee on the location of all vault ventilation grates and utilities as part of the review of the final site engineering plan and the final site development and landscape plan before the issuance of the Footing to Grade Structure Permit.
35. The developer agrees that interior space shall be provided and used for the collection, storage, compaction, and removal of trash, as well as appropriate facilities for the recycling of reusable materials as defined by the County. The collection, storage, compaction, and removal of trash shall not occur outside the interior loading space. This space may not conflict with the use of a loading berth. Drawings showing compliance with this condition shall be approved by the Zoning Administrator before the issuance of the Footing to Grade Structure Permit.

36. The developer agrees that all loading spaces shall be in the interior of the building and shall also comply with the requirements of Section 1 (minimum 12 foot clear width [including entrances], 30 foot length and 14 foot height clearance) and Section 33.C.5 of the Zoning Ordinance, and shall contain roll-down doors. Use of the loading dock for deliveries or trash pick-ups, excluding moving vans, shall be limited to the hours from 8:00 a.m. to 6:00 p.m., seven (7) days a week. The loading dock door shall also be closed when the loading dock is in use, except when necessary for entry or exit of vehicles, venting of vehicle exhaust, or when required for similar operational or safety measures.

37. The developer agrees that new parking garages shall be designed to allow access and use by vans. At least 10% of the total new parking supply shall be accessible to vans, shall be conveniently located on the level of the garage closest to street level, and on the two upper most levels of the garage. The parking level closest to the street and shall have a minimum clearance of 98 inches, the second uppermost level shall have a minimum clearance of 86 inches, and.—All other areas of the garage shall have a minimum clearance of 84 inches. Compliance with this condition shall be determined by review of the building plans by the Zoning Administrator before the issuance of the Footing to Grade Structure Permit, which review shall not relieve the developer from constructing in accordance with this condition.

38. The developer agrees to ensure that all parking spaces comply with the requirements of Section 33 of the Zoning Ordinance. Unless otherwise approved by the County Board, the number of compact spaces for the Phase Two office building shall not exceed 137 spaces or 35.3 percent of the total spaces in the Phase Two office building may not exceed the Zoning Ordinance requirement. The developer shall submit drawings showing that these requirements are met, and shall obtain approval by the Zoning Administrator before the issuance of the Footing to Grade Structure Permit.

39. The developer agrees to provide, at no charge to the user, secure bicycle storage facilities in locations convenient to office, residential and retail areas on the following basis at a minimum:

**Office and Residential-Bicycle Storage Facilities:**

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One (1) employee bicycle parking space for every 7,500 square feet, or portion thereof, of office floor area and one (1) additional such visitor space for every 20,000 square feet, or portion thereof, of office floor area.

One (1) resident bicycle parking space for every 10 three (3) residential units, or portion thereof, of residential units and one (1) visitor space for every 50 residential units, or portion thereof, of residential units.

These bicycle parking facilities shall be highly visible to the intended users and protected from rain and snow within a structure shown on the site plan. The facilities shall not encroach on any area in the public right-of-way intended for use by pedestrians nor any required fire egress. The facilities for office users residential bicycle parking must meet the acceptable standards for Class I storage space as contained in the Arlington Bicycle Transportation Plan, dated April 1994 with Amendments through March 2003, and be highly visible from an elevator entrance, a full-time parking attendant, a full-time security guard or a visitor/customer entrance. Visitor parking must be located within 50 feet of the primary building entrance. Any bicycle parking racks used on the site must conform to the Arlington County Standard or be approved by the Bicycle and Pedestrian Program Manager. Drawings showing that these requirements have been met shall be approved by the Zoning Administrator before the issuance of the Footing to Grade Structure Permit.

In addition, the developer agrees that for every 50,000 square feet or fraction thereof of office Gross Floor Area (GFA), one (1) shower per gender shall be installed, up to a maximum of three (3) showers per gender. Also, a minimum of one (1) clothes storage locker per gender shall be installed for every required employee bicycle parking space. The lockers shall be installed adjacent to the showers in a safe and secured area and both showers and lockers shall be accessible to all tenants of the building. The location, layout and security of the showers and lockers shall be reviewed by the Arlington County Police Department before issuance of the Footing to Grade Structure Permit. The developer agrees that an exercise/health facility containing a maximum of 1,000 square feet shall not count as density (FAR) but shall count as GFA if this facility meets all of the following criteria: 1). The facility shall be located in the interior of the building and shall not add to the bulk or height of the project; 2). Showers and clothes lockers shall be provided as required above; 3). The lockers shall be installed adjacent to the showers in a safe and secured area within the exercise facility and both showers and lockers shall be accessible to all tenants of the project; 4). The exercise facility shall be open only to tenants of the project and shall not accept or solicit memberships from outside of the project. The exercise facility, including the showers and lockers, shall be open during normal working hours. If the required number of showers (3 showers per gender) and lockers (51 lockers) for the Phase Two office building, above and beyond the required number of showers and lockers for the Phase One
building, have been provided in the Phase One office building, then the developer shall be relieved from meeting this requirement in the Phase Two building, provided that the developer can demonstrate that office and retail tenants, employees, customers and visitors of the Phase Two office building will have access to the showers and lockers in the Phase One office building.

**Retail Bicycle Storage Facilities:**
Two (2) retail visitor/customer bicycle parking spaces for every 10,000 square feet, or portion thereof, of the first 50,000 square feet of retail floor area; one (1) additional retail visitor/customer space for every 12,500 square feet, or portion thereof, of additional retail floor area; and one (1) additional retail employee space for every 25,000 square feet, or portion thereof, of retail floor area. The retail visitor/customer bicycle spaces shall be installed at exterior locations that are convenient to the retail visitors/customers, and such locations shall be reviewed by the Department of Public Works. The developer agrees to obtain approval of the location, design and details of the retail visitor/customer bicycle spaces as part of the final site development and landscape plan. Facilities for retail visitors/customers must meet the County standards for bicycle racks, and be located close to retail visitor/customer entrances or the closest retail vehicle parking spaces.

40. The developer agrees to construct all plaza areas used for vehicular access and all surface parking areas to support the live load of any fire apparatus. Bollards or curbs shall be used on pedestrian plazas to separate the areas intended for emergency vehicle use from areas intended for pedestrian use. No above-grade structure shall be allowed to encroach in fire lanes. The requirements of this condition shall be incorporated in the drawings submitted for the Footing to Grade Structure Permit.

- **The following conditions of site plan approval (#41 through #45) are valid for the life of the site plan and must be met by the developer before the issuance of the Final Building Permit.**

41. The developer agrees to submit one (1) original and three (3) copies of a wall check survey to confirm its consistency with the plans approved by the County Board, as referenced in Conditions #1 and #10 above.

42. Mechanical equipment shall be screened so as not to be visible from public rights-of-way.

43. The use of any penthouse shall be limited to mechanical equipment and equipment maintenance space or telecommunication transmitter and/or receiver equipment as required in Condition #53 below.
44. The developer agrees to coordinate with the Operations Division of the Arlington County Police Department for comments regarding security measures.

45. The developer agrees to obtain from the Federal Aviation Administration (FAA), before the issuance of the final building permit, a written statement that the project is not a hazard to air navigation or that the project does not require notice to or approval by the FAA.

- The following conditions of site plan approval (#46 through #52) are valid for the life of the site plan and must be met by the developer before the issuance of the First Certificate of Occupancy.

46. The developer agrees to develop and submit a comprehensive sign plan and that all exterior signs shall comply with the conditions of the approved Comprehensive Sign Plan for the Ellipse at Ballston Site Plan, as well as shall be consistent with the guidelines contained in “Sign Guidelines for Site Plan Buildings and with Section 34 of the Zoning Ordinance, except that retail signs may have a design which differs from the approved Comprehensive Sign Plan. The Comprehensive Sign Plan and be revised to include retail signage for the Phase Two office building, which revisions shall be reviewed and approved by the County Manager or his designee. The Zoning Administrator shall determine whether the signs meet the standards of the approved Comprehensive Sign Plan, the guidelines and the Ordinance, and no sign permits will be issued until this determination has been made or, as deemed appropriate, a revised Comprehensive Sign Plan has been approved. A comprehensive sign plan is approved. The comprehensive sign plan shall be approved before the issuance of the First Certificate of Occupancy. All proposed rooftop signs, defined as all signs that are 35 feet or more above the ground, shall require a site plan approval or amendment. Further, the developer agrees that any signage facing The Jefferson residential building, including retail tenant identification signage, shall not be illuminated after 11:00 p.m.

47. The developer agrees to develop and implement a transportation management plan, as outlined in the attached Transportation Demand Management Program submitted to Arlington County by Wells and Associates, letter from (applicant) dated to (staff), and the attachment thereto, as amended below, prior to the issuance of the first Certificate of Occupancy. Such plan shall include a schedule for and details of implementation and continued operation of the elements listed in the attachment letter.

a. The developer agrees to contribute $19,311 to the Commuter Assistance Program to sustain direct and indirect on-site and off-site services in support of the TMP activities. The contribution shall be made before the issuance of the first Certificate of Occupancy for the Phase Two office building.
48. **Intentionally Omitted** The intent of this condition is to ensure that at least one parking space is available in perpetuity for parking use by each residential unit in the project. Accordingly, the developer agrees to offer the use, for rental units, and the purchase or use for condominium units, of at least one parking space for each dwelling unit.

Further, for condominium units, the developer agrees to notify the Zoning Administrator at the time of the settlement of the last dwelling unit. If excess parking spaces are available at the time of settlement of the last dwelling unit, the number of excess parking spaces equaling the number of dwelling units which were sold without a parking space, shall first be offered exclusively for a period of twelve (12) months to the owners of those dwelling units which were sold without a parking space. Any other remaining spaces shall be offered to all dwelling unit owners or transferred to the condominium, cooperative or homeowners association. By the end of twenty-four (24) months following the settlement of the last dwelling unit, the developer agrees to relinquish in writing to the condominium, cooperative or homeowners association any and all remaining interest in the parking spaces or garage and a copy shall be filed with the Zoning Administrator. The future purchase of any parking spaces shall be limited to the dwelling unit owners or condominium, cooperative or homeowners association of the building.

For both rental and condominium buildings, the use of the parking spaces shall be limited to parking use by the residents of the building and their guests, unless otherwise permitted by the Zoning Ordinance, and shall not be converted to storage or other use without approval of a site plan amendment.

The developer agrees to submit to the Zoning Administrator a parking management plan which outlines how guest and visitor parking for the residential building, and parking for retail tenants' employees and customers for retail located in the residential buildings, will be provided, where the parking will be located and how guests and visitors, and retail employees and customers, will be directed to the parking spaces. The developer further agrees to make a minimum of ____ residential visitor parking spaces, and ____ retail tenant parking spaces, available within the residential garage. The parking management plan shall be submitted to the Zoning Administrator, and reviewed and approved by the County Manager or his designee, prior to the issuance of the first Certificate of Occupancy for the first residential building.

49. The developer agrees to include a lighting plan for all internal and external public areas, including parking areas, as part of the final site development and landscape plan. This lighting plan shall be subject to review by the County Manager or his designee, including street lighting as described in Condition #26 above. The developer shall include in the site development and landscape plan
certification that the lighting plan meets the minimum standards of the Zoning Ordinance, Section 2, Subsection H, and the Illumination Engineering Society of North America Standards. The lighting shall be installed and tested before the issuance of the First Certificate of Occupancy.

50. The developer agrees to be responsible for documenting any historical artifact or historical natural feature uncovered during construction on the site. This documentation shall include written notation describing the artifact or natural feature, color photographs, and mapping of the location and/or depth of the site excavation at which the item was found. The developer agrees to submit a copy of this documentation to Arlington County before issuance of the First Certificate of Occupancy.

In the event an historical artifact or natural feature is found on the site, and is to be disturbed or removed from the site during construction, the developer agrees to contact the Arlington County Historic Preservation Program, Neighborhood Services Division before removing or disturbing the artifact or natural feature. Arlington County shall be given the opportunity to accept donation of the artifact or natural feature before the item is offered to any other organization or individual.

51. **Intentionally Omitted** If the project includes a residential, condominium, or cooperative component, then the developer agrees that a copy of the conditions of this site plan approval shall be made available with the condominium's, cooperative's or homeowners association's bylaws or agreements. Documentation that this condition has been satisfied shall be provided to the County Manager or his designee before the issuance of the First Certificate of Occupancy. If the project includes a residential rental component that is converted to a condominium or a cooperative, then the developer agrees that a copy of the conditions of this site plan approval shall be made available with the condominium's, cooperative's, or homeowners' association's bylaws or agreements prior to the issuance of the first Certificate of Occupancy following the conversion.

52. Before the issuance of the Master Certificate of Occupancy, the developer agrees to submit drawings certifying the building height as measured from the average site elevation to both the building roof and to the top of the penthouse roof.

- **Post Certificate of Occupancy:** the following Conditions of site plan approval (#53 through #58) are valid for the life of the site plan.

53. In order to maintain the effectiveness of the County's public safety systems, the County reserves the right to install telecommunications transmitter and/or receiver equipment and conducting wire in or on the penthouse or top floor, and antennae and traffic monitoring systems on the roof of the proposed buildings at
no charge to the County in a location and design that is acceptable to the County and the building owner based on a reasonable exercise of judgment by both upon request by the County. Upon request by the County, the developer agrees to provide access to electrical service separately metered, including auxiliary electrical power, and telephone radio control lines to the penthouse in the defined area. Any radio transmitter or receiver equipment and antenna to be installed or used by others must not interfere with the emergency communication system of the County.

54. The developer agrees that any structural addition shall be subject to the approval of the Zoning Administrator consistent with Section 36.H.2.c of the Zoning Ordinance. If the Zoning Administrator determines that any proposed improvements have a significant impact on the site plan, or otherwise meet Zoning Ordinance requirements for site plan amendments that go to the County Board, a site plan amendment shall be required.

55. The developer or owner agrees to remove snow from all interior streets and interior and exterior sidewalks, including accessibility ramps and gutter areas within crosswalks, within a reasonable time after snow has stopped falling but in no case later than snow removal provided for vehicular access to the site.

56. **Intentionally Omitted**

57. The developer agrees to provide parking for each building according to the approved parking ratio; when this parking is not located within the parcel designation of each building but located within the overall project, it shall continue to be committed to the entire project for purposes of administering the Zoning Ordinance.

58. The density allocated for any new construction pursuant to the site plan on any subdivided parcel of the site shall be the same as the approved density for the entire site. No additional density shall be allowed on any individual parcel formed by subdivision of the site.

*The following unique site specific conditions (#59 through #74) are valid for the life of the site plan and must be met before the issuance of the permit specified in each Condition.*

59. Retail Elements
   a. The developer agrees to develop and implement a retail attraction and marketing plan for the 13,977 square feet of retail space located on the
first floor of the office building. The plan shall identify the types of retail
desired, the marketing strategy to attract the retail, and strategies to
retain the retail. The retail attraction and marketing plan shall be in
accordance with the approved Retail Action Plan for the Rosslyn-Ballston
Corridor, dated January 2001. The retail attraction and marketing plan
shall be reviewed and approved by the Department of Economic
Development before being submitted to the Zoning Administrator. The
above-grade building permit shall not be issued until documentation has
been provided to the Zoning Administrator assuring that the plan has
been approved by the Department of Economic Development. Any
change in the use of the retail space from retail to office or other non-
retail use shall require a site plan amendment.

b. The retail spaces shall be designed and constructed to include interior and
exterior improvements necessary to ensure that they are functional and
attractive to prospective retailers and that they animate the street
frontage. These elements shall include, but not limited to: approximately
17-foot floor to floor heights, as shown on the plans dated November 7,
2003; access to the service corridor/areas as shown on the architectural
plans dated November 10, 2003; direct street frontage and access;
provision for any venting systems required for any food preparation or
restaurant use; and sufficient transparency of the building facade to
achieve adequate street exposure.

c. The developer agrees that all retail storefronts along public rights-of-way,
as shown on plans dated November 10, 2003, are required to have an
overall minimum transparency of 50%. In addition, the portion of the
retail storefronts that is located between three and eight feet from grade
is required to be at least 80% transparent. The purpose of this condition
is to allow pedestrians to view the activity within the retail establishment
and to allow patrons and employees of the retail establishments to view
the activity on the sidewalk and street. “Transparency” shall mean using
glass or other transparent exterior material offering a view into an area of
the retail establishment where human activity normally occurs and shall
not be satisfied by views into areas blocked by display cases, the rear of
shelving, interior walls, blinds, hallways, or the like. Provided that the
exterior material is glass or other transparent material, a tenant may
apply to the County Board for a site plan amendment to grant an
exception to this condition for a specified duration.

60. The developer agrees to provide for a public art component within the site
consistent with the objectives outlined in the WALKArlington report issued March
2001, the WALKArlington Ballston Pilot Study, and the Public Art Master Plan
(anticipated adoption by the County Board spring 2004). Public art may include
integrated design elements such as, but not be limited to, the following:
markers, paving designs, seating areas, landscaping, fountains/water sculpture, banners, kiosks, bus shelters, special public places and other aesthetic and functional elements that forward the WALKArlington mission. The developer agrees to involve an artist as a member of the project's design team. The artist will work with the project architects, to provide public art in the site plan development. The developer agrees to fund the public art at a cost no less than $50,000. The budget amount shall include all reasonable costs of the work, including the direct costs (e.g., maquettes or proposals) and indirect costs (excluding any in-house or internal costs to the developer, third party reimbursements or art consultant fees) of interviewing artists, artist fees, all costs of design, fabrication, installation, and all costs of any structural enhancements to the building and or sidewalk to support said art work. Notwithstanding this minimum amount, the developer agrees to fund all costs of the public art. The developer shall coordinate with the County Manager or his designee (including staff from DPRCR and DCPHD) on the selection of the artist and the design, fabrication, installation and maintenance plan for the public art. Prior to any installation, the developer shall provide the County Manager with, and obtain his approval of, a reasonable budget for the art work, which budget demonstrates compliance with this condition. The County's Arts Commission shall be consulted. The public art shall be commissioned prior to the issuance of the above grade building permit, and installed prior to the issuance of the final Certificate of Occupancy. In lieu of the development of public art in consultation with the County Manager or his designee, the developer may opt to make a contribution in the amount of $50,000 to the County's Public Art Fund toward realizing the public art as described above, either off site in the Ballston Metro station area or on site, including such space as may be necessary to locate the public art if on site, whereupon the process for developing the art components would be managed by the County. This contribution shall be made prior to the issuance of the above grade building permit.

61. The developer agrees to make all parking on the P1 level of the garage available to the public for parking after standard office hours (weekday evenings after 6:00 p.m., weekends, and all legal holidays) until 12:00 midnight or until the close of business of retail operations, whichever is later. The developer further agrees to make a minimum of 24 parking spaces on the P1 level of the garage (equivalent to a ratio of one space per 580 square feet) available for use exclusively by the retail tenants' employees and customers; at a minimum, the number of spaces to be so reserved shall be consistent with the requirements of the Zoning Ordinance for the retail uses that occupy the space, but need to leave sufficient spaces for other uses. The developer agrees to implement a validation program to allow free use of such spaces for retail customers and employees between 6:00 p.m. and 12:00 midnight or until the close of business of retail operations, whichever is later.
62. Outdoor cafes shall be permitted in the public right-of-way or within public easements along Wilson Boulevard in accordance with the applicable provisions of the Zoning Ordinance, with a maximum seating area and all other applicable requirements as set forth in the Zoning Ordinance and as determined by the Zoning Administrator. A minimum of eight (8) feet of clear sidewalk width must be maintained along Wilson Boulevard. Upon application to the Zoning Administrator, an additional two (2) feet of outdoor café space may be considered administratively. Plans for all outdoor cafes shall be subject to prior administrative approval by the Zoning Administrator for consistency with County ordinances, regulations and policies. Any outdoor café shall be administratively reviewed one year following its approval to evaluate it after a season of operation. At that time, the Zoning Administrator may review the approval, impose conditions on the operation of the outdoor café, or revoke the prior approval.

63. The developer agrees to make a contribution to the County's Housing Reserve Fund of $75,600. The payment shall be made to the Department of Community Planning, Housing and Development and compliance with this condition shall be provided to the Zoning Administrator. The developer agrees that the contribution will be paid prior to the issuance of the final building permit.

64. Building Security Requirements

a. In order to address exterior building security needs that may be required by a federal government agency(s) that may potentially occupy the building(s) as the primary tenant(s), the developer agrees to coordinate with County staff on the design of exterior building security measures in order to limit or mitigate any adverse impacts that these measures may have on the project's urban design (including street and retail base) and streetscape. All exterior building security measures shall be shown on, and approved as part of, the final site development and landscape plan. The base of the buildings, as shown in the drawings dated November 10, 2003, and consistent with Condition #59 above, have been designed to accommodate retail uses and provide interest and activate the streetscape. Any change in the use and design of the base shall require a site plan amendment.

b. The developer agrees that it is the policy of the County to maintain the maximum number of on-street parking spaces around the perimeter of a site, and that it will not remove or reduce the number of on-street parking spaces around the perimeter of a site whether at the request of the developer or a tenant or otherwise. Accordingly, the developer agrees that it shall notify tenants of the aforesaid policy prior to execution of any lease with a tenant.
65. The developer agrees that the County Board has approved additional density for this project based on the applicant’s agreement to achieve a LEED score on the LEED Green Building Rating System, Version 2.1 (May 2003) of 27 points or higher by including components in its development that earn the LEED credits listed below. These components are referred to herein as a group, as the “Green Elements.” The developer agrees that the LEED rating system described above shall apply to this site plan, irrespective of whether the US Green Building Council revises its rating system. The developer agrees that no permits will be issued for the project unless the Green Elements that would reasonably be shown on such permit are included therein. The developer further agrees that certificates of occupancy will be issued for parts of the development only after all of the applicable Green Elements have been included in that part of the development. The developer further agrees that, together with its application for a Building Permit, it shall include a listing of the Green Elements, with a notation of where and how each element has been incorporated into the construction of the project. To the extent a Green Element is not included in drawings, or has not been incorporated into the project at the time a Building Permit application is submitted, the applicant agrees to provide a plan for providing the Green Element. Such plan shall include sufficient specificity to enable the County Manager or designee’s approval (as including all Green Elements) of the plan prior to issuance of a Building Permit. A building permit based on such plans will be issued only after the County Manager has approved the plan as fulfilling the requirements of this condition. Within ninety (90) days after the issuance of the first certificate of occupancy for any part of the last floor of floors two through eleven, the applicant agrees to provide a certification by a LEED-certified consultant, or other person with substantial experience with the LEED system, approved by the County in its sole discretion. The certification shall state that all of the Green Elements, or substitutes as provided for below, have been incorporated into the project and that, in the consultant’s opinion, the project will qualify for a LEED Score of 27 points or higher. Prior to the issuance of the first certificate of occupancy for the building, the developer agrees to provide to the County financial security (in the form of a bond or letter of credit or other form approved by the County Attorney) in the amount of two hundred fifty thousand dollars ($250,000) guaranteeing that, within eighteen months from the date of issuance of the first certificate of occupancy for any part of the last floor of floors two through eleven, the developer will have received its “Certified” certification, with 27 or more points, from the United States Green Building Council. Should the developer fail to achieve that rating or to obtain the USGBC’s within the eighteen month period, the developer shall automatically forfeit the security, which shall be immediately paid to the County. The developer agrees to implement this site plan approval so as to earn the points achievable under the LEED Green Building Rating System, Version 2.1 (May 2003). Should the developer find that it is impossible to include any of the Green Elements in construction of the development, the developer agrees to notify the County Manager in writing of the basis for the developer’s finding and
of what LEED Rating Credits will be substituted to maintain a LEED score of 27 points or higher. The developer will obtain the County Manager’s approval of any substitute Green Element, which shall be given if the County Manager determines that the substitute will enable the developer to maintain a LEED score of 27 points or higher. The developer agrees to permit the County Manager or his designee to access the USGBC records for the project, and to provide the County Manager with such authorization as may be necessary to allow such access. Should there be a dispute between the County and the developer as to whether any Green Element has properly been included in the development so as to qualify for the applicable number of LEED Rating System points, the County and the developer will select a mutually agreeable third-party LEED-certified individual, or other person with substantial experience in the LEED system if approved by the County Manager, and accept the determination of that individual as to whether the developer has qualified for those points. If the third-party person determines that the Green Element has properly been included, the County will issue the permit. Such a determination shall in no way relieve the developer of the obligation to achieve the level of certification called for in this condition.

a. **Innovation and Design Credit 1.1 and 2:** two points;

b. **Sustainable Sites Prerequisite 1, Erosion and Sedimentation Control:** no points;

c. **Sustainable Sites Credits 1, 2, 4.1, 4.2, 4.3, 4.4, 6.1:** seven points;

d. **Water Efficiency Credits 1.1 and 1.2:** two points;

e. **Energy and Atmosphere Prerequisites 1, 2, and 3:** no points;

f. **Energy and Atmosphere Credits 1, 4, 5 and 6:** four points;

g. **Materials and Resources Prerequisite 1:** no points;

h. **Materials and Resources Credits 2.1, 4.1, 5.1, and 7:** four points;

i. **Indoor Environmental Quality Prerequisites 1 and 2:** no points; and

j. **Indoor Environmental Quality Credits 1, 3.1, 4.1, 4.2, 4.3, 4.4, and 7.2:** eight points.

66. The developer agrees to grant a permanent public access easement to the County Board of Arlington County providing for public access to the development’s open space and plaza area, including the plaza area located between the Phase One and Two office buildings, which extends northward from
Wilson Boulevard to the Ellipse Plaza, and the Ellipse Plaza. The final location of the easement may change with the preparation of the final building plans. The developer agrees to construct and landscape this area, as shown on plans dated **November 10, 2003** and made a part of the public record on **December 6, 2003**. Final landscape plan design and implementation, including installation of landscape materials, shall be approved by the County Manager or his designee as part of the final site development and landscape plan. Construction and landscaping of this area and granting of the public access easement shall be completed prior to issuance of the first certificate of occupancy for the building. The easement shall be granted by deed, in form and substance acceptable to the County Manager, and shall be recorded among the land records of the Clerk of the Circuit Court of Arlington County. The developer shall be responsible for maintaining this area.

67. The developer agrees to deliver all refuse, as defined by the Arlington County Code, to an operating refuse disposal facility designated by the County Manager. The developer further agrees to stipulate in any future lease or property sale agreements that all tenants or property owners shall also comply with this requirement.

68. The developer agrees to have, as a part of its parking management plan, provisions relating to the towing of impermissibly parked vehicles. Such provisions shall include, but not be limited to:

   a. Requirements for signage at the developer’s parking lot(s) providing notice of all applicable parking restrictions enforced by towing, the location of the towing contractor(s)’ impoundment yard, and the name and telephone number of the developer’s on-site representative responsible for towing-related complaints, as well as the telephone number of the Arlington County Office of Citizen and Consumer Affairs;

   b. Disclosure by the developer and its towing contractor(s), at the developer’s parking lot(s), of all fees and charges for towing; and

   c. Evidence that the developer has a contract with the towing contractor that requires the towing contractor to clearly display all fees and charges for towing.

69. The developer agrees to install speed bumps adjacent to the top of garage exit ramps at locations where ramps abut the pedestrian sidewalk, in order to slow vehicular traffic prior to vehicles crossing the sidewalk. The locations of the speed bumps shall be shown on the site engineering and building plans approved by the County Manager or his designee.
70. The developer agrees to install and maintain in operable condition, in a manner acceptable to the County Manager or his designee, an internal antenna/amplifier system that permits public safety radio communications to transmit in the 806-825 MHz frequency and to receive in the 851-870 MHz frequency from all areas within the building. The developer agrees to provide documentation in the approved electrical engineering drawings that adequate accommodations have been made in the building to meet this requirement.
PREVIOUS COUNTY BOARD ACTIONS:

January 10, 1987
Approved [Z-2181-80-6 (SP-5)] a mixed-use office, residential and retail development.

January 9, 1988
Approved a site plan amendment [Z-2181-80-6 (SP-5)] to convert the residential portion of the approved site plan to a lifecare facility with 350 independent living units, 32 personal care rooms, and 50 nursing care beds.

Approved a site plan amendment [Z-2181-80-6 (SP-5)] to re-configure the access drives serving the residential (lifecare) buildings.

May 13, 1989
Approved a site plan amendment [Z-2181-80-6 (SP-5)] to increase the GFA, decrease the number of units, decrease parking spaces and increase the building height on the approved site plan for a life care facility.

August 11, 1990
Deferred a site plan amendment [Z-2181-80-6 (SP-5)] request to convert retail space to office use to the September 8, 1990 County Board Meeting.

Approved a site plan amendment [Z-2181-80-6 (SP-5)] to convert the approximately 2,524 square feet of retail space to a dentist office subject to all previous conditions and one (1) new condition.

Deferred a site plan amendment request [Z-2181-80-6 (SP-5)] for two tenant identification signs on the east and west pavilion arms of the Ellipse building to the December 8, 1990 County Board meeting.

November 17, 1990
Denied a site plan amendment request [Z-2181-80-6 (SP-5)] to convert approximately 900 square feet of retail gross floor area to office use.

Deferred a site plan amendment request for a comprehensive sign plan [Z-2181-80-6 (SP-5)]
Major Site Plan Amendment Request
SP #249

February 9, 1991
Approved a site plan amendment for a comprehensive sign plan [Z-2181-80-6 (SP-5)] for the Ellipse at Ballston, subject to all previous conditions and six (6) new conditions.

May 20, 1993
Ratified a contract for the sale of the portion of the out-parcel not needed for public right-of-way.

July 10, 1993
Approved a site plan amendment for the balance of the office development at the Ellipse at Ballston, including incorporation of a portion of the out-parcel and development of two (2) 11-story office buildings.

March 5, 1994
Approved a site plan amendment to exclude 4,500 square feet of storage from the floor area ratio (Condition #64), to amend Condition #34 to allow separate parking management element, and to amend Condition #32 to extend vanpool parking to the P-2 level of the parking garage, subject to all previous conditions, amended Conditions #32 and 34, and new condition #64.

July 20, 1996
Approved a site plan amendment for a free-standing retail tenant identification sign within the site (4301 Wilson Boulevard), behind the public sidewalk and right-of-way on Wilson Boulevard.

August 17, 1999
Approved a site plan amendment to increase office gross floor area by 25,419 (revised to 20,919) square feet to the West Building (typical floor increase by approximately 2,400 square feet, from approximately 20,100 square feet to approximately 22,422 square feet) and reduce the building setback from the western property line from the approved setback of 30.1 feet to proposed setback of 15 feet, subject to all previous conditions, and the following amended conditions number 54 and 59 and new conditions number 65 through 72.
July 28, 2001

Approved a site plan amendment to add 4,055 square feet of space to the garage of the NRECA Phase Two building, and to construct an arched sheltered walkway between the two NRECA buildings.
Duffy, Robert J. 40 Years of Smart Growth: Arlington County's Experience with Transit Oriented Development in the Rosslyn-Ballston Metro Corridor. Arlington, VA, n.d.
40 Years of Smart Growth
Arlington County’s Experience with Transit Oriented Development in the Rosslyn-Ballston Metro Corridor

A presentation by the Arlington County Department of Community Planning, Housing and Development, Planning Division

December 6, 2012

Photo Credit: Arlington County Staff.
Agenda

• Arlington Overview
• Setting the Stage
  • Arlington History
  • Planning for Metro
• How We did It
  • Sector Plans
  • Site Plans
• Mid Course Review
• Then & Now
• Where are we now?
• Measuring Success
• Lessons Learned
• Challenges

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Arlington County

- 25.8 square miles
- Population 214,500 (2012)
- Employment 227,500 (2012)
- Housing Units 107,519 (2012)
- Daytime Population 301,100 (2012)
- 11 Metrorail Stations
• Located in the core of a rapidly growing Washington region (over 5 million residents, 3 million jobs and 1,200 sq. miles of urbanized area)
Setting the Stage

Arlington County - 1960

- 7.5 million sq. Ft. Office
- Declining retail corridors
- Emerging market for government office space
- Strong single family neighborhoods
- Large number of garden apartments, some of which were beginning to decline
- 97,505 jobs
- 71,230 housing units

R-B Corridor: 1972

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Setting the Stage

1960s and 1970s

• Beginning of the planning for a regional transit system

• Embarked on an ambitious community planning effort

• Had already debated the impacts of development vs the benefits of growth and decided we wanted to encourage growth as well as encourage riders

Photo Credit: Images originally produced by WMATA. Found in the RB '72 Land Use Alternatives, Arlington County Department of Community Planning, Housing & Development.
The Proposed Metrorail Route

Arlington lobbied strongly for an underground route along the old commercial corridor vs along the median of future highway.
Setting the Stage

The Roads Not Built

Image Source: Arlington County Department of Community Planning, Housing & Development.
Setting the Stage

1979 – First Year Metro Started Service

Ballston Metro  Virginia Square Metro  Clarendon Metro

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Setting the Stage

2009 – 30 Years of Metro

Ballston Metro

Virginia Square Metro

Photo Credit: Pictometry International Corporation.
Setting the Stage

1979 – First Year Metro Started Service

Virginia Square Metro

Clarendon Metro

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Setting the Stage

2009 – 30 Years of Metro

Virginia Square Metro

Clarendon Metro

Photo Credit: Pictometry International Corporation.
Setting the Stage

1979 – First Year Metro Started Service

Court House Metro

Rosslyn Metro

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Setting the Stage

2009 – 30 Years of Metro

Court House Metro

Rosslyn

Photo Credit: Pictometry International Corporation.
The Bull’s Eye

- Concentrate high and mid-density redevelopment around transit stations (highly targeted) and taper down to existing neighborhoods
- Encourage a mix of uses and services in station areas
- Create high quality pedestrian environments and enhanced open space
- Preserve and reinvest in established residential neighborhoods

Image Source: Arlington County Department of Community Planning, Housing & Development. Found in the RB '72 Land Use Alternatives.
Walkability & Multimodal Transportation Planning

- Focus community development around transit and require appropriate investments in transportation
- Emphasize community walkability
- Maximize travel choice for residents, workers and visitors
- Provide comprehensive and easy to access information about travel options
- Employ transportation demand management strategies
- Manage curb-space and parking efficiently
- Emphasize multi-modal street operations

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Sector Plans

• Adopted a corridor-wide GLUP based on agreed-to development goals

• Then focused on developing sector plans to create distinctive “urban villages”

  – Overall vision for each station area
  – Desired public improvements
  – Location for retail
  – Urban design standards
  – Public infrastructure needs
  – Open space, streetscape standards
  – Each focused on an area of approximately 1/4 mile to ½ mile from the metro station

Source: Arlington County Department of Community Planning, Housing & Development.
Clarendon Sector Plan - 1984

Clarendon Sector Plan - 2006

Illustrative Plan

Concept Sketch

How We Did It

Zoning

Planning for Metro

- 11% of county (2 rail corridors) re-planned to encourage mixed-use, high density development
- Zoning in the 89% was primarily low density so little unplanned development can happen

General Land Use Plan

For Metro Corridors

- Land remains zoned for low density, but GLUP indicates willingness to rezone for higher density.
- In response to proposals, county would rezone to higher density as shown on GLUP
- Requires a special exception. **Site Plan** is used to approved the development. Requires County Board approval.
How We Did It

The General Land Use Plan (GLUP)
Site Plan

- Site Plan allows flexibility but is tied to the GLUP and the adopted sector Plans in terms of uses, density, height and design
- Property owner always maintains underlying by-right zoning until they implement approved site plan
- By-right development is at a much lower density with a more limited array of uses allowed
- The site plan allows significantly higher density & height than underlying zoning

<table>
<thead>
<tr>
<th>By-right</th>
<th>Site Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 F.A.R.</td>
<td>3.8 – 10 F.A.R.</td>
</tr>
<tr>
<td>35-45 ft (height)</td>
<td>100-300 ft (height)</td>
</tr>
<tr>
<td>4 Parking spaces per 1,000 SF</td>
<td>2 Parking spaces per 1,000 SF</td>
</tr>
</tbody>
</table>
Site Plan

Site Plan is Approved IF:

- It complies with the standards of the zoning ordinance,
- Is in compliance with the mix required by the GLUP
- Provides the features called for in the sector plan for the area - including public improvements
- Matches the FORM identified in the Sector Plan

Increased density in return for

- Building the development we want
- Where we want it
- And building significant amount of the required and desired public improvements
- LEED & Affordable Housing

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
New Zoning Tools

• Some of the zoning tools we’ve created include

  Mixed use
  - C-0-A: 50/50 res/off mix up to 6.0 FAR can be 100 % residential
  - R-C: 1.24 FAR office, 2.0 FAR residential - residential must proceed first or concurrent with office

Redevelopment
- C-O Rosslyn: 10.0 FAR
Early Results

• Early results were successful from a development perspective
• But not from a place making perspective
Mid-Course Review

Early Results

Rosslyn – 2000s
Mid-Course Review

Early Results

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Responding to Early Results: Mid Course Review - 1989

• Worked with a group of Architects and Urban Designers to evaluate efforts to date
• Led to development of corridor-wide urban design concept
• Raised awareness of design issues
• First new Sector Plan to utilize what we learned was Rosslyn followed by Clarendon
• Going forward design and architecture became much more important
  • First critical lesson was that it’s not about the density
  • It’s about the form, and what place we were trying to create
Then & Now

Rosslyn 1950s-1960s

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Rosslyn Today

C-O Rosslyn
Development: 10 FAR
Then & Now

Rosslyn Today

[Image of modern buildings in Rosslyn, Virginia]

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Rosslyn Tomorrow
Then & Now

Courthouse 1950s-1960s

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Courthouse Today

Photo Credit: Arlington County Department of Community Planning, Housing & Development and Pictometry International Corporation.
Then & Now

Clarendon – 1920s-?  Arlington’s Old Downtown

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Then & Now

Clarendon Today

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Then & Now

Clarendon 1980s
Clarendon Today
Then & Now

Clarendon Today

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Then & Now

Virginia Square 1980s

Metro Entrance

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Then & Now

Virginia Square Today

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Then & Now

Ballston – 1970s

Metro Entrance
Then & Now

Ballston – 2000s

Metro Entrance

Photo Credit: Arlington County Department of Community Planning, Housing & Development and Pictometry International Corporation.
Then & Now

Ballston Today
Then & Now

Ballston Today

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Then & Now

R-B Corridor – Late 2000s

Photo Credit: Arlington County Department of Community Planning, Housing & Development.
Measuring Success

Development

1970
OFFICE
• 5,568,600 SF
RESIDENTIAL
• 7,000 UNITS
RETAIL
• 865,507
JOBS
• 22,000

2011
OFFICE
• 21,917,017 SF
RESIDENTIAL
• 29,366 UNITS
RETAIL
• 2,842,169
JOBS
• 96,300

Photo Credit: Flickr User “M.V. Jantzen”.

Prepared by Community Planning, Housing and Development - Planning Division: Planning, Research and Analysis Team (PRAT), April 2012.
Where are we now?

Demographic Overview

• R-B Corridor is 21% of the County Population

• The R-B Corridor is young.

• According to the 2010 Census, Arlington County had the highest percentage of 25-34 Year Olds out of any other city or county in the U.S.

Source: American Community Survey 2006-2010 5-Year Sample. Tabulated by the Planning Research and analysis Team, Arlington County Department of Community Planning, Housing & Development.
Where are we now?

Demographic Overview

- 70% of R-B Corridor residents are white

- 82% of R-B residents have a Bachelor’s degree or higher.

- Median Household Income for R-B Corridor: $92,000 - $98,000 (2010 dollars)

Source: American Community Survey 2006-2010 5-Year Sample. Tabulated by the Planning Research and analysis Team, Arlington County Department of Community Planning, Housing & Development.
Demographic Overview

- R-B Corridor: 40% of residents take public transportation to work.

- R-B Corridor has “Car-Light” households
  - 16% have no vehicle available.
  - 59% have one available.

Source: American Community Survey 2006-2010 5-Year Sample. Tabulated by the Planning Research and analysis Team, Arlington County Department of Community Planning, Housing & Development.
Measuring Success

Metrorail Station Access

Rosslyn-Ballston Corridor Stations

- 76.9% Walk
- 6.3% Metrobus
- 4.3% Other Bus
- 10.9% Auto (including dropoff)
- 0.5% Other
- 1.2% No Response

Suburban VA Orange Line Stations

- 15.2% Walk
- 9.6% Metrobus
- 10.2% Other Bus
- 49.9% Auto (including dropoff)
- 1.3% Other
- 13.8% No Response

Rosslyn, Court House, Clarendon, Virginia Square, and Ballston stations

East Falls Church, West Falls Church, Dunn Loring, and Vienna stations

Source: WMATA 2007 Metrorail Passenger Survey
Measuring Success

Balanced Development

- Crystal City
- Pent City
- Rosslyn
- Court House
- Clarendon
- Virginia Square
- Ballston

- Retail
- Hotel
- Residential
- Office

Prepared by Community Planning, Housing and Development - Planning Division: Planning, Research and Analysis Team (PRAT), April 2012.
Measuring Success

Development Approval Trend 2001-2011

- Office (GFA)
- Retail (GFA)
- Other (GFA)
- Residential (Units)
- Hotel (Rooms)
Measuring Success

Arlington Metro Ridership

Average Weekday Passenger Boardings for Arlington, VA (1977-2012)

Source: WMATA

*Includes Arlington Cemetery Station
**Includes East Falls Church Station
Data are for May of each calendar year.
### Measuring Success

**METRO RIDERSHIP** (Average daily entries and exits)

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>1991</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ROSSLYN</td>
<td>13,637</td>
<td>33,891</td>
</tr>
<tr>
<td></td>
<td>COURT HOUSE</td>
<td>5,561</td>
<td>14,640</td>
</tr>
<tr>
<td></td>
<td>CLARENDON</td>
<td>2,964</td>
<td>8,617</td>
</tr>
<tr>
<td></td>
<td>BALLSTON</td>
<td>9,482</td>
<td>23,641</td>
</tr>
</tbody>
</table>

*Source: WMATA*
Measuring Success

Balanced Development = Balanced Ridership

For All Arlington Stations

<table>
<thead>
<tr>
<th>Time</th>
<th>Average Weekday Ridership (May 2011)</th>
<th>Entries (Red)</th>
<th>Exits (Orange)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM PEAK</td>
<td>(Opening - 9:29 a.m.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM OFF</td>
<td>(9:30 a.m. - 2:59 p.m.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM PEAK</td>
<td>(3:00 p.m. - 6:59 p.m.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM OFF</td>
<td>(7:00 p.m. - 12:00 a.m.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: WMATA
Measuring Success

High Transit Accessibility for Jobs and People

Transit Accessibility in Arlington County
Using Round 8.1 Population and Employment Data
August 2012

2010

<table>
<thead>
<tr>
<th>Mode</th>
<th>People</th>
<th>Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metrorail 0 – ¼ Mile</td>
<td>16%</td>
<td>59%</td>
</tr>
<tr>
<td>Metrorail 0 – ½ Mile</td>
<td>34%</td>
<td>80%</td>
</tr>
<tr>
<td>Any Transit 0 – ¼ Mile</td>
<td>97%</td>
<td>99%</td>
</tr>
</tbody>
</table>

Prepared by Community Planning, Housing and Development - Planning Division: Planning, Research and Analysis Team (PRAT), December 2012.
• Car ownership (vehicles per household)
  – Nationally, almost 91% have a car; 58% have 2 or more
  – In Fairfax, 96% have at least one; 66% have 2 or more
  – Arlington: 12% have zero cars; less than 40% have 2 or more

Source: 2010 5-Year American Community Survey

Prepared by Community Planning, Housing and Development - Planning Division: Planning, Research and Analysis Team (PRAT), April 2012.
Numbers are more dramatic in Arlington’s Metro corridors

- Car ownership: 16.7% have zero cars, while less than 25% have 2 or more
- Getting to work: Less than half drive alone (39.8%)
  - 42.8% use transit
  - 9.5% walk or bike
  - 3.1% work at home

Source: 2010 5-Year American Community Survey

Prepared by Community Planning, Housing and Development - Planning Division: Planning, Research and Analysis Team (PRAT), April 2012.
Real Estate Assessments

• $27.5 billion of a total $57.5 billion in assessed land and improvements value in the county is in the metro corridors which is 11% of total land

• Today Arlington has more office space than downtown
  – Dallas, Los Angeles, Denver, or Boston

• County has maintained low property tax rate ($0.935 per $100 fmv) and maintains amongst the highest levels of services

• Tax base divided between 46% commercial and 54% residential

• County consistently maintains AAA bond rating from all rating agencies
# Measuring Success

## Real Estate Values in Transit

**Arlington County Real Estate Assessed Values by Sub-area (2011)**

<table>
<thead>
<tr>
<th>Sub-area</th>
<th>Comm. Value*</th>
<th>%</th>
<th>Resid. Value **</th>
<th>%</th>
<th>Total Value</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-B Corridor</td>
<td>$8,770,173,300</td>
<td>51%</td>
<td>$9,218,388,700</td>
<td>23%</td>
<td>$17,988,562,000</td>
<td>31%</td>
</tr>
<tr>
<td>J-D Corridor</td>
<td>$6,490,559,100</td>
<td>38%</td>
<td>$3,315,434,200</td>
<td>8%</td>
<td>$9,805,993,300</td>
<td>17%</td>
</tr>
<tr>
<td>Columbia Pike</td>
<td>$342,617,000</td>
<td>2%</td>
<td>$3,604,671,400</td>
<td>9%</td>
<td>$3,947,288,400</td>
<td>7%</td>
</tr>
<tr>
<td>Shirlington</td>
<td>$312,391,700</td>
<td>2%</td>
<td>$816,882,600</td>
<td>2%</td>
<td>$1,129,274,300</td>
<td>2%</td>
</tr>
<tr>
<td>Other ***</td>
<td>$1,128,291,900</td>
<td>7%</td>
<td>$23,399,656,100</td>
<td>58%</td>
<td>$24,527,948,000</td>
<td>43%</td>
</tr>
<tr>
<td>Total</td>
<td>$17,044,033,000</td>
<td>100%</td>
<td>$40,355,033,000</td>
<td>100%</td>
<td>$57,399,066,000</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Arlington County Real Estate Taxes Levied by Sub-area (2011)**

<table>
<thead>
<tr>
<th>Sub-area</th>
<th>Comm. Value*</th>
<th>%</th>
<th>Resid. Value **</th>
<th>%</th>
<th>Total Value</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-B Corridor</td>
<td>$82,878,138</td>
<td>51%</td>
<td>$87,113,773</td>
<td>23%</td>
<td>$169,991,911</td>
<td>31%</td>
</tr>
<tr>
<td>J-D Corridor</td>
<td>$61,335,783</td>
<td>38%</td>
<td>$31,330,853</td>
<td>8%</td>
<td>$92,666,637</td>
<td>17%</td>
</tr>
<tr>
<td>Columbia Pike</td>
<td>$3,237,731</td>
<td>2%</td>
<td>$34,064,145</td>
<td>9%</td>
<td>$37,301,875</td>
<td>7%</td>
</tr>
<tr>
<td>Shirlington</td>
<td>$2,952,102</td>
<td>2%</td>
<td>$7,719,541</td>
<td>2%</td>
<td>$10,671,642</td>
<td>2%</td>
</tr>
<tr>
<td>Other ***</td>
<td>$10,662,358</td>
<td>7%</td>
<td>$221,126,750</td>
<td>58%</td>
<td>$231,789,109</td>
<td>43%</td>
</tr>
<tr>
<td>Total</td>
<td>$161,066,112</td>
<td>100%</td>
<td>$381,355,062</td>
<td>100%</td>
<td>$542,421,174</td>
<td>100%</td>
</tr>
</tbody>
</table>

* Commercial use = office, retail, hotel
** Residential includes apartments
*** All other parcels outside listed areas.

Source: Arlington County Department of Real Estate Assessments
Awards

EPA Smart Growth

• League of American Bicyclists -- Bicycle Friendly Community designation

• APTA -- Outstanding Public Transportation System Award (for ART)

• American Podiatric Association -- Best Walking City in America

• APA Great Streets Award
• Transit investments can be used as a catalyst to reshape communities
• Multimodal transportation strategies can result in substantial benefits – allowing continued growth with less reliance on autos
• Establish the vision, design supportive public policies/plans and tools and be patient
• Build community consensus
Lessons Learned

• Ensure that transit is integrated with development – not secondary
• An attractive and functional pedestrian environment is important
• Develop public-private partnerships to continue consensus building and assist in the implementation
• Integrity of plan – be consistent
• Do the detailed planning at the sector area to avoid the battles at development review time
Lessons Learned

- Station areas must be able to satisfy the daily needs of users if they are to really leave their cars behind (mixed use)
- Reduce parking requirements
Challenges

Refining the Vision

• Transportation Demand Management (TDM)
• Affordable housing
• Parking
• Pedestrian improvements
• Expansion of transportation options
• Architecture
Refining the Vision

• Affordable housing
  – 22,000 new market rate units in R-B since 1980
  – Few affordable
  – New tools
    • Special affordable housing protection district
    • 25 % bonus
    • State enabled mandatory contribution
Robert J. Duffy, AICP
Planning Director
Department of Community Planning and Development
703-228-3797
bduffy@arlingtonva.us
www.arlingtonva.us
Alameda County, CA

### APPENDIX G. MENU OF TDM MEASURES

**Table G-1. Alameda County TDM Program: City and Public Agency Measures**

<table>
<thead>
<tr>
<th>TDM Program</th>
<th>Description</th>
<th>Primary Agency Responsible</th>
<th>City Implementation mechanism</th>
<th>Recommended Application/Context</th>
<th>% Trip Reduction</th>
<th>Factors</th>
<th>Source</th>
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</thead>
<tbody>
<tr>
<td>Set trip reduction requirements for multifamily residential or commercial development</td>
<td>Require as a condition of approval for developments (either commercial, multifamily residential, or both) that certain TDM measures are implemented on an ongoing basis, or that specified vehicle trip reduction requirements are met.</td>
<td>Cities or business associations</td>
<td>Planning code or other municipal ordinance</td>
<td>Any urban area with good transit service; suburban downtowns, commercial and mixed use areas; transit stations (particularly in high-growth areas)</td>
<td>6%-10%, Enables other strategies</td>
<td>Effects of this strategy depend on the location/accessibility of the development site(s), demographics of the project's residential/commercial occupants/tenants and the type of measures required. The US EPA notes that &quot;reasonable initial targets for the programs established under a trip reduction ordinance (TRO), might be a 5-10 percent reduction in single occupant vehicle (SOV) trips, with somewhat larger reductions (perhaps 15 percent) if substantial fees for parking are imposed.&quot;</td>
<td><a href="http://www.epa.gov/oiaa/stateresources/policy/transitcmt/tp_reduction.pdf">http://www.epa.gov/oiaa/stateresources/policy/transitcmt/tp_reduction.pdf</a></td>
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<tr>
<td>Establish a Transportation Management Association</td>
<td>Establish an organization to assist businesses in reducing vehicle trips, either by administering programs, providing services (such as shuttle service), or providing technical assistance to businesses. Often implemented together with a trip reduction requirement.</td>
<td>Cities or business associations</td>
<td>Planning code or other municipal ordinance; or voluntary action by business association</td>
<td>Commercial area or other major business or employment districts</td>
<td>6%-7%</td>
<td>The TDM Resource Center (1996) estimated that just by improving coordination, and providing information on travel alternatives, establishment of a TMA can reduce commute-related vehicle trips by 6%-7%, with greater impact when implemented in concert with other trip reduction, TDM and parking management programs and services.</td>
<td>TDM Resource Center (1996), Transportation Demand Management, A Guide to Including TDM Strategies in Major Investment Studies and in Planning for Other Transportation Projects, Office of Urban Mobility, USDOT (<a href="http://www.wsdot.wa.gov">www.wsdot.wa.gov</a>), as cited in the Victoria Transportation Policy Institute's TDM Encyclopedia (<a href="http://www.vtpi.org/tdm/tdm44.htm">http://www.vtpi.org/tdm/tdm44.htm</a>).</td>
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<tr>
<td>Implement an employee-trip reduction program for municipal employees</td>
<td>Appoint an employee commute coordinator, and implement incentive programs to reduce single-occupant vehicle commuting among municipal employees. Elements may include: Subsidized transit passes; employee parking and/or parking cash-out programs; commuter checks; Direct financial incentives to bike, walk, carpool or take transit; Ride sharing; Shuttles; Vanpools</td>
<td>Cities</td>
<td>Modify agency procedures</td>
<td>Any</td>
<td>4-20%</td>
<td>Management support and the presence of an on-site employee transportation corridor are important factors in the success of a program. Mandatory employee/commute trip reduction (CTR) ordinances often require employers with more than 50 or 100 employees at a given employment site to implement a CTR program. This reduces the costs of administering TDM programs and compliance with survey and reporting requirements, but prevents such programs from reaching the majority of employees in a given city/region who work for small to mid-sized firms and organizations with less than 50 employees.</td>
<td>Marlon G. Boarnet, Him-Ping Hsu and Susan Handy (2010), Draft Policy Brief on the Impacts of Employer-Based Trip Reduction Based on a Review of the Empirical Literature, for Research on Impacts of Transportation and Land Use-Related Policies, California Air Resources Board <a href="http://arb.ca.gov/cc/375/policies/policies.htm">http://arb.ca.gov/cc/375/policies/policies.htm</a>); Philip Winters and Daniel Rudge (1995), Commute Alternatives Educational Outreach, National Urban Transit Institute, Center for Urban Transportation Research, University of South Florida; Tom Rye (2002), &quot;Travel Plans: Do They Work?&quot; Transport Policy, Vol 9, No. 4. (<a href="http://www.elsevier.com/locate/transportpol">www.elsevier.com/locate/transportpol</a>), Oct. 2002, pp. 287-298.</td>
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<td>Safety Net</td>
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<td>Guaranteed Emergency Ride Home program</td>
<td>Provide a guaranteed ride home for people who do not drive to work alone to ensure they are not stranded if they need to go home in the middle of the day due to an emergency, or stay late for work unexpectedly.</td>
<td>Any</td>
<td>Guaranteed/Emergency Safety Net</td>
<td>Alameda County is provided by Alameda CTC</td>
<td>9%-38%</td>
<td>Coupled with active program marketing by employers, including marketing of other TDM programs and financial incentives; such as parking pricing, the Alameda County Guaranteed Ride Home program has been shown to reduce drive alone vehicle trips to participating employment sites by as much as 38% (Draft Alameda County Guaranteed Ride Home Program Evaluation (Nelson/Nygaard 2012))</td>
<td>Draft Alameda County Guaranteed Ride Home Program Evaluation (Nelson/Nygaard 2012)</td>
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Appendix G | Menu of TDM Measures

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<tr>
<td>Parking Management</td>
<td>Set on-street parking prices based on parking demand in area to achieve parking availability targets.</td>
<td>Cities</td>
<td>Urban or suburban downtowns, commercial and mixed use areas; transit stations.</td>
<td></td>
<td>4%-12%</td>
<td>One of the most significant factors affecting motorists’ choice of whether to drive or travel by another mode is the price of parking at the destination. Moreover, up to 26% of traffic in mixed-use districts is attributable to cruising for parking. By encouraging use of alternative modes and reducing parking search related delays for transit, demand responsive pricing can significantly reduce vehicle trips to major destinations/districts. The impact of parking pricing depends on the overall supply and availability of both on-street and off-street parking and the extent to which employers subsidize such parking.</td>
<td>Low-end estimate per Harvey and Deakin (1997), who estimated that parking pricing for work and non-work trips would reduce regional vehicle trips by 2.0% (Greg Harvey and Elizabeth Deakin (1997), “The STEP Analysis Package: Description and Application Examples,” Appendix B, in Apogee Research, Guidance on the Use of Market Mechanisms to Reduce Transportation Emissions, USEPA (Washington DC; <a href="http://www.epa.gov/omswww/market.htm">www.epa.gov/omswww/market.htm</a>)). High end estimated based on the Victoria Transportation Policy Institute, Trip Reduction Tables (<a href="http://www.vtpi.org/tdm/trm41.htm">http://www.vtpi.org/tdm/trm41.htm</a>). Additional resource: <a href="http://www.spur.org/publications/library/report/critical_cooling/option27/Urbanist">http://www.spur.org/publications/library/report/critical_cooling/option27/Urbanist</a>, Issue 482, May, 2009 (<a href="http://www.spur.org/publications/library/report/critical_cooling/option27/">http://www.spur.org/publications/library/report/critical_cooling/option27/</a>).</td>
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<tr>
<td>Use of new meter technologies to allow multiple forms of payment and dynamic pricing</td>
<td>Install parking meters that allow payment by credit card, phone, and that connect to a central system in real-time, allowing for remote programming and management of parking prices.</td>
<td>Cities</td>
<td>Urban or suburban downtowns, commercial and mixed use areas; transit stations.</td>
<td>Enables demand responsive parking pricing</td>
<td>Installation of new parking management technologies, including new meters and infrastructure to support payment by cell phone and real-time monitoring of parking space utilization and turnover enable implementation of demand responsive parking pricing, which in turn reduces vehicle travel (see Demand Responsive Parking Pricing).</td>
<td>San Francisco Planning and Urban Research (2009). “Critical Cooling,” The Urbanist, Issue 482, May, 2009 (<a href="http://www.spur.org/publications/library/report/critical_cooling/option27/">http://www.spur.org/publications/library/report/critical_cooling/option27/</a>).</td>
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<td>Use of parking revenue to support other mobility/neighborhood programs</td>
<td>Dedicate meter revenue from designated area to uses such as mobility improvements, neighborhood or business improvement programs, potentially through the creation of a parking benefit district.</td>
<td>Cities</td>
<td>Any area with paid parking</td>
<td>Enables investment in Multimodal Infrastructure and TDM Programs.</td>
<td>Creation of parking benefit district can directly support vehicle trip reduction by providing funding for investments in other multimodal access programs and services that increase opportunities for access by non-auto modes. The establishment of such districts and provisions requiring meter and permit revenues to be spent within the district can also indirectly support vehicle trip reduction by increasing local political support for demand responsive, market-based pricing of on-street and off-street parking.</td>
<td>Additional Guidance on the Use of Market Mechanisms to Reduce Transportation Demand and Emissions, USEPA (Washington DC; <a href="http://www.epa.gov/omswww/market.htm">www.epa.gov/omswww/market.htm</a>)). Additional resource: <a href="http://www.spur.org/publications/library/report/critical_cooling/option27/Urbanist">http://www.spur.org/publications/library/report/critical_cooling/option27/Urbanist</a>, Issue 482, May, 2009 (<a href="http://www.spur.org/publications/library/report/critical_cooling/option27/">http://www.spur.org/publications/library/report/critical_cooling/option27/</a>).</td>
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<tr>
<td>Require “Unbundling” of parking costs from rents and leases</td>
<td>Separate the charge for leasing or buying a unit or square footage in multifamily residential or commercial buildings from charges for parking spaces.</td>
<td>Cities</td>
<td>Any</td>
<td>6%-16%</td>
<td>For residential development, unbundled parking may prompt some residents to dispense with one of their cars and to make more of their trips by other modes. The elasticity of vehicle ownership with respect to price is typically -0.4 to -1.0. Assuming total annual vehicle spending of $7,788 (BLS Consumer Expenditure Survey, 2011), unbundling of an average of $100/mo in parking costs would increase perceived transportation costs/vehicle by 15%/year for the typical hh, which in turn is expected to result in a decline in vehicle ownership of 6% (at a price elasticity of -0.4) to 16% (at -0.4), with corresponding declines in vehicle trips.</td>
<td>Appendix G, Menu of TDM Measures, Transportation cost/vehicle elasticity: 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0.</td>
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### Appendix G | Menu of TDM Measures

<p>| TDM Program                                      | Description                                                                 | City Implementation Mechanism | Recommended Application/Context | % Trip Reduction | Factors                                                                 | Source                                                                 |
|--------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------|---------------------------------|-----------------|-------------------------------------------------------------------------|                                                                      |
| Reduced or eliminated minimum parking requirements | In areas that are well-served by transit and other alternatives to driving, allow developers to build residential and commercial buildings with fewer parking spaces or no parking. | Cities                         | Modify planning code            | Any area with quality transit service | 9%-16%                                                                 | This policy reform does not directly influence vehicle travel demand associated with existing development, although elimination of minimum off-street parking requirements does remove a barrier to changes of use, and/or the lease or sale of underutilized private off-street parking constructed in accordance with previous requirements, supporting the development of market-based parking pricing that in turn reduces vehicle travel. | Range of vehicle trip reduction impact of eliminating minimum parking requirements on Los Angeles’ Westside, as incorporated in the vehicle trip reduction impact analysis conducted for the Los Angeles Westside Mobility Plan (<a href="http://www.westsidemobilityplan.com/transportation-demand-model/">http://www.westsidemobilityplan.com/transportation-demand-model/</a>) |
| District-based parking management                | Manage parking supply in a defined area as a unified whole in order to better manage parking demand between different facilities to eliminate cruising for parking and improve the customer experience. | Cities                         | Modify city agency procedures;  | Urban or suburban downtowns, commercial and mixed use areas; transit stations | Enables compact development | As with shared parking facilities, the coordinated provision and management of a shared, publicly accessible supply of on-street and off-street parking at a district scale can reduce vehicle trips by facilitating dense/compact, clustered, and mixed-use development and by reducing expenditure of land and financial resources on off-street parking, thereby reducing an effective subsidy for auto access and mobility. |                                                                      |
| Incentivize shared parking.                      | Facilitate the sharing of parking among multiple land uses that have complementary schedules (e.g. an office with greater demand during the day and restaurant with greater demand at night). | Enabled by cities, stimulated by private businesses or developments | Modify planning code            | Urban or suburban downtowns, commercial and mixed use areas. | Enables compact development | Shared parking facilities can reduce vehicle trips by reducing the need for construction of dedicated off-street parking facilities for each land use/activity commensurate with the peak parking demand for that use. By so doing, shared parking facilities can enable dense, clustered development that facilitates a greater share of trips by walking, cycling and public transit. | Shared Parking does not directly reduce vehicle travel if it substitutes for increased parking supply. To the degree that it increases the available supply of parking and reduces parking prices it can encourage automobile travel. To the degree that Shared Parking allows more Clustered Development it can encourage use of alternative modes. |
| Improved parking wayfinding signage             | Install wayfinding signage to make parking easier to find. This can help to shift parking demand away from overfull spaces to underutilized areas and can help reduce local traffic impacts caused by searching for parking. | Cities                         | Capital project                 | Urban or suburban downtowns, commercial and mixed use areas; transit stations | Not available | Enhanced wayfinding, signage and provision of real-time information about parking supply and availability can reduce Vehicle Miles Traveled (VMT), and traffic congestion by reducing parking search time, but impacts on total vehicle trips are unclear. |                                                                      |
| Urban Form and Land use                          | Compact, mixed use development and “park once” districts. Encourage development of districts that allow people to park just once if they drive to reach the district, and walk to destinations within the area once they are there. | Cities are responsible for zoning, land use planning, and development permissions | Amending general plans and zoning codes to plan for and facilitate compact, mixed-use development in appropriate areas. Support implementation of compact, mixed-use development by establishment of public development commissions and other mechanisms to support public investment. | Urban; suburb and downtown; transit station | 20%-40% | Recent literature indicates that compact development can reduce VMT per capita by 20%-40% compared to conventional “sprawl type” development characterized by low density and segregation of land uses and activities (vehicle trips are assumed to be reduced by a corresponding 20%-40%). Cumulative effects depend on the pace of new development in the County relative to the base of existing development (at a more rapid pace and extensive geographic scale, compact/mixed-use development/redevelopment can lead to greater reduction in vehicle trips. | Grewg, R, K. Bartholomew, S. Winkelman, J. Walters, and D. Chen (2008). Growing Cooler: The Evidence on Urban Development and Climate Change. Washington, DC: Urban Land Institute (ULI), p. 33. |</p>
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<td>Multi-Modal Infrastructure</td>
<td>Bicycles are available to members for short-term rental and can be returned at any bike share station. Bike share may be offered in city neighborhoods, near transit hubs, or at major employment centers.</td>
<td>Cities or private bicycle sharing companies (usually at invitation of a city)</td>
<td>Urban; suburban downtown; transit station</td>
<td>2% to 8%</td>
<td>The impact depends on the larger bike network and bicycling conditions. This research does not state if the shift from automobile trips to bicycle trips is for commute or non-commute trips, nor does the research state at what time of day these trips occur, i.e. peak or non-peak trips.</td>
<td>Victoria Transport Policy Institute (2008), Public Bike Systems: Automated Bike Rentals for Short Utilitarian Trips, <a href="http://www.vtpi.org/fhwa/hcm126.htm">www.vtpi.org/fhwa/hcm126.htm</a>.</td>
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<td>Enhanced transit service</td>
<td>Improve transit service to better serve potential riders and shift travel from driving trips.</td>
<td>Transit agencies, funded by cities, counties, TMAs, BIDs, regional agencies</td>
<td>Any</td>
<td>5% to 30%</td>
<td>Impacts depend on the level and quality of improvements. The elasticity of transit use with respect to transit service frequency is about 0.5, which means that a 1.0% increase in service (measured by transit vehicle mileage or operating hours) increases average ridership by 0.5%. Not all persons will be shifting from auto to transit so the relationship is not one to one.</td>
<td>Richard Pratt (2000) Traveler Response to Transportation System Changes, Interim Handbook, TCRP Web Document 12. <a href="http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_webdoc_12.pdf">http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_webdoc_12.pdf</a>.</td>
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<tr>
<td>High Occupancy Vehicle/Toll (HOV/HOT) lanes</td>
<td>Implement a system of express lanes for high-occupancy vehicles, transit, and/or people who pay a toll. This provides a time savings to people who commute by modes other than driving alone.</td>
<td>Highway districts, often led by counties or regional agencies</td>
<td>Freeways, any context</td>
<td>2% to 30%</td>
<td>Comsys (1993) and Turnbull, Levinson and Pratt (2006) find that HOV facilities can reduce vehicle trips on a particular roadway by 4-30%. Ewing (1993) estimates that HOV facilities can reduce peak-period vehicle trips on individual facilities by 2-10%, and up to 30% on very congested highways if HOV lanes are separated from general purpose lanes by a barrier. (Turnbull, Levinson and Pratt, 2006) suggests that HOV highway lanes are most effective at reducing automobile use on congested highways to large employment centers in large urban areas with 25 or more buses per hour during peak periods, where transit provides time savings of at least 5 to 10 minutes per trip.</td>
<td>Comsys Corporation (1993), Implementing Effective Travel Demand Management Measures: Inventory of Measures and Synthesis of Experience, USDOT and Institute of Transportation Engineers (<a href="http://www.ite.org">www.ite.org</a>); available at <a href="http://www.bts.gov/ntl/DOCS/474.html">www.bts.gov/ntl/DOCS/474.html</a>. Katherine F. Turnbull, Herbert S. Levinson and Richard H. Pratt (2006) HOV Facilities – Traveler Response to Transportation System Changes, TCRB Report 95, Transportation Research Board (<a href="http://www.trb.org">www.trb.org</a>); available at <a href="http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_tr_95c2.pdf">http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_tr_95c2.pdf</a>.</td>
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<tr>
<td>Financial Incentives</td>
<td>Transit agency provides free rides in designated zone.</td>
<td>Transit agencies, can be initiated/funded by cities, transportation management associations (TMAs), Business Districts.</td>
<td>Can be implemented directly by transit agency, or another organization can form a funding partnership with the transit agency</td>
<td>Urban or suburban downtowns</td>
<td>Not available</td>
<td>Impact of transit fare-free zones is highly context specific. Some cities have seen very large increases in transit ridership within free-fare zones.</td>
<td><a href="http://www.theatlanticcities.com/jobs-and-economy/2012/10/what-really-happens-when-city-makes-its-transit-system-free/3708/">http://www.theatlanticcities.com/jobs-and-economy/2012/10/what-really-happens-when-city-makes-its-transit-system-free/3708/</a></td>
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<td>Car sharing services</td>
<td>Private companies offer shared vehicles that are available for short-term rental. These services reduce the need for car ownership for people who only need a vehicle occasionally.</td>
<td>Private car sharing companies (non-profit and for-profit)</td>
<td>Urban, suburban, downtown, transit station</td>
<td>Not available</td>
<td>Studies have focused on vehicle ownership rates not trips. According to the Transportation Research Board, each car-sharing vehicle takes nearly 15 private cars off the road – a net reduction of almost 14 vehicles, and the average reduction in vehicle ownership in North American cities with carsharing programs was 20%.</td>
<td>Transportation Research Board (2005), Car-Sharing: Where and How It Succeeds, Transit Cooperative Research Program Report 108. <a href="http://onlinepubs.trb.org/onlinepubs/tcrp_rpt_108.pdf">http://onlinepubs.trb.org/onlinepubs/tcrp_rpt_108.pdf</a>.</td>
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<tr>
<td>Secure bicycle parking</td>
<td>Offer secure bike parking to encourage travel by bicycle, especially at major transit hubs and employment centers and other areas where there is demand for long-term bike parking.</td>
<td>Cities, employers, housing developments, TMAs, transit agencies depending on ownership of right of way; counties and regional agencies can also purchase and facilitate installation of bicycle parking</td>
<td>Urban, suburban, downtown, transit station</td>
<td>Not available</td>
<td>Bicycle parking has limited impact as a standalone strategy; in combination with improved networks and other strategies to accommodate bicycles into development, it can promote cycling as a viable alternative to driving for shorter trips. As a rule of thumb, the Center for Clean Air Policy (CCAP) guidebook attributes a 1% to 5% reduction in VMT to the use of bicycles</td>
<td>California Air Pollution Control Officers Association (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures. August, 2010 <a href="http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf">http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf</a>. CCAP Transportation Emissions Guidebook <a href="http://www.ccap.org/guidebook/downloads/CCAP%20Transportation%20Facts%202011.pdf">http://www.ccap.org/guidebook/downloads/CCAP%20Transportation%20Facts%202011.pdf</a>.</td>
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<tr>
<td>Preferential parking for carpools</td>
<td>Provide dedicated parking spaces for carpool users. These spaces should be the most desirable spaces.</td>
<td>Cities, transit agencies, employers, or any entity that owns a parking lot</td>
<td>Any</td>
<td>Not available</td>
<td>Impact of this strategy depends upon existing parking availability, among other factors. Most effective if implemented as part of a comprehensive TDM strategy.</td>
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<td>On-site bicycling amenities (lockers, showers, etc.)</td>
<td>Employees offer on-site amenities that make it easier for people to bike or walk to work, by offering a place to store extra clothes and/or bicycles, shower, etc.</td>
<td>Employers, housing developments</td>
<td>Urban, suburban, downtown, transit station</td>
<td>Not available</td>
<td>This strategy has limited impact if implemented alone. Most effective if implemented as part of a comprehensive TDM strategy.</td>
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<td>Subsidized transit passes</td>
<td>Employers/developers provide discounted or free transit passes to employees/residents. transit agencies sell passes at reduced rates based on purchase of passes for all employees/residents regardless of transit use (e.g., universal pass programs).</td>
<td>Employers, housing developments or TMAs/Business Improvement Districts are the most common distributors of discounted transit passes; agreements are made with transit agencies. Cities sometimes include distribution of transit passes as a part of a development’s conditions for approval or in zoning requirements.</td>
<td>Urban or suburban areas with high quality transit</td>
<td>4% to 20%</td>
<td>Depends on level of transit service</td>
<td>Alameda CTC Issue Paper: Transportation Demand Management (TDM) and Parking Management</td>
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<td>Alternative Commute</td>
<td>Provide shuttles</td>
<td>Employers</td>
<td>Provide shuttle service to major employment centers or schools to reduce demand for driving and parking. Oftentimes financed wholly or in part by contributions from businesses along route.</td>
<td>Any</td>
<td>Not available</td>
<td>15% to 30%</td>
<td>5-10% if they consist solely of educational efforts, and up to 30% if combined with cash incentives such as parking cash out or vanpool subsidies</td>
</tr>
<tr>
<td></td>
<td>Operate a free or subsidized shuttle service to major employment centers or schools to reduce demand for driving and parking. Often financed wholly or in part by contributions from businesses along route.</td>
<td>Any organization, public or private</td>
<td>Provide shuttle service</td>
<td>Any</td>
<td>5% to 30%</td>
<td>5-10% if they consist solely of educational efforts, and up to 30% if combined with cash incentives such as parking cash out or vanpool subsidies</td>
<td>Red Ewing (1993), TDM, Growth Management, and the Other Four Out of Five Trips.</td>
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<td></td>
<td>Commute to work in a shared van with 7-15 people. Public agencies may facilitate vanpooling by providing rideshare matching websites and the van or other subsidies or incentives.</td>
<td>Any organization, public or private</td>
<td>Provide ridesharing web site (public agencies or employers); Provide preferential parking (employers)</td>
<td>Any</td>
<td>5% to 30%</td>
<td>5-10% if they consist solely of educational efforts, and up to 30% if combined with cash incentives such as parking cash out or vanpool subsidies</td>
<td>Red Ewing (1993), TDM, Growth Management, and the Other Four Out of Five Trips.</td>
</tr>
<tr>
<td></td>
<td>Facilitate Vanpools</td>
<td>Any organization, public or private</td>
<td>Provide ridesharing web site (public agencies or employers); Subsidize vans or provide preferential parking (employers)</td>
<td>Any</td>
<td>5% to 30%</td>
<td>5-10% if they consist solely of educational efforts, and up to 30% if combined with cash incentives such as parking cash out or vanpool subsidies</td>
<td>Red Ewing (1993), TDM, Growth Management, and the Other Four Out of Five Trips.</td>
</tr>
<tr>
<td></td>
<td>Operate a free or subsidized shuttle service to major employment centers or schools to reduce demand for driving and parking. Oftentimes financed wholly or in part by contributions from businesses along route.</td>
<td>Any organization, public or private</td>
<td>Provide or contract service</td>
<td>Any</td>
<td>Not available</td>
<td>The design of a shuttle service varies greatly, from last mile/distances to and from transit centers, to long distance employer shuttle, to local circulator services. As a general proxy, he elasticity of transit use with respect to transit service frequency can be used</td>
<td>Red Ewing (1993), TDM, Growth Management, and the Other Four Out of Five Trips.</td>
</tr>
<tr>
<td></td>
<td>Telecommuting</td>
<td>Employers</td>
<td>Employers</td>
<td>Any</td>
<td>2% to 10%</td>
<td>The range is large depending on the study examined. Also one study found that telecommuting and compressed work weeks together generate larger trip reductions</td>
<td>Red Ewing (1993), TDM, Growth Management, and the Other Four Out of Five Trips.</td>
</tr>
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<td></td>
</tr>
<tr>
<td></td>
<td>Provide Shuttles</td>
<td>Any organization, public or private</td>
<td>Provide or contract service</td>
<td>Any</td>
<td>Not available</td>
<td>The design of a shuttle service varies greatly, from last mile/distances to and from transit centers, to long distance employer shuttle, to local circulator services. As a general proxy, he elasticity of transit use with respect to transit service frequency can be used</td>
<td>Red Ewing (1993), TDM, Growth Management, and the Other Four Out of Five Trips.</td>
</tr>
<tr>
<td></td>
<td>Operate a free or subsidized shuttle service to major employment centers or schools to reduce demand for driving and parking. Often financed wholly or in part by contributions from businesses along route.</td>
<td>Any organization, public or private</td>
<td>Provide shuttle service</td>
<td>Any</td>
<td>5% to 30%</td>
<td>5-10% if they consist solely of educational efforts, and up to 30% if combined with cash incentives such as parking cash out or vanpool subsidies</td>
<td>Red Ewing (1993), TDM, Growth Management, and the Other Four Out of Five Trips.</td>
</tr>
<tr>
<td></td>
<td>Commute to work in a shared van with 7-15 people. Public agencies may facilitate vanpooling by providing rideshare matching websites and the van or other subsidies or incentives.</td>
<td>Any organization, public or private</td>
<td>Provide ridesharing web site (public agencies or employers); Provide preferential parking (employers)</td>
<td>Any</td>
<td>5% to 30%</td>
<td>5-10% if they consist solely of educational efforts, and up to 30% if combined with cash incentives such as parking cash out or vanpool subsidies</td>
<td>Red Ewing (1993), TDM, Growth Management, and the Other Four Out of Five Trips.</td>
</tr>
<tr>
<td></td>
<td>Facilitate Vanpools</td>
<td>Any organization, public or private</td>
<td>Provide ridesharing web site (public agencies or employers); Subsidize vans or provide preferential parking (employers)</td>
<td>Any</td>
<td>5% to 30%</td>
<td>5-10% if they consist solely of educational efforts, and up to 30% if combined with cash incentives such as parking cash out or vanpool subsidies</td>
<td>Red Ewing (1993), TDM, Growth Management, and the Other Four Out of Five Trips.</td>
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<td>Red Ewing (1993), TDM, Growth Management, and the Other Four Out of Five Trips.</td>
</tr>
</tbody>
</table>
## Appendix G | Menu of TDM Measures

<table>
<thead>
<tr>
<th>TDM Program</th>
<th>Description</th>
<th>Organization Responsible</th>
<th>Implementation mechanism</th>
<th>Recommended Contexts</th>
<th>% Trip Reduction</th>
<th>Factors</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotional Activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel marketing programs</td>
<td>Promote awareness of alternative travel modes through campaigns.</td>
<td>Any organization, public or private</td>
<td>Urban or suburban areas with high quality transit</td>
<td>5% to 8%</td>
<td>There is often a greater increase in alternative mode share than reduction in vehicle trips given that some individuals switch between alternative modes or shift from driving alone to ridesharing. One study estimates that marketing increases the effectiveness of other TDM strategies by up to 3% (Shadoff, 1996)</td>
<td>Steven Spears, Marlon G. Boarnet and Susan Handy (2011), Draft Policy Brief on the Impacts of Voluntary Travel Behavior Change Programs Based on a Review of the Empirical Literature, for Research on Impacts of Transportation and Land Use-Related Policies, California Air Resources Board (<a href="http://arb.ca.gov/cc/sb375/policies/policies.htm">http://arb.ca.gov/cc/sb375/policies/policies.htm</a>). John Shadoff (1996), Transportation Demand Management; A Guide for Including TDM Strategies in Major Investment Studies and in Planning for Other Transportation Projects, Office of Urban Mobility, WSDOT (<a href="http://www.wsdot.wa.gov/Mobility">www.wsdot.wa.gov/Mobility</a>).</td>
<td></td>
</tr>
<tr>
<td>Personalized Travel Planning</td>
<td>Promote awareness of alternative travel modes through personalized travel planning.</td>
<td>Any organization, public or private</td>
<td>Urban or suburban areas with high quality transit</td>
<td>5% to 15%</td>
<td>Effectiveness depends upon the travel options available and the level of investment into personalized marketing. Ongoing investment may be required to maintain effectiveness over time.</td>
<td>Transport Today, Issue 334, pg 10 (2002) <a href="http://www.utp.org/tdm/tdn23.htm">http://www.utp.org/tdm/tdn23.htm</a></td>
<td></td>
</tr>
<tr>
<td>On-site transportation coordinators</td>
<td>Employers hire dedicated staff member to oversee TDM programs and/or provide one-on-one employee travel education/training.</td>
<td>Employers, housing developments</td>
<td>Any</td>
<td>Not available</td>
<td>The presence of a transportation coordinator can help increase the effectiveness of other TDM programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bike/ped maps, education, and promotion</td>
<td>Maps of safe biking/walking routes, educational classes on safe biking/walking, and promotional activities such as Bike to Work Day, usually provided by public agencies or non-profit organizations.</td>
<td>Any organization, public or private</td>
<td>Any</td>
<td></td>
<td></td>
<td></td>
<td>This strategy has limited impact if implemented alone. Most effective if implemented as part of a comprehensive TDM strategy.</td>
</tr>
</tbody>
</table>
Alexandria, VA

City of Alexandria
Transportation Management Plan
Special Use Permit Program
Review

Final Report
April 2008

Prepared for:
City of Alexandria, VA and
Metropolitan Washington Council of Governments

Prepared by:
Nelson\Nygaard
consulting associates
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EXECUTIVE SUMMARY

In December, 2007 the City of Alexandria, with funding provided by the Metropolitan Washington Council of Governments initiated a four-month review of the City of Alexandria’s Transportation Management Plan Special Use Permit (TMPSUP) program. The project consisted of four major tasks:

- Review of Existing Conditions
- Review of Best Practices
- Focus Group Discussions
- Analysis and Conclusions

Following is a summary of the results of these tasks.

Existing Conditions

The review of existing TMPSUP program conditions was largely based on documents, data, and other information provided by the City of Alexandria to the Project Team, including:

- The program’s originating ordinance in the City Code;
- Sample TMP’s; and
- Reports and surveys including Semi-Annual Fund Reports, Residential and Commercial Surveys, and TMP Annual Reports.

Program Summary

- The program is one of the oldest in the country – in effect for over 20 years.
- The program covers all land uses.
- The program is triggered based on proposed development for aggregate usable square footage of:
  - 50,000 or more for commercial and/or professional office uses;
  - 40,000 or more for retail sales uses;
  - 150,000 or more for industrial uses; or
  - 250 or more for residential uses.

Developments that reach the requirement thresholds outlined above must receive an approved TMP/SUP before it can receive a building permit. Applications for the TMP/SUP must include: general information on the nature and ownership of the proposed development; a Traffic Impact Study (TIS) of the proposed use; and a Transportation Management Plan (TMP) designed to mitigate any negative impacts projected in the TIS.

TMP’s are further required to include a number of key program elements:

- Production of annual reports summarizing TMP activities and funding;
- Annual surveys capturing tenant transportation behavior; and
- TMP Fund maintenance, contributions, and administration.
**Key Issues**

Existing program conditions identified as key issues to be addressed through the study included:

- Residential Participation – especially the “disconnect” between the developer that enters into the TMP contract and the eventual building owners that are bound by it without having given their explicit consent;
- TMP Funds and contribution levels;
- Ensuring that TMP contributions are spent appropriately and effectively; and
- The site-specific focus of TMP’s vs. incorporation into districts.

**Best Practices**

The next major task was a review of long-standing, effective programs similar in scope, nature, and intention to the TMPSUP. Neighboring Arlington County, Virginia and Montgomery County, Maryland provided two regional examples of such programs that have gained wide-spread attention and praise. Additionally, programs established by the City of Cambridge, Massachusetts were reviewed.

Available literature was reviewed to provide an introduction to each program, while interviews were conducted with key program staff to identify practices specifically instructive to the situation in Alexandria. The following are the three standout practices identified during this review.

**Arlington County – Voluntary, Incentivized Participation**

The voluntary, incentivized participation approach utilized by Arlington County, known as the Site Plan Review Process, provides a unique strength to its program in the form of increased leverage. Developers enter into the program in order to receive highly-valued density bonuses for their projects; this provides the County leverage to seek appropriately aggressive TDM concessions. That roughly 90% of development in recent years has gone through the Site Plan Review process indicates that this leverage has allowed the County to achieve progressive levels of TDM commitments while encouraging high levels of development directed toward its transit corridors.

**Montgomery County – District Focus**

Montgomery County’s emphasis on mitigating vehicular congestion at the district level provides a useful example of “right-sizing” as a program’s focus. By concentrating on key commercial corridors at high levels of congestion-risk, the County’s program allows it to expend its resources where success is most critical. At the same time, district-wide performance targets broaden the focus beyond individual sites, and reinforce the most critical measure of success – district level congestion mitigation.

**Cambridge – Residential Inclusion**

Cambridge’s A19 process represents a direct attempt to include residential development in the City’s traffic mitigation efforts. This process has revealed challenges for incorporating traditionally commute-oriented strategies at residential sites. Effective
inclusion of such sites has been shown to require creative solutions in identifying strategies for a new kind of participant.

**Stakeholder Focus Groups**

For the next task, Nelson\Nygaard led a series of interviews and focus group discussions with stakeholders involved with the City’s TMPSUP program, including:

- City of Alexandria Department of Transportation and Environmental Services staff;
- City of Alexandria Department of Planning and Zoning staff;
- City of Alexandria City Attorney’s office
- Real estate developers with TMPSUP experience and/or their attorneys;
- Representatives from commercial and office developments with on-going TMPSUP obligations; and
- Representatives from residential developments with on-going TMPSUP obligations.

Combined, these interviews and focus group discussions provided a spectrum of feedback from the perspectives of program administrators and participants regarding current program structure and function – as well as how the program could better serve its stated goals, and perhaps whether those goals remain appropriate. Key findings include:

Generally developers view the program benignly, feeling at worst it is a necessary evil. It was specifically stated that the program was appreciated for not being an anti-development program. It was also clear that Alexandria is a sufficiently attractive real estate market to make it worth the added obligations of the program. Some developers were finding that within the local real estate market, it has become possible to sell the program’s obligations as a “green” amenity to prospective tenants.

Current non-residential development participants have had a wide range of experiences with the program. Some have found that the program guided them toward developing programs and services that their tenants have come to value — to the point that the program managers fund these programs beyond their TMP obligations and would continue them regardless of continued TMP obligations. Others expressed the need for more guidance from the City on what is expected of them beyond annual reports and surveys. Difficulties seem particularly significant where buildings have had a high rate of turnover in management.

City staff involved in the program expressed strong optimism for the program’s potential to be more effective. Interest in consolidating TMP’s into TMP districts was particularly keen. Among staff, however there were different views about whether the program should focus on performance measures or compliance with current funding and implementation obligations. The City Attorney’s staff noted particular interest in broadening current compliance measures to better match consequences to levels of non-compliance.
Residential development tenants expressed strong opposition to their program obligations. Opposition was expressed over both the financial obligations and the time and labor commitments required to administer their own TMP’s. Further frustration was also expressed over the difficulty in finding appropriate ways to invest their TMP funds – noting a consistent disconnect between what residents were interested in funding and what the City found appropriate. Many stated that it was futile to attempt to reduce driving rates where they lived, citing the relative affluence and/or age of residents, distance to transit, or location of primary employment sites.

Analysis and Conclusions – Program Recommendations

Nelson\Nygaard analyzed all task findings to identify a comprehensive set of recommended program improvements. Key recommendations include:

Policy Goals

It is recommended that the City broaden its TMPSUP program goals and objectives to include reduced VMT and the many benefits tied to the current official goal of reducing VMT and peak congestion conditions, such as:

- Environmental benefits: improved air quality, reduced carbon emissions, reduced noise pollution;
- Improved roadway conditions: shorter travel times on local roads (for transit and private vehicles), fewer barriers to walking and biking, and reduced roadway wear and tear;
- Livability: improving the attractiveness of Alexandria as a Smart Growth community; and
- Social-Capital: community-building benefits of increased walking, biking, carpooling, and transit use.

This broadening of program goals and objectives would expand opportunities for quantifying program achievements, while underscoring the rationale for including residential developments in the program.

Program Structure and Implementation – Consolidation and Program Options

It is recommended that the City facilitate TMP consolidation by offering various TMP models and options to better fit the variety of affected developments. The recommended process can be summed up in three steps:

1. All new TMP’s are organized into TMP Districts (non-residential uses), or a pay-only model (residential uses) that directly supports consolidated TMP Districts.
2. Develop program options to better fit conditions of each existing TMP development – TMP District, TMA, or pay-only.
3. Attract existing TMP’s into a consolidated or a pay-only model.
Program Focus – Emphasize Results over Process

It is recommended that the City shift from its current focus on program processes (setting funding levels, ensuring compliance with surveying and investment requirements at each TMP) to mandating outcomes (setting broad performance targets on the District/TMA level). To do so, the City should identify specific performance targets for each TMP District and TMA. Meeting these targets then becomes the primary compliance focus for the City.

TMP District staff and TMA administrators would then be freed to set funding, investment, survey, and reporting obligations for each participant as means for achieving performance targets – increasing obligations for under-performers and decreasing obligations for high-achievers. With such a change, participants will gain autonomy while the City gains accountability — as well as improved, goal-oriented program performance.

Non-Compliance Enforcement

Focusing on performance measures and targets, along with effective consolidation, will address many identified compliance enforcement issues and offer the following improvements for the City’s compliance efforts:

- Consolidation of compliance monitoring responsibilities via monitoring all program activities through the TMP District staff;
- Single-source of information for participants on both compliance requirements and non-compliance responses (TMP District staff or TMA); and
- Reduced compliance measures as the primary area of compliance becomes explicit targets.

Consolidation and accountability also add a number of new compliance tools, including:

- Performance accountability as TMP District staff will be able to adjust annual TMP plans to reflect prior-year compliance levels. For instance, a TMP District can require an employer that failed to submit an acceptable volume of completed surveys to hire an outside firm to either complete surveys or conduct driveway counts in the following year’s TMP plan.
- The TMA which would essentially be extended on credit. The potential dissolution of any TMA becomes the main incentive for participants’ compliance.

A table summarizing recommendations and the issues and opportunities identified during the TMPSUP review that they address is provided as an appendix to this report.
DETAILED SUMMARY OF TASKS

The following sections provide a detailed summary of each project task, including a more detailed review of all final recommendations, beginning with the review of existing program conditions.

Task I – Review Existing Program Conditions

Implemented as Ordinance No. 3204, the Transportation Management Plan Special Use Permit (TMP/SUP) program was enacted by the Alexandria City Council on May 16, 1987 and is now part of the Alexandria Zoning Code (Chapter 6, Title 7). The ordinance requires that proposed office, retail, residential, and industrial development projects which meet certain square footage thresholds submit a special use permit application including a Traffic Impact Study and a Transportation Management Plan.

All special use permit applications are considered by the Planning Commission and the City Council, with the City Council making final decision whether to approve the application. Any project requiring a Transportation Management Plan must receive a TMP/SUP before the project can proceed. Site plans and TMP/SUP applications must be submitted concurrently.

Purpose

The primary purpose of the TMP/SUP ordinance is to “reduce peak traffic congestion resulting from development within the City.”¹ The goals of the TMP are to:

- Reduce the proportion of single occupancy vehicle (SOV) trips;
- Increase the use of carpools, vanpools, and mass transit during the peak hour; and
- Spread the number of SOV trips outside of the peak hour.

The City’s administrators believe that traffic impacts must be mitigated to maintain the City’s attractiveness as a place to live and work. In this way, the TMP ordinance serves to maintain the viability of the city’s commercial centers and growth areas. Although the ordinance cannot directly address regional traffic problems, it can potentially have an important effect in mitigating localized traffic impacts. And, should the TMP ordinance be emulated and implemented by other jurisdictions, it can potentially contribute toward a regional approach to solving traffic congestion.²

TMP/SUP Triggers

Development proposals which include any of the following thresholds trigger the TMP/SUP process:

- Any individual building, structure, or complex of structures, with aggregate usable square footage of:

¹ City of Alexandria, “Administrative Guidelines Ordinance No. 3204”
² Ibid
Buildings constructed, or receiving final site plan approval, prior to May 16, 1987 are exempt from program requirements, unless expansion subsequent to this date results in developments that cross the above detailed thresholds.

**Application**

Developments that reach the requirement thresholds outlined above must receive an approved TMP/SUP before it can receive a building permit. Applications for the TMP/SUP must include: general information on the nature and ownership of the proposed development; a Traffic Impact Study (TIS) of the proposed use; and a Transportation Management Plan (TMP) designed to mitigate any negative impacts projected in the TIS.

**The Traffic Impact Study**

The extent of the TIS will vary depending on the location of the site and the size and nature of the project. The TMP must be prepared by a qualified transportation planner or traffic engineer, and may include some or all of the following elements, to be determined by the City:

- The streets and intersections to be included in the study;
- The adequacy of available traffic and turning movement counts and the need for additional data;
- The time period of the study (i.e., morning or evening peak period or both);
- The approximate trip generation rates of the proposed use;
- The directional distribution of the traffic generated by the proposed use;
- The modal split and vehicle occupancy assumption to be utilized in the study;
- The trends in the growth of traffic in the area but not generated by the proposed use;
- The transportation management programs operated by the city or other governmental units in the area of the proposed use, as well as the transportation management programs proposed for the area, to be considered in the study;
- The nature and level of public transit that will service the site of the proposed use;
- The years to be covered by the study;
- The intersection level of service analytical technique to be utilized in the study; and
• The identification of citizen and neighborhood associations whose membership will be proximately affected by the traffic and related impacts of the proposed use.\(^3\)

Typical actions conducted for the TIS include:

- A field reconnaissance of site access opportunities and constraints;
- AM and PM peak traffic counts at key off-site intersections;
- Analysis of existing peak hour levels of service;
- Estimation of AM and PM peak hour trips generated by proposed development;
- Projection and analysis of key intersection levels of service, with and without proposed development; and
- Identification of road improvements required to accommodate projected demand.
- Compliance with the Virginia Department of Transportation (VDOT) Traffic Impact Analysis Regulations which impose a fee based on the distance of the property line to a State maintained highway and the size of a project.

**The Transportation Management Plan**

The TMP is provided in narrative form and contains specific details and supporting documentation to ensure that the use will comply with the provisions of the TMP/SUP program. The TMP must be prepared by a qualified transportation planner or traffic engineer and must include a description of procedures to:

- Establish transportation activities to persuade SOV riders to switch to public transportation. These activities should be measured against a TMP percentage goal which is determined by demographic data and factors in the site’s distance to Metro stations.
- Establish a fund to finance the transportation activities. The fund is calculated on an annual rate per unit or square foot and increases every year as per the Consumer Price Index (CPI) of the United States;
- Biannual fund reports should be submitted to the City’s Office of Transit Services and Programs (OTS&P), detailing the expenses incurred and submitting supporting documentation;
- Restrict parking spaces to carpools and vanpool vehicles;
- Register carpool and vanpool vehicles with the City’s OTS&P;
- Manage and supervise on-site parking facilities proposed for the use;
- Enforce the parking management aspects of the TMP; and
- Appoint a transportation coordinator for the proposed use to:
  - Administer its TMP and coordinate its activities with the (OTS&P);
  - Distribute, display and promote literature on regional transportation services;
  - Conduct and submit annual transportation surveys; and
  - Prepare and submit annual reports that discuss activities conducted during the year pursuant to the TMP and the effect of these activities in

\(^3\) City of Alexandria, Zoning Ordinance Article 11-700, 1997.
reducing traffic and related impacts of the use. The report should also include the activities planned for the coming year.

The TMP is further required to include a combination of some or all of the following elements:

- **Ride-sharing incentive programs** which may include activities to encourage and assist the formation of car, van, and bus pools. These can include: cash payments or subsidies, preferential parking charges and/or location, and other analogous incentive programs.
- Establish a carshare program with Zipcar. The TMP fund would reimburse a percentage in usage fees or pay for subsequent annual fees, given that the City of Alexandria already pays for the first time membership and application fees.
- **Public transit incentive programs** which may include:
  - Providing shuttle services connecting to public transit stops and providing midday and evening services to non-driving employees/tenants;
  - Subsidizing transit services;
  - Constructing transit shelters and amenities;
  - Constructing transit stations and related facilities;
  - Dedicating land for transit facilities;
  - Providing transit fare media subsidies and marketing programs; or
  - Providing other analogous incentive programs.
- **Funding for Recommended improvements in public transit** which serves the site of the proposed use.
- **Bicycle and pedestrian incentive measures** which may include the provision of bicycle parking and storage facilities, the construction and extension of bicycle paths and pedestrian walkways, the provision of shower and locker facilities and similar incentive features.
- In the case of office and industrial uses, **variable work hour**, telework, or **flex time**, programs under which employees working at the proposed use will stagger their work hours in order to reduce the amount of peak period traffic to/from the use which would otherwise occur.
- **Measures to reduce the reliance on single-occupancy vehicles** which may include:
  - Parking fees to discourage single-occupancy vehicles;
  - Time and other access restrictions to parking spaces in on-site parking facilities; or
  - Programs to support and encourage the utilization of alternative transportation modes.
- **Use and accessory use design options** which reduce reliance on single-occupancy vehicles such as the provision of less parking area than that required under the provisions of this ordinance, shared parking arrangements, the incorporation of residential units (in the case of proposed commercial uses) and other analogous design features.
- **Any other** technique or combination of techniques capable of reducing the traffic and related impacts of the proposed use.
• **Demonstration** that reasonable and practicable actions will be taken in conjunction with, and over the life of, the use which will produce a significant reduction in the traffic and related impacts of the use.

**Approvals and Compliance**

The City will approve an application for a special use permit if it determines that the applicant’s TMP:

- Is in accord with the requirements of the TMP/SUP; and
- Together with any amendments deemed appropriate by council, demonstrates that reasonable and practicable actions will be taken that will produce a significant reduction in the traffic and transportation impacts of the use.

Any TMP/SUP granted by the City, unless revoked or expired, runs with the land and remains mandatory and binding upon the applicant, all owners of the land and all occupants and upon all of their heirs, successors and assigns. Any use authorized by a special use permit must be operated in conformity with such permit, and failure to so operate can be deemed grounds for revocation of such permit, after notice and hearing, by the city council. The City may attach conditions and requirements to the permit as it deems necessary to ensure that the TMP for the proposed use will be fully and continuously implemented throughout the life of the proposed use, unless revised or rescinded by City.

**TMP Products and Establishing Performance Measures**

One of the basic requirements of the program is conducting annual mode share surveys among tenants at each development subject to TMP/SUP conditions. This annual accumulation of mode split data represents a wealth of opportunities to track the effectiveness of the TMP/SUP program in general, as well as specific strategies implemented at each site. Yearly, systematic collection, analysis, and review of this data from each site will allow the City to track changes and shifts in transportation behavior at each site, within the program, and across the city — a vital performance measure for this program. Without this level of comprehensive analysis the City will be left only with “snapshots” of travel behavior at isolated sites.

**TMP Funds**

Tenants and/or owners of each site are required to contribute to, and manage, a fund for implementing their site’s TMP measures. Figure 1 summarizes current levels of annual contribution, by land use.
Figure 1: Annual TMP/SUP Funding

<table>
<thead>
<tr>
<th>Use</th>
<th>Projects</th>
<th>Square Feet</th>
<th>Share %</th>
<th>Annual Funding</th>
<th>Share %</th>
</tr>
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<tbody>
<tr>
<td>Office</td>
<td>16</td>
<td>7,143,266</td>
<td>63.6</td>
<td>$1,129,836.74</td>
<td>47%</td>
</tr>
<tr>
<td>Office/ Retail</td>
<td>3</td>
<td>612,985</td>
<td>5.5</td>
<td>$59,418.50</td>
<td>2%</td>
</tr>
<tr>
<td>Retail</td>
<td>16</td>
<td>2,845,999</td>
<td>25.3</td>
<td>$290,243.94</td>
<td>12%</td>
</tr>
<tr>
<td>Warehouse</td>
<td>1</td>
<td>260,733</td>
<td>2.3</td>
<td>$35,981.15</td>
<td>1%</td>
</tr>
<tr>
<td>Industrial</td>
<td>1</td>
<td>346,194</td>
<td>3.1</td>
<td>$0.00</td>
<td>0%</td>
</tr>
<tr>
<td>Residential</td>
<td>30</td>
<td>13,312</td>
<td>0.1</td>
<td>$810,157.01</td>
<td>34%</td>
</tr>
<tr>
<td>Hotel</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
<td>$73,500.00</td>
<td>3%</td>
</tr>
<tr>
<td>Day Care</td>
<td>1</td>
<td>4,500</td>
<td>0.0</td>
<td>$450.00</td>
<td>0%</td>
</tr>
<tr>
<td><strong>All</strong></td>
<td><strong>71</strong></td>
<td><strong>11,226,989</strong></td>
<td><strong>100%</strong></td>
<td><strong>$2,399,587.34</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

TMP Process Observations

The following sections present general observations about the current TMP process following a review of the following approved TMP’s:

- Avalon at Cameron Court (1996);
- Mark Center (2004); and

These issues raised by these observations are further explored in the analysis and conclusions deliverable of this study.

Common Strategies/Tactics

Common requirements among these TMP’s include:

- Employing a manager/ coordinator for the plan to control its funds and promote its objectives;
- Contribution of funds – as stipulated by formulas based on development scale;
- Annual surveys – documenting resident/ tenant transportation behavior;
- Administering a ride-sharing program; and
- Annual reports – documenting TMP activities and assessing their effectiveness in addressing TMP objectives.

Targets

Within the last two years the City has been incorporating mode split targets in all TMP documents. From the list above, the Madison Mixed Use Development TMP was approved by Council on January 12, 2008 and has a target of no less than 50% non-single-occupant-vehicle (non-SOV) mode share. Such a target provides a clear basis upon which the effectiveness of future TMP activities can be measured.

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4 City of Alexandria, Office of Transit Services and Programs
Non-Binding Commitments
Some of the commitments contained in these TMP’s are obscured by non-binding language:

- “This TMP has been designed to be flexible and responsive to the inputs of these annual evaluations in prescribing… strategies and tactics to be implemented…”
- “Participating with other projects… and the City of Alexandria in the mutually agreed upon cooperative planning and implementation of TMP programs and activities…”
- “As dictated by demand, up to five (5) percent of the new parking spaces… will be reserved… for carpools and vanpools.”
- “The… Company will, to the extent practicable…”

There also seems to be minimal to no direct reference to results of the Traffic Impact Study, which neglects stated aims of the TMP/SUP program.

Fund Control
Each TMP commits the property owners to contribute to a TMP fund, which is in turn to be used only to fund TMP strategies and tactics. There appears to currently be no specified process for ensuring that any funds are applied to strategies for meeting aims of the program or individual TMP’s.

Each fund remains under the control of the participating development. One exception can be found in the Madison Mixed Use Development TMP, which states under the heading of “District Transit Management Program”:

“As the area near the Braddock Road Metro Small Area redevelops, the City hopes to organize a District Transit Management Program in the area. The Madison development is expected to be part of this group when the group is organized.”

The cited District Transit Management Program has yet to be established and implemented. The City, however, is including this concept in all new TMP’s.

Format
It is our understanding that the format incorporated in the Madison TMP is a standardized format that has been in use for approximately two years. This format appears to be one which presents information clearly and is easily used by the City and the TMP holder. Other TMP’s reviewed used a variety of formats, inconsistencies between which made review of these TMP’s more difficult.
Task 2 – Best Practices Review

Project Context
The following review of Best Practices for mandatory, municipally administered Transportation Demand Management programs is conducted for the benefit of the City of Alexandria’s Transportation Management Plan Special Use Permit program (TMPSUP). Implemented as Ordinance No. 3204, this program was enacted by the Alexandria City Council on May 16, 1987 in order to reduce the level of traffic congestion generated during peak commute times.

The ordinance requires that office, retail, residential, and industrial projects which meet certain square footage thresholds submit a special use permit application which must include a Traffic Impact Statement and a Transportation Management Plan that outlines strategies for mitigating the project’s impact on peak traffic conditions.

Objectives of Best Practice Review
The purpose of the Best Practice Review, like that of the overall project, is to identify means by which the current program can become more effective in meeting its traffic reduction objectives and the City’s quality of life goals. Specifically, the following review is intended to provide examples of successful program activities and achievements that may be reproducible within an improved TMPSUP program.

In addition to identifying general best practices, the City indicated that the review should address specific program areas that present unique challenges and/or opportunities for the TMPSUP. These include:

- Focusing on land uses at the development stage, in comparison to programs that focus on established land uses;
- Inclusion of residential developments – less common among programs focused on reducing “peak-hour” traffic and presents its own challenges and opportunities;
- Ensuring that TMP contributions are spent on implementing approved strategies;
- Advantages of one-time contribution payments versus annual fees;
- Specifying travel targets for TMP participants; and
- Organizing participants and their program activities into districts versus preserving individual autonomy of each development.

Selection of Best Practice Cities
Below is a brief summary of the process used to select “Best Practice” cities for the review.

Initial List (7)
Figure 2 identifies the initial set of trip reduction programs reviewed for selection.
Figure 2: Initial List of Peer Programs

<table>
<thead>
<tr>
<th>Location</th>
<th>Name of Program/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Francisco, CA</td>
<td>Transit Impact Development Fee</td>
</tr>
<tr>
<td>Cambridge, MA</td>
<td>Parking &amp; Transportation Demand Management Program and Article 19 – Project Special Review Permits</td>
</tr>
<tr>
<td>Arlington, VA</td>
<td>Site Plan Review Process</td>
</tr>
<tr>
<td>Seattle, WA</td>
<td>Commuter Trip Reduction Program</td>
</tr>
<tr>
<td>Montgomery County, MD</td>
<td>Transportation Management Districts</td>
</tr>
<tr>
<td>Bellevue, WA</td>
<td>&quot;Commuter Trip Reduction Program&quot; and &quot;Growth and Transportation Efficiency Center&quot;</td>
</tr>
<tr>
<td>Boulder, CO</td>
<td>Go Boulder</td>
</tr>
</tbody>
</table>

San Francisco’s impact fee was decided to be too narrowly focused to provide much useful information – beyond serving as an example of a development fee that directly funds broad transit improvements. The legality of such fees varies from state to state, limiting the applicability of many of the strategy’s details to Alexandria.

The City of Cambridge provides two useful case studies for the City of Alexandria in its Parking and Transportation Demand Management Program and its Article 19 – Project Special Review Permit Program. The first covers existing developments that add any amount of on-site parking while the second addresses new development by anticipating and requiring the mitigation of traffic impacts.

Arlington County’s Site Plan Review provides another useful program for the review. Not only is it recognized nationally as a Best Practice for municipal traffic reduction programs, its location proximate to the City of Alexandria provides useful contextual comparability. Arlington’s program also shares Alexandria’s focus on new development.

Successful programs in Boulder, Colorado as well as Seattle and Bellevue, Washington, were also considered for the following review. It was decided, however that the Transportation Management Districts Program in Montgomery, County, Maryland would provide a more useful comparison due to its regional proximity. Additionally, the organization of the program into four cohesive districts addressed the City’s interest in this concept of combining program resources to maximize benefits.

Final List
Figure 3 presents the final set of peer programs to be reviewed and the key program components that are anticipated to provide useful comparison for specific components of the Alexandria program.

Figure 3: Final List of Peer Programs

<table>
<thead>
<tr>
<th>Location</th>
<th>Key Comparable Component/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge, MA</td>
<td>Focus on New Development, Inclusion of Residential Uses</td>
</tr>
<tr>
<td>Arlington, VA</td>
<td>Focus on New Development, Inclusion of Residential Uses</td>
</tr>
<tr>
<td>Montgomery County, MD</td>
<td>Transportation Management Districts, Targets</td>
</tr>
</tbody>
</table>
Background
The City of Cambridge established a Vehicle Trip Reduction Ordinance (VTRO) in 1992 to reduce overall auto trip impacts in the city. Out of this ordinance, the City has developed two new programs, one to mandate TDM participation at existing developments and one to cover new development projects — the City’s Parking and Transportation Demand Management (PTDM) ordinance and its Article 19 process (A19), respectively.

The PTDM enjoys widespread support among the city council, city planners, the business community, and the public. This is most clearly evident by the Cambridge City Council’s September 11, 2006 vote to eliminate the program’s sunset clause in order to expand the positive impact of the program. The A19 program is newer and has just recently begun to affect residential developments.

Vehicle Trip Reduction Ordinance
In 1992, the Cambridge City Council passed the Vehicle Trip Reduction Ordinance as part of an effort to address community concerns about increasing traffic congestion and environmental pollution. The ordinance required the City government to begin implementing Transportation Demand Management strategies such as transit subsidies and bicycle parking that would reduce vehicle trips by City staff. The most significant
effort was led by the Environmental and Transportation Planning Division of the City’s Community Development Department, which also began working cooperatively with citizens, businesses, and institutions in Cambridge and the Boston area to implement similar TDM benefits for their employees.

**Parking & Transportation Demand Management (PTDM) Ordinance**

In 1998, a formalized, mandated TDM program for businesses in Cambridge was approved by the City Council with the passage of the PTDM Ordinance (Section 10.18 of the *Cambridge Municipal Code*).

**Participation Trigger**

The PTDM Ordinance is triggered when any landowner in the City of Cambridge seeks any increase in the amount of off-street parking they maintain for non-residential uses. All landowners are required to register their parking with the City’s Traffic, Parking & Transportation Department (TPTD) which has maintained a comprehensive inventory of all off-street parking facilities in Cambridge since 1971. The Director of TPTD determines if a building permit or parking license to increase registered parking has triggered the PTDM Ordinance and if so, sends notification to the landowner.

**Compliance**

Compliance with PTDM requires approval of a PTDM plan by a PTDM Planning Officer. Parking facilities with a total of 5 to 19 spaces are considered “small projects” and must implement three unique TDM measures from a toolbox of suggested TDM measures (see Appendix) — as a one-time implementation with no required monitoring or performance targets.

The list of specific measures is not documented in the ordinance, but is rather maintained and updated by the Planning Officer. Commonly implemented measures include:

- subsidized transit passes;
- information kiosks;
- bike racks;
- bike showers;
- car-sharing spaces;
- carpool spaces; and
- a guaranteed ride home program.

Projects that create facilities of 20 or more parking spaces are considered “large projects” and are subject to greater implementation and reporting requirements. Most significantly, most projects must commit to reducing their percentage of drive-alone trips by 10% from 1990 levels for the census tract in which the site is located. To achieve this goal, landowners must prepare an aggressive package of TDM measures under the guidance of the Planning Officer.

Typical plans include many of the small project measures listed above as well as:

- Membership in a Transportation Management Association (TMA);
Each plan must also include a detailed monitoring program to determine the mode shares of all persons who may use the subject parking facility. Programs typically include annual or biennial employee surveys, parking utilization counts, and driveway counts — each of which are compared to a base-year set of observations.

All small or large project plans must be approved or rejected by the PTDM Planning Officer within 90 days of their submittal. If a plan is rejected, the landowner cannot receive a permit to expand their parking facility.

Large projects that are subject to monitoring must implement additional, more aggressive TDM measures if they fail to meet the mode split goal of a 10% drive-alone-rate reduction from 1990 levels for the census tract in which the site is located.

**Administration and Enforcement**

If a landowner fails to comply with the PTDM, the TPTD Director may take enforcement action until the landowner complies. Enforcement can consist of a fine of $10 per day for every parking space in the facility or even physical closure of the subject facility. Landowners are directed to work with the City’s PTDM Planning Officer who is appointed by the City Manager and works in the Community Development Department. The Planning Officer provides guidance to landowners, approves final PTDM plans, and reviews and approves any required monitoring reports.

Compliance has been very high and consistent. To date, non-compliance penalties have not been used. Survey return success has been aided by the fact that the State requires a number of annual surveys from employers. As a result, employers tend to have already implemented effective strategies for surveying, including contracting out for the services.

**Performance Measures**

The fixed 10% target reduction in drive-alone commute rates is the primary performance measure for the program. A secondary measure of the program’s impact is its own growth in terms of how many developments enter into PTDM agreements.

**Performance to Date**

The PTDM Ordinance has been very successful for Cambridge. Nearly 100 large projects have resulted in detailed monitoring plans — and dozens of small project landowners have implemented one-time TDM measures. The regular monitoring
requirement for large projects has demonstrated much success. Over 85-percent of the monitored businesses have met or exceeded their mode split goal. The average drive-alone mode split for monitored businesses by 2004 had dropped from 68% to 55%, removing an estimated 7,000 vehicle trips from Cambridge roads each day.

The ordinance is notable for both its impact on new developments and popularity. It enjoys widespread support among the city council, city planners, the business community, and the public. The original ordinance contained a sunset clause for the ordinance, which was lobbied for by the business community which feared the implications of TDM on the cost of business. After two renewals, the sunset clause has been eliminated in the latest version of the ordinance, so PTDM is now a permanent policy.5

Developers who originally received the ordinance with skepticism found that employees support the transit benefits program and that it has become an effective marketing tool to attract prospective employees.

Success stories include the Technology Square development which sought to double its office and research campus from 1M square feet to 2.6M square feet and add over 600 new parking spaces. During preparation of its PTDM plan, the developer cut back the parking expansion by over 200 spaces and was able to commit to a drive-alone rate of 50 percent. Within one-year, the project exceeded this goal, and was operating at only 40 percent drive-alone by year two. A smaller development with 220,000 square feet of office space and 220 parking spaces committed to a 56 percent drive-alone mode split in 2002, and has been performing at less than 48 percent since.

**Funding**

Program participants fund their own mitigation activities, but are not required to contribute to the overall cost of program administration.

**A19 and the Project Special Review Permit**

The success of the PTDM program, though significant, was limited in its impact on overall traffic generation by the program’s narrow focus — existing land uses for which parking expansions were sought. Throughout the 1990’s, Cambridge residents continued to oppose the overall level of local traffic growth due to rapid development within the city, especially in East Cambridge. Eventually, citizens demanded a halt on development, eventually settling for the Interim Planning Overlay Petition (IPOP) that sought detailed traffic review of new developments along with impact thresholds and mitigation requirements.

The IPOP became formalized as Article 19 of the City’s zoning ordinance. While the City’s PTDM did not require participation from residential developments, the only exclusion in A19 was for university housing.

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5 Section 10.18.090
1. **Intent of A19**
The intent of A19 is to establish traffic and urban design standards for development projects likely to have significant impact on abutting properties and the surrounding urban environment.

To realize this intent, A19 codifies the city’s urban design objectives and establishes detailed building and site development standards to (1) regulate new building construction in the city’s commercial and high density residential areas; (2) establish standards by which significant adverse traffic impacts can be measured; and (3) establish procedures by which individual proposals can be reviewed by the Planning Board, city staff and the general public before a building permit is issued.

2. **Traffic Impact Review**
The Planning Board assesses the impact of the vehicular traffic, and pedestrian and bicycle circulation expected to be generated by a proposed development project. The procedures and requirements are intended to encourage applicants to adopt a development program that reduces the number of single occupancy vehicles coming to the site.

Such a program is also expected to encourage pedestrian and bicycle access to the site and throughout the neighboring district, while reducing potential negative impacts of the vehicles coming to the site on abutting properties. While the review focuses especially on the impacts affecting abutting properties and the immediate environment, the impacts on streets and locations more distant from the site, and on transit and bus facilities serving the site, are also assessed.

3. **Project Special Review Permit**
To ensure that new construction or changes of use in existing buildings do not impose substantial adverse impacts on city traffic, a special permit process was established as part of A19.

a. **Participation Threshold**
A Project Special Review Permit (PSRP) is required for new building construction based on the gross floor area (GFA) and nature of the proposed project, as stipulated within the ordinance (see Appendix). In an existing building, the PRSP shall be required where the total GFA of a new use or uses on a lot exceeds the threshold limits set forth for new developments.

b. **Application**
An application for the PSRP is made to the City Planning Board. The application must consist of the following materials:

   - Planning Board Special Permit Application Form. The application shall include all required plans and narrative statements. The site plan and other plans, elevations, and drawings shall clearly show:
     - The access and egress points for all forms of travel to the site;
     - The location of adjacent bus and transit stops;
The schematic design of proposed mechanical equipment; and
The architectural screening treatment proposed for that mechanical equipment.

Traffic Study. This must include a geographic and functional scope determined by the Traffic, Parking and Transportation Department (TPTD) to be appropriate to the location of the project. In general, the study must review intersections where the project will have significant and measurable impact.

The TPTD must issue a certification to the applicant within twenty-one (21) days of its submission that the traffic study has been done in a complete and reliable manner. Where that certification is denied, the applicant may revise the information in the traffic study and resubmit it; a certification of the revised study must be issued or denied by the TPTD within fourteen (14) days of the resubmission of material.

Based on guidelines established by TPTD, the traffic study must include a narrative discussion of:
- The nature and quantity of vehicles traveling to the site including, in addition to passenger cars, service, delivery and other commercial vehicles;
- The likely impact of such vehicular traffic on abutters, abutting streets, and nearby residential streets, including on-street parking behavior;
- The physical nature of pedestrian and bicycle access to the site and the quantity of movements anticipated for each;
- An analysis of the crash history at intersections within the study area; and
- Parking and transportation demand management measures proposed to ameliorate any adverse traffic impacts identified in the study.

Additional elements of the Application (not related to traffic) include:
- A Tree Study;
- An Urban Design Objectives Narrative;
- A Sewer Service Infrastructure Narrative;
- A Water Service Infrastructure Narrative; and
- A Noise Mitigation Narrative.

c. Approvals Evaluation
The Planning Board only grants the special permit if it finds that the project will have no substantial adverse impact on city traffic within the study area as analyzed in the Traffic Impact Review. In determining whether a proposal has substantial adverse impacts on city traffic the Planning Board assesses the following indicators:
- Project vehicle trip generation: weekdays and weekends for a twenty-four hour period, and A.M. and P.M. peak vehicle trips generated;
- Change in level of service at identified signalized intersections;
- Increased trip volume on residential streets;
- Increase of length of vehicle queues at identified signalized intersections; and
- Lack of sufficient pedestrian and bicycle facilities.
When one or more of the indicators is exceeded, it is indicative of potentially substantial adverse impact on city traffic. In making its findings, however, the Planning Board considers the mitigation efforts proposed, their anticipated effectiveness, and other supplemental information that identifies circumstances or actions that will result in a reduction in adverse traffic impacts.

Such mitigation efforts and actions can include, but are not limited to:

- Transportation Demand Management plans;
- Roadway, bicycle, and pedestrian facilities improvements;
- Measures to reduce traffic on residential streets; and
- Measures undertaken to improve safety for pedestrians and vehicles, particularly at intersections identified in the Traffic Study as having a history of high crash rates.

The precise numerical values that indicate potentially substantial adverse impacts for each of these indicators are revised periodically from time to time by the City Planning Board in consultation with the TPTD, and published and made available to all applicants.

4. Results
Around 2002, several large residential developments were proposed. This was the first real test of applying the new program’s requirements to residential development, which was met with much resistance. Residential developers claimed they were fulfilling an official City goal by providing more housing, and so shouldn’t be treated like commercial developers. However, traffic studies of the projected impacts of large residential developments were not easily dismissed — and the new legislation has been upheld.

**Residential Implementation – A New Challenge**

Residential projects tend not to trigger the primary VTRO criteria — peak-hour trip generation — as much as they do secondary criteria such as daily trip rates. Therefore, unlike commercial developments, impacts were not as clear for peak-hour intersections. Impacts on overall daily trip volumes, by contrast, are not as easy to quantify, nor as immediately noticeable. For instance, a large residential development may not significantly impact nearby intersections at any one hour of the day, though it produces a significant amount of trips throughout the day.

**TDM Measures for Residential Developments**

The most effective measures among commercial developments caused much debate and resistance among residential developers — contributions to the transit shuttles, subsidized transit passes, and ongoing, annual monitoring. These measures required on-going financial commitments, which were deemed to be unsustainable by some homeowners’ associations.

Cambridge’s zoning prevents unbundling (assessing a fee for parking distinct from rental fees or home purchases), so pricing parking is not an available tool for residential developments. Bike & pedestrian measures have been frequently implemented —
racks, sidewalks, paths, bigger elevators, etc. Other TDM toolbox measures that have been used include car-sharing, electric charging stations, posting transit information in lobbies and on websites, and on-site transportation coordinators (provided by the management office).

ARLINGTON COUNTY’S TDM PROGRAM FOR SITE PLAN DEVELOPMENT

Background
Arlington County’s coordinated policy approach to land use and transportation planning has allowed it to grow rapidly over the last 30 years without major expansions in the highway network and minimal traffic growth. In that time, nearly 18,000 residential units, 14 million square feet of office space, 1.5 million square feet of retail, and 1,218 hotel rooms have been built just in the area served by the county’s Orange-Line Metrorail corridor – Rosslyn, Courthouse, Clarendon, Virginia Square, and Ballston stations. Other major development areas include the Jefferson Davis and Columbia Pike Corridors. Today, the County contains more than 46 million square feet of office and retail space – more than downtown Dallas, Denver, or Seattle6

As intense as this development has been, it has generated only modest levels of traffic growth. Year 2000 U.S. Census data show that almost half of Orange-line corridor residents ride transit to work. Traffic counts from 1997 to 2004 show that while office and residential square footage increased by 17.5% and 21.5% respectively, traffic along the Rosslyn-Ballston corridor grew by only 2.3%. Surveys at large apartment buildings have shown peak hour auto trip generation rates of one trip per 5.9 units, far below the standard in the Institute of Transportation Engineers’ Trip Generation Manual.

The resulting economic prosperity has been remarkable, including the lowest property tax rate among the major cities and towns in northern Virginia and a AAA bond rating. The county’s Metrorail corridors provide 50% of the County’s tax base — on only 7% of the land. The County also enjoys far lower vacancy rates and higher lease and sale prices, compared to other regional locations.

**The TDM Program for Site Plan Development**

Arlington County’s TDM Program for Site Plan Development is an Arlington County Commuter Services (ACCS) program adopted by the County Board in 1990. This program was the product of a joint task force of the Arlington County Planning and Transportation Commissions, and an outgrowth of the comprehensive site-plan review process headed by the Arlington County Department of Community Planning, Housing and Development (DCPHD).

Arlington’s TDM policy focuses on workplace commuter travel and looks to reduce peak hour work travel by achieving a reduction of single occupant vehicle trips. Its objectives are consistent with, and help support, those of the County’s Master Transportation Plan, including achievement of major street and intersection level of service goals.

The key program requirements include:

- A TDM plan for each development consistent with the TDM Matrix (see Figure 4);
- A standard site plan condition to implement the TDM Matrix;
- In-building parking provisions that extend preference to vanpools, carpools, and bicycles;
- The encouragement of travel to and from the work place by modes of other than single occupant automobile through various educational and incentive measures;
- Coordination and cooperation on such measures among employers, building owners, and management companies. The county has one central transportation management agency (TMA), Arlington Transportation Partners, that serves this function for most developments; and
- Arlington County using its roles as developer of public buildings and as employer to encourage TDM practices.

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7 Ibid
8 The county’s second TMA, the recently formed, Potomac Yards TMA, was established exclusively to assist in the implementation, coordination, and monitoring of TDM’s generated among developments within a single, large development area in southern Arlington County.
The Matrix

Recommended County TDM programs are set forth in the TDM matrix (see Figure 4). However, upon providing clear and convincing evidence that particular elements of the TDM matrix may be inappropriate for a particular project, the developer may propose substitution of other elements which provide equivalent value.

No Site Plan TDM Program is expected to incorporate all the strategies outlined in the matrix. Rather, the matrix provides a framework of options from which the County will help developers identify appropriate actions for their project. In doing so, the County distinguishes the intensity of the strategies, matching them with the assessed impact of different developments on the transportation system. The greater the impact, the more intense the mitigation measures in the approved Site Plan will be. The categories and density thresholds are described in the matrix below and through the following context codes:

Matrix Land Use Category Codes

A. Development plan is consistent with the General Land Use Plan (GLUP), and no traffic problems are projected related to the development and its surroundings.

B. Development plan is consistent with the GLUP, however, traffic problems are projected related to the development and its surroundings.

C. A GLUP amendment is requested for a non-conforming development plan, no traffic problems are projected however.

D. A GLUP amendment is requested, and traffic problems are projected.
### Figure 4: Arlington's TDM Program Matrix

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Land Use Category</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information dissemination</strong></td>
<td></td>
</tr>
<tr>
<td>- Distribute/ Display</td>
<td>X     X     X     X</td>
</tr>
<tr>
<td>- Employee Surveys</td>
<td>X     X     X     X</td>
</tr>
<tr>
<td><strong>Operate Vanpools</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Subsidize Vanpools</strong></td>
<td></td>
</tr>
<tr>
<td>- Match State Subsidies</td>
<td>X     X</td>
</tr>
<tr>
<td>- Double Match State Subsidies</td>
<td>X</td>
</tr>
<tr>
<td><strong>Backup, Reserve Maintenance Vehicle</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Employee Transportation Coordinator</strong></td>
<td></td>
</tr>
<tr>
<td>- Part-Time</td>
<td>** X     X</td>
</tr>
<tr>
<td>- Full-Time</td>
<td>X</td>
</tr>
<tr>
<td>- On-Site Ride Matching</td>
<td>X</td>
</tr>
<tr>
<td><strong>Transit Store or TMA Contribution</strong></td>
<td></td>
</tr>
<tr>
<td>- $7,970/ Year</td>
<td>** X</td>
</tr>
<tr>
<td>- $15,947/ Year</td>
<td>X</td>
</tr>
<tr>
<td>- $23,911/ Year</td>
<td>X</td>
</tr>
<tr>
<td><strong>Locate/ Operate Transit Store</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Emergency Ride Home</strong></td>
<td>*** *** X</td>
</tr>
<tr>
<td><strong>Unlimited Reserved Rideshare Parking</strong></td>
<td>X     X     X     X</td>
</tr>
<tr>
<td><strong>Market Rates for SOV Parking</strong></td>
<td>X     X     X     X</td>
</tr>
<tr>
<td><strong>Outsource Parking Management</strong></td>
<td>X     X     X     X</td>
</tr>
<tr>
<td><strong>Reserved Vanpool Parking Space</strong></td>
<td>X     X     X     X</td>
</tr>
<tr>
<td><strong>One-Half Market Rate</strong></td>
<td>X     X</td>
</tr>
<tr>
<td><strong>Free</strong></td>
<td>X     X</td>
</tr>
<tr>
<td><strong>Variable Rate for Carpools (2+ Employees)</strong></td>
<td></td>
</tr>
<tr>
<td>- Market Rate</td>
<td>X</td>
</tr>
<tr>
<td>- One-Half Market Rate</td>
<td>X     X</td>
</tr>
<tr>
<td>- Free</td>
<td>X     X</td>
</tr>
<tr>
<td><strong>Contribute to Employer Bus Shuttle</strong></td>
<td></td>
</tr>
<tr>
<td>- $7,970/ Year</td>
<td>** *     *     *</td>
</tr>
<tr>
<td>- $15,947/ Year</td>
<td>*** **   ** **</td>
</tr>
<tr>
<td>- $23,911/ Year</td>
<td>*** *** ***</td>
</tr>
<tr>
<td><strong>Operate Employer Bus Shuttle</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>Fare Media Subsidy</strong></td>
<td></td>
</tr>
<tr>
<td>- 25-50 Percent</td>
<td>X</td>
</tr>
<tr>
<td>- 50-75 Percent</td>
<td>X</td>
</tr>
<tr>
<td>- 75+ Percent</td>
<td>X</td>
</tr>
<tr>
<td><strong>Bike Lockers, Racks</strong></td>
<td>X     X     X     X</td>
</tr>
<tr>
<td><strong>Shower Facilities</strong></td>
<td>X     X     X     X</td>
</tr>
<tr>
<td><strong>Van Accessible Garage</strong></td>
<td>X     X     X     X</td>
</tr>
</tbody>
</table>

9 To ensure that parking rates will reflect true market conditions in a competitive environment, lease agreements with parking garage operators are encouraged. Although a set number of spaces may be reserved for a tenant, the cost of an individual parking space is not controlled by the tenant and subsidies are prevented from being passed along to specific persons.
The DCPHD reviews submitted site plan proposals to assess transportation impacts and opportunities. Reviews incorporate an assessment of site characteristics, proposed land-uses, a traffic impact analysis (TIA) report, and a proposed parking plan (see “Parking Report and Charge Summary” template in Appendix). The ACCS then helps the developer identify site-specific strategies and prepare a TDM plan. Each TDM strategy is selected to mitigate the transportation impacts of the site on a case-by-case basis.

Developers can obtain further assistance in implementing their TDM plan requirements by contacting the County’s primary TMA – Arlington Transportation Partners (ATP), a division of ACCS – or the County’s TDM planner.

**Participation**

Participation in the Site Plan Review process is voluntary, but incentivized through density bonuses. Each zoning district permits a certain type and level of development "by-right." Beyond this, certain districts provide public review processes for a special exception by "site plan" that allows for greater flexibility in use, density, and form of development. The key to the success of the Site Plan Review Process is that additional

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10 To date, approved Site Plans have no required either Contribution - to offset monitoring and compliance costs - nor Performance Guarantees.
development potential serves as an incentive to developers to seek a special exception by site plan and participate in the process.

To date, the density bonuses have been significant enough to attract the majority of new development projects into the process. By framing incentives in terms of added project density, the Site Plan Review Process supports the County’s objective of concentrating development around transit stations.

**Implementation**

The developer must follow conditions outlined in the final approved site plan in order to receive a building permit and to continue to be in compliance with the property’s existing zoning. While entering the site plan approval process is voluntary, once approvals are received, TDM conditions run for the life of the building, regardless of ownership, and guide all future decisions regarding development on the property.

The developer of an approved site plan property must implement the TDM program and obtain approval from the County before gaining the first Certificate of Occupancy. At this time the developer will prepare a property TDM Report. Subsequent to the first approval, the property owner will re-submit the property’s TDM Report on the anniversary of the approval of the first Certificate of Occupancy.

Common components of site plan implementation include:

- Ridesharing promotion;
- Parking management;
- Transit promotion;
- On-site construction measures;
- Mutually agreed off-site provisions or contributions;
- Lease agreements; and
- Monitoring and compliance

**Common Strategies**

Some of the most common strategies used today include:

- Conducting an employee transportation survey, provided free by ATP;
- Attending a free, ATP-sponsored employer workshop or seminar;
- Posting commuter information in a company newsletter, on a central bulletin board, internal e-mail system, or website;
- Installing a permanent display case, stocked with commuter information tailored to the specific worksite, in a central area;
- Hosting an on-site transportation event for employees;
- Providing preferred parking spaces for carpools and vanpools;
- Implementing an informal teleworking program;
- Installing bicycle and/or shower facilities to encourage bicycle and pedestrian commuting; and
- Offering employees flextime, compressed work week, or job sharing options.
More intensive TDM strategies include:
- Starting a formal telework program;
- Instituting a tax-free transit benefits program, either employer-sponsored or through pre-tax payroll deduction;
- Developing a commuting incentive program for those who carpool, bicycle or walk to work;
- Providing an employee/customer shuttle to local transit stations or other service areas;
- Supplementing the regional Guaranteed Ride Home program with an additional employer-sponsored service;
- Implementing a parking fee for solo drivers (for employers who previously offered free parking);
- Offering free or reduced-price parking for carpools and vanpools (where a fee previously existed);
- Starting business-sponsored or subsidized vanpools; and
- Implementing an active Air Quality Action Days program.

**Monitoring and Compliance**

The County’s TDM planner is assigned to cover TDM compliance and monitoring (see compliance checklist in Appendix). Staff for these tasks has increased along with the number of properties with Site Plan review obligations.

For Category D projects, developers can be required to provide a performance guarantee to assure continuing performance. To date this option has not been used by the County for any project.

**Performance Measures**

The Arlington TDM program seeks to achieve the following results, which may be employed as evaluators of the success of the program:

1. Maintain pre-construction peak hour levels of service at major intersections.
2. Limit single occupancy vehicle trips generated by development.
3. Reduce vehicle-generated air pollution.
4. Maximize transportation alternatives while minimizing single occupancy travel.
5. Utilize transportation facilities efficiently.
6. Encourage efficient, cost effective modes of transportation that focus on moving people, not vehicles.
7. Improve transit information and dissemination so people will be able to make the most efficient and friendly use of the system.
8. Utilize public transportation effectively and efficiently, through improved system information, frequencies, routing, connections, transfers; innovative technologies are encouraged.
9. Configure mass transportation to provide access to, through, and around employment centers.
10. Encourage innovative technologies that move people between home and work the most efficient and effective way.
11. Maximize convenience of inter-modal transfers between the commuter rail system and feeder/distributor systems.
12. Encourage group riding and shared parking arrangements through parking management plans.
13. Minimize or eliminate barriers to group riding.
14. Review transportation management plans during the site development process.

**Performance**
Arlington’s TDM initiatives have successfully evolved and expanded since authorization of the original policy in 1990. Today, over 110 site plans have been approved by the County board with TDM plans and ACCS now includes a ten-person sales team that serves 600 businesses. Ninety percent of all development is now conducted through the Site Plan review program - almost all of the remaining 10% consists of either single-family homes or small, town home developments.

**Funding**
The most fundamental obstacle to long-term operation of the TDM program is a lack of funding. Currently, no dedicated funding is available for ACCS; instead programs rely upon state and federal grants. Unlike most other civic functions performed by Arlington, TDM programs have no financial backing from the County. This leaves this important function in a precarious position, especially in its potential for continued growth. Recent changes that have brought improved financial security for the program include: indexing contribution increases to inflation (as indicated by the Consumer Price Index) and expanding the obligation for Transit Store/TMA contributions from 10 years to 30 years.

The key opportunity for the County continues to be the level of development demand. This has allowed the County to extract substantial civic improvements from private developers without slowing development activity. In fact, over time, the public investments secured by the program increase development demand by contributing to the distinct mobility environment that makes Arlington County a uniquely desirable place to live, work, and visit.
MONTGOMERY COUNTY’S TRANSPORTATION MANAGEMENT DISTRICTS

Background
Montgomery County Commuter Services (MCCS), a section of the Division of Transit Services in Montgomery County’s Department of Public Works and Transportation (DPWT), provides free commuter assistance to county employers and employees through education and promotional outreach services, as well as incentive programs and a transit store.11

Beginning in the late 1980’s, Montgomery County established Transportation Management Districts (TMD’s) to provide concentrated services to encourage the use of transit and other commuting options in the County’s major business districts — Downtown Bethesda, North Bethesda, Friendship Heights, and Downtown Silver Spring. A dedicated TMD staff was assigned to each district, to focus efforts in these areas.

The TMD Program
The County has four broad goals for its TMD’s:
  • Reduce traffic congestion;
  • Increase transportation capacity;
  • Reduce air and noise pollution; and
  • Promote bicycle and pedestrian access.

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11 These are physical stores although online fare media sales are also available - http://www.montgomerycountymd.gov/cittmpl.asp?url=/apps/dpwt/fare_media/index.asp.
On November 26, 2002, the County Council passed legislation mandating that employers with 25 or more full- or part-time employees located within a TMD actively work with their TMD’s staff to reduce drive-alone commute trip rates. At a minimum, these employers are required to:

- Designate a TMP Coordinator to serve the company’s employees;
- Implement a Traffic Mitigation Plan (TMP) – developed in consultation with TMD staff;
- Submit an Annual Report of Activities; and
- Participate in the County’s Annual Commuter Survey.

1. **The Traffic Mitigation Plan**

   MCCS and its contractors assist County employers in developing a Traffic Mitigation Plan (TMP) designed to reduce the rates at which their employees drive alone to work (see sample TMP in Appendix). Each TMP is reviewed by the TMD staff and the Advisory Committee for that TMD which recommends approval or changes. The Director of DPWT has final approval authority.

2. **Annual Report of Activities**

   Once a year, employers are asked to summarize the activities they have undertaken to implement their plans. Employers who successfully encourage “Better Ways to Work” (used as the program’s tag line) are eligible for local and national recognition and awards.

3. **Annual Commuter Survey**

   Employers receive annual Commuter Surveys from Commuter Services for distribution to their employees. Employers are required to circulate the Commuter Surveys to their employees within 45 days for their completion. The completed Annual Commuter Surveys are submitted to each Employer’s TMD. All surveys are conducted in the spring (see sample survey in Appendix).

   These surveys are used to track employee commuting patterns in the TMD and to monitor progress toward reaching any commuting goals set in the County’s Annual Growth Policy. They help DPWT determine what changes to programs and services are necessary. Employers are asked to make a good faith effort to achieve an 80% response rate from their employees.

   The County assists employers in reaching the target response rate by supporting the efforts of the company’s TMP Coordinator in getting a survey into every employee’s hand. The TBC is the contact person at that employment site with whom MCCS and its contractors work to provide services and the person who is asked to distribute the survey. Surveys are available in hard copy format or online, distributed through the company email system. The County also provides detailed instructions, flyers, and prize drawings for participants who take the survey. If requested, TMD staff will hand out surveys at company-sponsored events and provide refreshments and additional prize drawings for participants.

4. **Common TMP Strategies**
• Designate contact person for employee transportation information (TBC);
• Distribute information on transit/pooling/other commute alternatives to employees on a regular basis;
• Commute information/alternatives presentations to employees at worksite by TMD staff;
• Information on commuting alternatives provided to new employees (orientation materials and presentations available from TMD staff);
• Attendance at free TMD-sponsored meetings/workshops permitted for TBC to learn about new services;
• Ozone Action Days participation (regional program to alert people to dangerous air quality days);
• Guaranteed Ride Home Promotion (free regional program offering emergency rides);
• Permanent display area for TMD-provided bus schedules and other transportation information;
• Provide ADA transportation options information;
• Tax-free monthly transit subsidies provided to employees (County subsidies and State commuter Tax credit may be available);
• Transit passes/tokens offered for purchase at worksite (at full or reduced price);
• Pre-tax payroll deduction for transit costs;
• Transit/pedestrian amenities at worksite, e.g. sidewalks, benches, etc.);
• Bike amenities at worksite - racks, lockers, and/or showers (TMD may be able to supply);
• Employee carpool matching service;
• Free or reduced rate parking for car/vanpools offered to employees;
• Preferred location and/or reserved parking for car/vanpools offered to employees;
• Alternative work schedules: Flex Time, Compressed Work Week; and
• Telecommute, telework, and job-sharing.

Compliance
The basic steps for compliance among qualifying employers include:
1. Contact TMD Staff for assistance in customizing an effective TMP.
2. Submit TMP to DPWT — DPWT reviews submitted TMP. Upon successful review, DPWT issues confirmation of approval.
3. Work with TMD Staff and employees to actively implement and promote the strategies that are included in approved TMP.
4. Participate in the Annual Commuter Survey.
5. Submit an annual “Report of Activities” documenting results of TMP implementation.

To date, compliance rates have been very high – estimated by one TMD administrator to be about 95%.\[12\] There are very few non-compliant companies in any of the TMD’s.

\[12\] Jim Carlson, Planning Specialist, Montgomery County Commuter Services
Those few will probably face fines in the near future. Failure to comply is a misdemeanor under County Code.

The County sets an 80% survey-response rate target in order to effectively measure the program’s performance. While this is a goal which many employers do not reach, most produce response rates significant enough to effectively track program performance. For some agreements, the TMD’s conduct their own mode split surveys, usually through driveway counts at the employment site.

**Enforcement**

An employer or owner that does not submit a traffic mitigation plan or provide survey data within 30 days after a second notice has committed a Class C violation. Continued non-compliance can result in fines.

To date, the County has not invoked any non-compliance penalties though enforcement efforts are being undertaken. There are no penalties for failing to achieve established survey-response rate targets.

**Performance Measures**

In addition to the broad goals set out for established TMD’s, commuting goals are identified for each district, stated as the percentage of participant-commuters not driving to work during peak times – tracked by the County as “non-auto driver mode share” (NADMS). Current NADMS targets for each TMD are as follows:

- Bethesda: 37%;
- North Bethesda: 39%;
- Friendship Heights: 39%; and
- Silver Spring: 46% (50% for new development\(^\text{13}\)).

While there are no individual NADMS targets established for participants, these targets serve as effective performance measures for the overall program.

**Performance**

Each TMD has active TMP’s from dozens of area employers, see Figure 5.

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13 Establish developments in Silver Spring are grandfathered at 46% in order to allow the County to maintain and update ambitious NADMS targets for new development in this transit-rich location.
All TMD’s have achieved or exceeded their NADMS target, according to the latest processed survey data (2006).\(^{14}\)

**Funding – County**

A variety of funding structures have been established to support TMD efforts. The Bethesda and North Bethesda TMD’s are primarily funded from parking revenues: parking meter payments, parking violation revenue, monthly permits for public parking lots, and In-Lieu of Parking development fees. For the Bethesda TMD, revenues from the Bethesda Parking Lot District facilities (including lots and garages) are used to support TMD expenses as well as other types of transportation costs. In the North Bethesda TMD, the County installed more than 800 parking meters to manage its parking system which also generates revenue for TMD activities.\(^{15}\)

Silver Spring TMD is eligible to receive net revenue from the Silver Spring Parking Lot District when available, though net revenue is not always generated there. The TMD’s in Silver Spring and Friendship Heights are supported by other sources, including developer fees and funds from the County’s general operating budget. Friendship Heights is the only TMD that does not receive any parking revenue, as there are no County parking facilities in Friendship Heights.

Around 2005, the County began assessing an annual fee for most new projects within TMD’s. These revenues are collected by the County and allocated to traffic mitigation actions — identified in coordination with TMD staff and the TMD Advisory Committees. The fee is currently set at $.10/SF for all commercial uses. There is enabling legislation for applying a fee of up to $60 per unit for multi-family residential development, but the County has chosen not to implement this strategy. The fee is assessed upon use and occupancy of the development.

Developments deemed to produce significant increases in traffic may also be required to produce a Traffic Mitigation Agreement, which outlines measures they will take to mitigate their project’s traffic impacts.

This policy may soon be changing significantly with the recent adoption of a new County growth policy. This policy will likely increase the frequency with which Traffic Mitigation Agreements are required. In addition, developers usually are required to pay the cost of driveway counts and similar monitoring required as part of their development approval.

**Funding – Participants**

Participants must bear the cost of the specific strategies they implement as part of their TMP. However, MCCS and its contractors provide assistance to all County employers, including those mandated to participate in the TMD program. Free services provided include:

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\(^{14}\) Carlson, Montgomery County Commuter Services

- Transportation Benefits Plans — How to design a suitable plan, while boosting productivity and morale;
- Transit Subsidies and Tax Credits — How commuter benefits can lower taxes for employers and employees;
- Public Transportation — Information on routes, fares, schedules, and where to buy transit passes, including pre-tax Metrocheck and other discounts;
- Carpools/Vanpools — Free assistance in forming or joining a carpool;
- Parking — Information on free/discount parking for carpools/vanpools and park-and-ride lots;
- Biking/Walking — Help with rental lockers, commuting routes, and other amenities;
- Guaranteed Ride Home — Free rides home in cases of emergency or unscheduled overtime;
- Teleworking/Alternative Work Schedules — How to design a program tailored to specific needs;
- Car Sharing — Programs that provide 24/7 access to a vehicle, available at Metro stations;
- Accessible Transportation — Freedom of mobility for those with special needs;
- HOV Lanes Information — Where, when, and how to access them;
- Customized Seminars and Presentations — For setting up a commuting benefits program that works for each business; and
- Commuter Information/Marketing Materials — Fact sheets, posters, flyers, exhibits fairs.

CONCLUSIONS
A number of common and standout practices can be identified within these program reviews which are applicable to Alexandria.

1. Common Practices

- **Program Focus**
  The programs all share the TMPSUP’s focus on SOV, or drive-alone, commute rates during peak hours. In addition, both the City of Cambridge and Arlington County have explicitly led by example by implementing TDM programs and commuter benefits covering their own employees.

- **Targets**
  The setting of specific performance targets is a strategy common to all three locations reviewed above. The target is, however, articulated in different ways in each. In Cambridge, the same target is set for all PTDM participants — reducing drive-alone rates by 10%. In Arlington, specific targets are assigned to each development, based on constraints and opportunities specific to each. Montgomery County’s approach — assigning distinct non-SOV commute targets for each of its four TMD districts — reflects a focus on key, high-congestion corridors.
• **Key Compliance Action – Surveys**
  The completion, collection, and review of annual employee surveys form a cornerstone of compliance for each program. These surveys are critical to assessing performance measures for each program reviewed. Consistent and effective survey completion and return is also critical to year-to-year amendments and improvements to individual mitigation plans in each location. These provide direct quantitative evidence on the impact of individual strategies as well as qualitative assessments of current and potential mitigation measures.

• **Support**
  Both Arlington and Montgomery counties provide a high level of support to program participants, especially to employers that seek their services. Dedicated County staff provide assistance in drafting effective mitigation plans and the implementation of their strategies. Compliance monitoring and assistance appears to be particularly robust in Arlington County.

• **Focus on Parking**
  Cambridge and Arlington each explicitly recognize the impact of on-site parking policies, especially at the workplace, on traffic mitigation. Cambridge’s PTDM program is triggered specifically by expansions of on-site parking inventories. Arlington County requires an approved “parking program” that combines costs for SOV parking and preferential treatment of bicycle and rideshare vehicle parking. This reveals a common understanding of the direct link between parking policy and travel choice at the workplace.

2. **Standout Practices**

• **Arlington County – Voluntary, Incentivized Participation**
  The voluntary, incentivized participation approach utilized by Arlington County provides a unique strength to its program in the form of increased leverage. According to John Durham, the County’s TDM Planner, the fact that developers enter into the program of their own volition in order to receive highly-valued density bonuses for their projects, gives the County leverage to seek appropriately aggressive TDM concessions. That roughly 90% of development in recent years has gone through the County’s Site Review process indicates that this leverage has allowed the County to achieve progressive levels of TDM commitments while encouraging high levels of development directed toward its transit corridors.

• **Montgomery County – District Focus**
  Montgomery County’s emphasis on mitigating congestion at the district level provides a useful example of “right-sizing” a program’s focus. By concentrating on key commercial corridors at high levels of congestion-risk, the County’s program allows it to expend its resources where success is most
critical. At the same time, district-wide performance targets broaden the focus beyond individual sites, and reinforce the most critical measure of success – district level congestion mitigation.

- **Cambridge - Residential Inclusion**

  Cambridge’s A19 process represents a direct attempt to include residential development in the City’s traffic mitigation efforts. This process has revealed challenges for incorporating traditionally commute-oriented strategies at residential sites. Effective inclusion of such sites has been shown to require creative solutions in identifying strategies for a new kind of participant.

3. **Performance and Achievements**

   Figure 6 provides a summary of the key achievements from each of the reviewed locations, in terms of the volume of participation and key performance measures.

![Figure 6: Performance Review](image)

<table>
<thead>
<tr>
<th>Location</th>
<th>Participating Sites</th>
<th>Key Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge, MA</td>
<td>100+</td>
<td>Bike commuting up 35% between 1990-2000</td>
</tr>
<tr>
<td>Arlington County, VA</td>
<td>110+</td>
<td>High levels of development with minimal increases in traffic</td>
</tr>
<tr>
<td>Montgomery County, MD</td>
<td>350+</td>
<td>All district performance targets achieved</td>
</tr>
</tbody>
</table>

**Task 3 – Stakeholder Focus Groups**

On Tuesday, February 19th, Nelson\Nygaard led a series of interviews and focus group discussions with stakeholders involved with the City’s TMPSUP program, including:

- City of Alexandria Department of Transportation and Environmental Services staff;
- City of Alexandria Department of Planning and Zoning staff;
- City of Alexandria City Attorney’s office;
- Real estate developers with TMPSUP experience and/ or their attorneys;
- Representatives from commercial and office developments with on-going TMPSUP obligations; and
- Representatives from residential developments with on-going TMPSUP obligations.

Combined, these interviews and focus group discussions provide a spectrum of feedback from the perspectives of program administrators and participants regarding current program structure and function – as well as how the program could be better serving its stated goals, and perhaps whether those goals remain appropriate.

An interview guide (provided as an Appendix to this report) was developed with the City to provide a general outline of suggested questions and areas of inquiry. The intent of the interviews, however, was to foster an open-ended discussion with all interviewees.
Input received during these meetings is summarized below, organized in the order in which they occurred.

**Summary of Discussion with Developers and Developers’ Representatives**

**General Comments on the Program**

- The study is a good idea. A “fresh set of eyes” to review the program is needed after 20+ years.
- One of the strengths of the program from the beginning is that it is not “just another technique for stopping development”. The City has remained faithful to this and has not rejected any project based on the TMPSUP process.
- Over the years, more requirements have been added: TMP Coordinator, posting materials in a central location, etc. This has increased a “boiler plate” feel to many TMP’s.
- One participant stated that he had gone through the process many, many times and the program has gotten “stale” to a certain extent. The intended accomplishments and effects have become lost in the process – or are not communicated to participants effectively.

**Comments on Program Components**

- The TIS is useful and necessary.
- One participant suggested that the terms used in the TIS – letter grades assigned to distinct levels of vehicle service – can be misleading. It was suggested that levels of service be stated as “seconds of delay” for vehicles at intersections. “The word ‘Fail’ feeds anti-development sentiments.”

**Comments on Program Effectiveness**

- Required actions are often hard to enforce.
- It was noted that some citizens have a strong desire for the program to be effectively and uniformly enforced, and complain when they perceive that a particular development is not living up to its obligations.
- Participation at commercial and office buildings is “a lot” more effective.
- The threshold for residential uses (development of 250 or more units) does shape projects as developers seek to avoid having to participate. However, it means there are several large projects just under the threshold.
- TMP Coordinators and Shuttles were identified as some of the more effective TMP strategies overall.
- Effective measures for residential uses include providing information and, to a lesser degree, shuttles.
- Cameron Station is a good example of a residential development with an effective shuttle. The Metrorail station is not close enough to be a real amenity without the shuttle. The distance is short enough, however, that the shuttle bridges the gap and attracts Metrorail trips from those that would otherwise drive.
Comments on Developer Buy-In

- As long as the developer understands the (TMPSUP) program, they tend to “buy in” to its value. Up-front information early in the development process is a key to achieving this result.
- Most developers have accepted the program as a “necessary evil” and “just another obligation” – the cost of doing business in a desirable market.
- Developers are aware of the program, but it is not generally brought up by the City until the end of the application process, so it feels like an afterthought.
- Developers do not perceive value in having a TMP attached to their development. Some, however, have effectively used their development’s TMP as part of a “green” marketing strategy. This is generally more effective for rental residential projects.

Comments on Program Process

- The TMPSUP process has always been smooth. There is very little public feedback or input.
- Developers have very little understanding of the implementation process for their developments. This happens after the developer has turned the development over to a home owners association or management company.
- There needs to be improved coordination between the TIS and the TMP. At best, the TIS informs the TMP as it is intended to do. Many times this does not appear to happen and the TMP is not used as a tool to address issues identified in the TIS. Preferably, the two would have an iterative relationship where the TIS and the TMP inform each other – TMP measures, for example, would be taken into account in a revised TIS.
- One developer noted parking reductions specifically as something that is not taken into account during the TMPSUP process. He suggested that such important demand management factors should inform the TIS and be accepted as a component of the TMP.

Comments on Compliance

- The City has been very hands-off in compliance and monitoring.
- “We didn’t really do a whole lot with it other than maintain a fund.”
- Some projects lack a “central” public space for posting TMP information (i.e., lower-density residential development without common areas.
- For residential developments especially, finding someone available and willing to administer the TMP is often an issue. “No one wants to do it.” Sometimes it’s a matter of a development’s size. “If it’s big enough for a management office or company, they take care of it.”
- While administering the TMP is an unwanted burden for some developments, the idea of a consolidated, district-focused fund is not likely to be appealing. The property-owners like self-control over the money. Developments will seek to pool their resources on their own if they see an advantage in it. Requirements to do so would be resisted.
• **Suggestion** – Management companies that administer TMP’s would be a good source for identifying the challenges and advantages of consolidating TMP administration.

**Comments on Public Perception**
- “The public does not care about it.”
- The public cares about parking and traffic. But they do not “buy” that the program reduces traffic.
- Citizens do pay attention to the TIS, because present impacts they can relate to.

**Current Annual Fee vs. One-Time Fee**
- All were opposed to the one-time fee concept.
- Upfront costs would hurt sales of owner-residential particularly.
- The annual fee structure provides more flexibility. For example, administrators can increase contributions to pay for one-time planned actions.

**Comparison to other TDM Programs**
- Generally, the Alexandria program was viewed favorably compared to other, similar programs. The flexibility of the Alexandria model was specifically noted as strength.
- “I like the give and take.”

**Summary**
In general, the attendees of this focus group were supportive of the program and its administration. While some of the obligations of the program are clearly viewed as, at best, “necessary evils”, the program is clearly not viewed as an “anti-development” program.
Opportunities Identified

- Promotion and conspicuous support of the program on the part of the City would reinforce it as a high priority component of development in Alexandria. There is clear indication that marketing the benefits of properties with TMP obligations to potential tenants is feasible and getting more so as current trends favoring “green” amenities continue.
- There was some skepticism as to whether participants would accept consolidation into a district TMP or TMA, in return for being relieved of administrative obligations. If this were an option for existing TMP’s, however, some may find it attractive.
- Creating an iterative process in which the TIS informs the TMP while the final TMP in turn is factored into a revised TIS would reward developers’ efforts to address demand management in their projects.

Constraints Identified

- Information and promotion. The program is often an afterthought in the development, sales and leasing, and occupancy process. Often parties involved only deal with the SUP terms toward the end.
- TMP administration. Identifying someone to volunteer to administer their program, especially at smaller residential developments, is a common challenge.
- Disconnect between the TIS and the TMP.

Commercial & Office Development Representatives Group

General Program Comments

- Transfer of responsibilities is often not smooth. One manager noted that her firm recently purchased a property with an active TMP. The previous management company had been neglecting its TMP obligations and her company had to develop a compliance plan from scratch with little experience with the program.
- The other attendee noted a high level of success at the development he manages – the Alexandria Technology Center (ATC). The primary TMP component noted was a shuttle running between the complex and the King Street VRE and Metrorail stations. Operating details of the service include:
  - Peak-only service – three hours in the morning and three in the afternoon;
  - Free service for employees of contributing tenants;
  - Cooperative service arrangements with other locations; and
  - Potential expansion into lunchtime service to respond to tenant demand.
• This TMP has effectively absorbed a number of other TMP’s within the service area of its shuttles. The ATC manager has accepted arrangements where other property-managers contribute some of their TMP funds to ATC in return for expanded shuttle service to their sites. These smaller locations could not support a shuttle service on their own. Such arrangements currently include residential developments – a key advantage of which is adding passengers on “return-trip” buses that would otherwise be running empty.

Additional ATC Comments
• The ATC management is currently examining providing car-sharing. Many tenants make midday trips to the pentagon and the motor-pool does not always have enough vehicles. Car-share vehicles could serve as a back-up to the motor-pool, allowing more employees to leave their cars at home.
• All parking is charged – with exemptions for military.
• While the TMP administrator does not like being forced to pay into the TMP fund, he acknowledging that:
  o He spends more on TMP activities than his TMPSUP requires in order to provide value-added services such as the shuttles;
  o There is “no question” that the shuttles add sufficient value to the property;
  o The shuttles would be continued even if the TMP went away;
  o The shuttles reduce SOV-commuting; and
  o “You can’t argue with the ridership”

Comments on Impact of Local Traffic Congestion
• The only problem is traffic. “We (the shuttles) get stuck in the same mess as everybody else.”
• Tenant-employees looking to avoid local traffic (in the “valley” especially) will park two Metrorail stations away and ride to King Street in order to take the ATC shuttle.

Comments on other Commercial and Office TMP Experiences
• The Winkler TMP seems to be enjoying success.
• Neither participant was aware of any particular struggles with the program among office and commercial buildings.

Summary
This focus group highlighted many of the potential benefits of effective TMP consolidation, including:
• More effective shuttle operations – more participants means more potential riders and more service coverage;
• Economies of scale – increasing access to, and the effectiveness and coverage of, employer-based shuttles without each site having to have a critical mass of employees;
• Incorporation of Residential Uses – these uses in particular struggle with means for investing their often modest TMP funds effectively; and
• Ridership – overall as well as reverse-peak trips as more types of land uses are incorporated.

The ATC TMP has effectively absorbed others based on points of mutual self-interest. The centralization of administration and the economies of scale that this has provided to all participants appear to be a significant and appreciated benefit.

On the other hand, this discussion also highlighted the potential for inaction when the program is not embraced by participants as well as the challenges of “handing off” TMP’s during transitions in ownership and/ or management.

**Opportunities Identified**
- Consolidation could address issues of continuing the TMP when property or management is transferred.
- TMP strategies benefit from economies of scale under effective consolidation.
- With effective consolidation, smaller TMP’s appear more than happy to delegate administrative control.

**Constraints Identified**
- Transitioning TMP administration when property or management is transferred.

**City Attorney’s Representative**

**General Program Comments**
- The City Attorney’s office’s interaction with the program occurs “as needed” rather than a part of standard program administration. Such interaction with the program comes in two contexts:
  - Enforcement – enforcing compliance with TMP obligations; and
  - Interpretation – defining compliance options and parameters.
- Overall, interaction occurs about a once-per-month.
- Once the attorneys get involved, compliance soon follows. At most, one “zoning ticket” is enough to get compliance.

**Comments on Areas for Improvement**
- Enforcement – There should be more enforcement options. Currently, the main option is zoning tickets, which have a daily monetary scale that – when exhausted – triggers a court procedure for revoking a development permit. It was expressed that measures that fell between the zoning ticket and permit revocation would be useful in better matching levels of enforcement to levels of non-compliance.
- Flexibility – Making changes to the SUP to adjust to changing circumstances should be easier. For example: a residential development that is required to
promote transit use, but has become a highly-affluent community is a common cause of unspent money – the people living there today are not likely to shift trips to transit. Administrative modification of approved SUPs should be allowed under such circumstances.

- **Suggestion** – A five-year schedule for revisiting approved SUPs, at which point administrative modifications can be made.
- **Suggestion** – Create hard triggers for enforcement actions. Move away from “personal judgments” on when to take legal recourse.
- **Suggestion** – Online surveys may be more effective for residential uses – mailbox surveys often feel “invasive” and get instinctively thrown out with the junk mail.

**Summary**

This interview highlighted the opportunity to improve enforcement in three ways:

- Providing more enforcement options;
- Creating “hard triggers” for enforcement actions that relieve City staff of making personal judgments on when to take legal action; and
- Allowing “administrative” modifications to approved TMP’s, perhaps on a fixed schedule of every five years – such as a five-year review period to allow City staff to review and update TMPs in accordance with what has worked as well as evolving opportunities and constraints.

**City Agency Group**

**General Program Comments**

- TMP’s are approved in perpetuity. Eventually TMP terms become out of date with current standards.
- Enforcement should be formalized. By contrast, the current system relies upon repeated attempts at correspondence before legal action is taken.
- There is no capacity to set performance standards and/or penalties.
- “It’s results that we need to be measuring.”

**Comments on Consolidation Options**

- What is the right size and forum for managing a TMP?
- Some developments are definitely too small.
- Creating a transportation management district system is key.
- Tie contribution levels to costs of meeting TMP obligations or meeting performance measures/mode shift targets.
- “Districting” will have to be voluntary (among existing TMP participants). Approved SUPs can only be amended when initiated by the development.

**City vs. Third-Party Management of District TMP’s**

- The City could provide a list of approved TMP managers. Ensuring that developments could not simply put someone in that would approve inappropriate use of TMP funds.
• With either city management or third party management, there should be a single clearinghouse for program information and benefits.
• The City already has a TDM Coordinator.
• The City must maintain control.
• If participants are held accountable for meeting performance measures – does the City need to control how funds are spent?
• “We have TMP’s that want to simply pay and be done. “

Reports and Surveys
• A lot of useful information is gathered through the program, but it is not coming in consistently and it is not being utilized fully.
• Surveys should ask more questions about the effectiveness of each program – how well is program and benefits information being distributed, for example.
• Suggestion – Offer rewards or recognition for highly-compliant participants: a “Best Place to Work for Commuters” type of award, for example.

Summary
This focus group discussion highlighted a key opportunity for the program and its interest in consolidating site-based TMP’s into district TMP. This opportunity comes in the form of a trade-off: Giving up control for the sake of gaining accountability.

The current system focuses on setting required funding levels and approving how the money is spent. The result that many TMP’s simply collect revenue without implementing any demand management strategies is recognized by most parties as a failure for the program. Shifting the emphasis to setting performance measures would allow the City to focus on results rather than process, while providing participants with more control to decide how to achieve them.

There is a strong reluctance, however, on the part of some City staff to relinquish fund control to participants that have historically shown an eagerness to spend funds on projects unrelated to program goals and objectives.

Residential Development Representatives Group

General Program Comments
• The discussion among this group was characterized by a nearly universal rejection of the program’s value and applicability to their own development or residential developments in general. Many members of this group expressed a strong desire to be removed from the program entirely – “Set us Free! Let us go!”
• Frustration is especially high among participants at developments that, post-construction, have divided into multiple, distinct housing associations. While the terms of the SUP bind each to original TMP obligations, the division has created many associations that, if constructed separately, would not have been obliged to seek an SUP. The small size of these associations further
reduces the effectiveness of potential TMP strategies such as shuttles and car-sharing.

- There was also an expression of frustration that, unless buyers read the fine print of their contract, they are typically unaware of the TMP obligations that come with their homes. When pressed, most acknowledged that this did not result in unexpected expenses, but rather the unexpected fact that some of the known expenses went into a TMP fund. Nonetheless it was expressed that such a commitment to the TMP represented developers “selling our rights away” and a “tax” that they did not support.

- The other most common sentiment expressed was a sense of futility in identifying uses for TMP funds that would both meet the terms of the SUP and have a meaningful impact on trip rates at their development. Most expressed that either the size of their fund and their development or the demographics of their community undermined any attempts to shift trips away from single occupancy vehicles.

- Participants expressed frustration that attempts to spend funds on efforts such as bus shelters were complicated by regulations that make them responsible for maintaining the shelter – a punishment in a sense for good intentions.

- Statements of sympathy with the program’s original intentions were made. These statements were verified by a number of additional comments regarding frustration over the level of development being allowed by the City – and the resulting impacts on local traffic and the environment.

- “We aren’t causing the traffic. It’s all this new development.”

Comments on Program Relevance

- Some expressed a sense that the program had become irrelevant and that other programs were performing functions for which it was intended more effectively – employer-based transit vouchers or discounts are very common among residents, for example.

- Others noted that many of the residential developments had become very wealthy communities whose residents “will never take the bus.”

- Others noted that many of the developments are not at all near transit and therefore do not attract those that use transit.

- Many expressed that the programs intentions and benefits are unclear –
  - “No one knows what it’s for.”
  - “No one knows why they have to pay.

- **Suggestion** – Requirement criteria for residential uses should be more context-sensitive, not just based on size.

- **Suggestion** – Broaden program goals to include environmental improvements.

- **Suggestion** – Create and distribute a “briefing booklet” on the program, its intentions, and benefits, as well as administrative guidance for TMP funds – use “plain English”

- **Suggestion** – Create an interactive website to guide TMP participants on administering and taking advantage of the program.
Comments on Administration Obligations

- Finding someone to manage the TMP is a constant struggle:
  - “No one wants to do it!”
  - “A lot of paperwork for something people just don’t use.”
  - “It costs more to run it, than the benefit we get out of it.”
- The City used to come to developments and suggest uses for TMP funds, but no longer does.

Comments on Administrative vs. Economic Hardship

- When asked which obligation, administrative or economic, was more of a burden, most agreed that, while both were unwanted, the economic obligation was more resented.
- When asked if being relieved of the administrative burden by pooling TMP contributions under the control of a centralized administrator – either the City or a third party – would offer an improvement, most strongly objected to giving up control of their money.
  - “I don’t want my money going anywhere else. I would rather see our fund grow to $300,000 and just sit there.”
  - “I would rather deal with the administrative time and effort and control my own funds.”

Proposed TMP Fund Uses

There was ambiguity about Fund expenditures that have been proposed and rejected by the City versus expenditures that were never proposed, but seemed certain to be rejected. Many participants have given up on approaching the City with ideas for TMP Fund projects. This also appears to be due in large measure to a lack of understanding about demand management concepts as well as the City’s expectations.

Summary

This focus group discussion underscored the uniqueness of program constraints at residential developments. Many of the most consistent issues with program compliance and effectiveness exist within residential TMP’s including:

- Limitations of smaller-development TMP’s;
- Administration – administrators often lack understanding, not only of this particular program but demand-management concepts in general;
- High rates of turnover in administration – the impact of which is increased when administrators are reluctant, inexperienced volunteers.

In addition to these shared constraints, residential TMP’s carry their own unique constraints, including:

- Varied trip patterns – Compared to employment-oriented uses, residential developments tend to generate trips that are more scattered throughout the day; and
• Communication – Reaching out to people is much more difficult when they are at home than when they are at work. Residents tend to be very protective of their private time at home, and less responsive to TMP surveys and marketing materials.

Opportunities Identified
• Creating a “pay-only” option for residential uses may remove many of the barriers to effective TMP implementation identified. Shifting from volunteer administration to a TMA or City control; creating economies of scale between smaller TMP’s; using varied trip patterns at residential developments to supplement ridership on employment-centered shuttles; and leaving people alone at home.
• While resistance to consolidation appears strong, this resistance may be based on long-simmering resentments of the program’s obligations. A sharp focus on simply being relieved of these obligations may delay a willingness on the part of some to voluntarily consolidate with other TMP’s if mutually beneficial relationships can be identified and arranged. Such consolidation can be offered as optional to existing TMP’s, while a pay-only level of participation is established for new residential TMP’s.

Constraints Identified
• Ineffective TMP’s at small residential developments.
• Lack of clear definition of applicable TMP program elements.
• Disagreement with overall program goals.
Task 4 – Analysis and Conclusions

The following section summarizes recommendations for improvements to the City of Alexandria’s Transportation Plan Special Use Permit Program (TMPSUP). These recommendations were derived from analysis of findings from all previous project tasks – Existing Conditions Review, Best Practices Review, and Stakeholder Interviews. All recommendations are intended to assist the City of Alexandria in updating its program and improving the ability for it to serve its goals and intentions.

Recommendations are organized by program component, as follows:

- Policy Goals;
- Program Structure and Implementation;
- Program Focus; and
- Non-Compliance Enforcement.

Policy Goals

The primary purpose of the TMP/SUP ordinance is to "reduce peak traffic congestion resulting from development within the City." The goals of the TMP are to:

- Reduce the proportion of single occupancy vehicle (SOV) trips;
- Increase the use of carpools, vanpools, and mass transit during the peak hour; and
- Spread the number of SOV trips outside of the peak hour.

The specificity of these goals and intentions is an opportunity to establish default performance measures up front in the program’s authorizing ordinance. The first recommendation is therefore to expand the goals of the program to recognize the spectrum of benefits that derive from reducing overall traffic congestion and SOV reliance as key program objectives. Whether formally incorporated in the ordinance, or merely officially recognized as key program objectives, these benefits should include at a minimum:

- Environmental benefits: improved air quality, reduced carbon emissions, reduced noise pollution;
- Improved roadway conditions: shorter travel times on local roads (for transit and private vehicles), fewer barriers to walking and biking, and reduced roadway wear and tear;
- Livability: improving the attractiveness of Alexandria as a Smart Growth community; and
- Social-Capital: community-building benefits of increased walking, biking, carpooling, and transit use.

Additionally, adding “reducing overall ‘Vehicle Miles Travelled’” as an explicit program goal would broaden options for quantifying program achievements, and underscore the rationale for including residential developments in the program.

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16 City of Alexandria, “Administrative Guidelines Ordinance No. 3204”
Program Structure and Implementation – Consolidation

The City has indicated a strong interest in shifting to a consolidated approach to TMP participation. Conversely, many current participants have expressed reservations, some quite strongly, to such an approach. Nonetheless, the advantages of consolidation are significant enough to recommend that the City place all new developments and attract as many existing TMP’s as possible into consolidated TMP’s. Advantages of consolidation include:

- **Economies of Scale for TMP Investments** – larger, centrally-controlled funding and participant pools allow more efficient investments in mitigation strategies, from shuttle services to ride-share programs;
- **Streamlined Administration** – a limited number of administrators, organized into districts, presents the opportunity to reduce human resource redundancies, bring a new level of program focus, and arguably places administration in the hands of those most suited to understand its unique barriers and potential achievements;
- **Provides Options** – a district-based administration would allow the City to provide two new, viable TMP model options: participation in a Transportation Management Association (TMA); and a pay-only option for residential developments; and
- **Improved Program Performance** – a consolidated approach would allow for program investments to be concentrated in areas and among populations within each district that offer the greatest potential impact on overall program goals and objectives.

It is recommended that the City facilitate TMP consolidation by shifting away from its current single-model approach to all TMP’s. Due to the different characteristics of residential and non-residential developments, and legal right of existing TMP’s to refuse to consolidate, a range of consolidation strategies and participation options are outlined below.

**Residential Developments**

The current TMP approach requires each residential development to fund and implement its own program. Many residential developments rely on volunteers who contribute their valuable personal time for TMP administration – volunteers that are likely to have limited experience with, and possibly no natural affinity for, the program or mitigation concepts and aims in general. Others spend TMP funding to hire outside administrative support.

Furthermore, all residential TMP’s suffer to some extent from barriers identified in the City of Cambridge (see Best Practices section above) as peculiar to residential developments – mainly that their trip generation impacts are not as easily quantified as are an employment destination’s. This makes it difficult to identify mitigation strategies that address peak-congestion-oriented program goals effectively. As a result, identifying appropriate TMP investments has been a challenge for both residential TMP’s and City staff. Such challenges are the likely reason that, among the three Best Practice peers
reviewed, only one has chosen to require residential participation – despite a second peer (Montgomery County) having the legal authority to do so.

Establishment of a “pay-only” TMP option would offer an opportunity to shift time and responsibility commitments from volunteers to professional, experienced district TMP staff, chosen specifically for their understanding and support of program aims and benefits. This pay-only model would also allow funding from residential developments to be consolidated and investments to be shifted to locations and populations where greater impact on program goals can be expected.

This pay-only option should be the standard model for new residential TMP’s to avoid the unique and chronic administrative issues which have created frustration in both participant-support for the program’s aims and the effectiveness of its implementation. For established residential TMP’s, shifting to the pay-only format must be offered as an option – open to all, any time they wish to switch over from their originally established TMP.

For all pay-only TMP’s, annual contribution levels can be set following the same process used for those choosing to continue under the traditional TMP model. Contribution levels, however, should be discounted for “pay-only” TMP’s to encourage existing TMP’s to opt in, and to reflect the efficiency gains offered by:

- Consolidating administration;
- Economies of scale resulting from consolidating TMP investments; and
- Performance improvements expected from shifting investments to populations and locations offering greater potential traffic and SOV-reliance impact.

While the loss of control over investment of TMP contributions may keep many existing residential TMP’s from opting into this model immediately, the savings in direct costs as well as time and labor offered by the pay-only option will become clearer over time. For TMP’s struggling to find investment opportunities, remaining in the traditional model will amount to paying for added administrative obligations and work. Holding onto funds for the sake of holding onto them will likely lose its appeal in time, especially with a cheaper and easier option waiting for them.

To further attract interest in this option, a good will gesture is proposed to permit existing TMP’s that opt into the pay-only model to spend any accrued TMP funds in any way they choose. This gesture is anticipated to be effective in attracting residential TMP’s into the new pay-only option as many interviewed in Task 3 stated that their TMP’s have accrued sizable funds — funds that would be theirs to spend as they see fit if they opt in. This would likely require a City Council-approved change to the TMP ordinance.

**Non-Residential Consolidation – TMP Districts**

Similar to the TMD District approach successfully implemented in Montgomery County (see Best Practices section above), it is recommended that the City of Alexandria establish TMP Districts across the city. The TMP Districts would cover the whole city, or
at least the parts of it within which TMP investments would likely be most effective. Districts would be defined strategically based on geography as well as land use commonalities and/or transportation synergies. The City would assign dedicated TMP District staff to assist each district individually. Such staff should be selected for:

- Significant understanding of traffic mitigation and transportation management concepts and strategies;
- Appropriate dedication to the value and potential of the program; and
- Demonstrable ability to market the program’s benefits to Alexandria businesses.

The described TMP District staff would:

- Receive all monies collected from “pay-only” TMP’s within their district;
- Receive modest administrative fees from all participating employers (optional);
- Operate as an extension of either the City’s Transportation and Environmental Services or Planning and Zoning department — similar to the City of Cambridge — or as a newly created body — similar to Montgomery County’s TMD Districts;
- Provide dedicated staff to support TMP-participating employers within district boundaries;
- Market the program’s intents and benefits to all district employers, utilizing websites, printed materials, and on-site training and information sessions similar to Montgomery and Arlington counties;
- Establish appropriate, district-wide performance measures;
- Assist employers in identifying demand-management strategies for achieving performance measures;
- Have the administrative authority to require and approve or reject annual TMP implementation plans, and initiate non-compliance measures; and
- Collect, organize, and analyze all survey data to assist in tracking performance among districts and across the city.

Coordinating with the City’s dedicated TMP staff member, employers with TMPSUP obligations would be required to:

- Develop annual implementation plans based on the terms of their SUP;
- Fund all implementation costs;
- Implement a set of basic program requirements similar to what is currently required: TMP Coordinator, annual employees surveys, annual reports, etc.

Each TMP District will be responsible for meeting its performance measures – as demonstrated through annual surveys and reports. Should measures not be met, each TMP District would rely upon surveys and reports to determine which TMP plans are under-performing and make appropriate adjustments in annual plan revisions. Like the Montgomery County and Arlington County programs, TMP District staff services would be offered to all employers to guide in the development of demand-management oriented commuter benefits.
A key improvement over the existing program would be that, each year, every TMP District participant would be required to implement an approved set of measures based on approved performance targets and previous-year performance.

**Alternative Consolidation Model – Transportation Management Associations**

The Potomac Yards TMA in Arlington County was established in lieu of the new development in Potomac Yards participating in the County’s official TMA – Arlington Transportation Partners. This option was intended to provide more autonomy to a large development, the developers of which had sought control over the spending of funds. The unique arrangement requires the independent Potomac Yards TMA to meet negotiated, annual performance measures specific to their area.

Under a similar arrangement in Alexandria, TMA’s could be established among individual TMP’s seeking more control or autonomy over their TMP investments. These independent TMA’s would:

- Negotiate locally-appropriate, TMA-wide performance measures with the appropriate TMP District;
- Operate in lieu of TMP District participation only so long as performance measures are achieved;
- Set and collect funding contributions from all participating employers; and
- Identify and fund demand-management and traffic mitigation strategies to achieve performance targets.

The TMA option should also be available for established residential developments choosing not to opt into the pay-only alternative, as well as new residential developments.

The City can set terms for each established TMA that define actions to be taken should performance targets not be achieved. For example, for each year that performance fails to meet or exceed targets, a TMA might be required to increase funding commitments by 15% for the subsequent year. Furthermore, should a TMA fail to meet performance measures within an established timeframe (five years for example), it could be dissolved. Optionally, failure to meet performance targets followed by a failure to meet increased funding obligations could result in immediate dissolution. Once dissolved, all residential participants would automatically shift to the pay-only model and all non-residential participants would automatically shift to the TMP District model.

Conversely, TMA’s that meet or exceed their targets are free to reduce funding commitment levels at their own discretion. This is a key aspect of their direct autonomy over their activities and investments, and a key incentive to attract traditional TMP’s into this alternative form of program consolidation.

**Optional vs. Mandatory Consolidation**

Due to differing regulations, mechanisms for consolidation must vary for new versus existing TMP’s. New TMP’s are at the discretion of the City and are therefore recommended to be brought into a consolidated TMP, as a participant in either a TMP
District or approved TMA. By contrast, an approved SUP can only be amended at the request of its holder; therefore, consolidation among existing TMP’s must be voluntary.

The City can offer increased autonomy to TMP’s that opt into TMP District or TMA participation by shifting the program’s emphasis to performance measures rather than funding and investment controls (see below). As long as a District’s performance targets are met (or substantially met) employers would be free to negotiate what TMP activities they will undertake each year, and on what they will expend their TMP investments.

The TMA option would provide even more autonomy compared to pay-only and TMP District options by allowing participants to select independent administrators of their choosing to collect funds, identify programs, and invest in strategies. This may be a popular solution for existing residential TMP’s that would like to participate in nearby employer-based shuttle services – providing the employer service with return-trip riders and increased service funding.

As long as this option is tied directly to meeting performance measures (with the clear understanding that failure to do so will result in absorption into the default model for each participant), the City can afford to offer this level of autonomy as means of attracting existing TMP’s into a more effective, consolidated program model. Stakeholders interviewed in Task 3 stated that such autonomy was highly desired among existing TMP participants. This benefit of consolidation is therefore anticipated to attract many existing TMP’s into a consolidated TMP option.

Figure 7 summarizes the track that any TMP can take through the proposed consolidation process – essentially there is no option to return to a traditional TMP once one opts into either a pay-only or TMA alternative. This is key to eventually attracting all TMP’s into either a TMP District or an approved TMA.

**Figure 7: Consolidation Model Alternatives for Existing and New TMP’s**

<table>
<thead>
<tr>
<th>TMP Type</th>
<th>TMP Model Options Available</th>
<th>Options Should TMA Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pay Only</td>
<td>Remain in Existing TMP</td>
</tr>
<tr>
<td>Established Residential</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>New Residential</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Est. Non-Residential</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>New Non-Residential</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Program Focus – Performance Measures vs. Funding and Investment Control**

Few changes to the existing program offer a greater chance to improve performance and generate participant and community buy-in than the City relinquishing direct control over funding levels and investments in return for setting quantifiable performance measures and targets. Two major advantages of such a trade off are:
• Accountability and Results – Each TMP participant is required to directly contribute to meeting overall program goals, as opposed to simply meeting funding and investment guidelines; and
• Improve TMP investment process – Both City staff and TMP participants have expressed frustration over the current implementation approvals process. A new focus on performance will:
  o Provide more flexibility to administrators:
  o Provide more autonomy to participants in identifying implementation options; and
  o Clarify what is expected of investments — that they directly impact measured performance.

Broad performance measures should be adopted that reflect stated program goals. Options include, but are not limited to:
  • Peak-period SOV-commute rates/Peak-period non-SOV-commute rates;
  • Transit commute rates (for transit-proximate sites or transit-rich areas); and/or
  • SOV-commute rate reductions.

Tracking these measures across the city will provide Alexandria with clear information on the impact of the program. This information will be invaluable for communicating the benefits of the program to participants and the general population.

In addition, individual performance targets should be set and annually revisited for each District and TMA, based on the constraints and opportunities of individual developments, sites, and/or district areas. Options include, but are not limited to:
  • Target SOV-, or non-SOV-, commute rates (as described in the Montgomery County TMD District approach in the Best Practices section above);
  • Transit-commute rate target;
  • SOV-commute rate reduction;
  • Meeting either SOV-commute, non-SOV-commute, or transit-commute target based on a set “base-performance” year. For example, matching non-SOV commute rates for a development’s census tract as measured by a census (Cambridge’s PTDMP sets their standard target based on the 1990 census; see Best Practices section above).

Whatever measures are chosen, and whatever targets are set, focusing on performance rather than process will provide a number of benefits for the program, as indicated above. In addition, such an approach will allow the City to offer increased autonomy to participants as a trade-off for opting into TMP Consolidation. In addition, focusing on performance and accountability, along with consolidation, will also provide important new tools for improving compliance among active TMP participants.

Non-Compliance Enforcement

Compliance enforcement was identified as an area in need of improvement during Task 3 interviews by participants in both the Developers and the City Attorney’s meetings. Specifically, identification of a series of non-compliance “triggers” and the resulting
consequences was suggested to clarify what the City expects of TMP participants as well as consequences for non-compliance. It was also suggested that a broader range of non-compliance response options would allow the City’s response options to better match various levels of non-compliance.

The review of compliance and enforcement issues during the Task 2 Review of Best Practices indicates that consolidating TMP’s and focusing on performance measures will greatly simplify these issues for Alexandria and provide the following enforcement improvements:

- Consolidation of compliance monitoring;
- Single-source of information for participants on both compliance requirements and non-compliance responses; and
- Focus on accountability in annual TMP plans, including measures responding to a lack of “good faith” compliance efforts.

**Consolidate Compliance Monitoring**

The current approach requires the City to enforce compliance in both the funding of TMP’s and the use of those funds to implement approved actions. This relies upon Transportation & Environmental Services staff to monitor compliance in terms of funding and completion of surveys and reports, while Planning & Zoning staff must identify implementation compliance – interpreting TMP funding proposals against SUP requirements. Monitoring all program activities through the TMP District staff, and a new focus on performance targets, would streamline this process.

The City's main compliance interest will be monitoring performance targets for each District and TMA. Within each District and TMA, reports, surveys, funding, and investments thus become tools for reaching and documenting these targets, rather than ends in themselves. Compliance with these obligations can be addressed at the level of annual TMP plan negotiations – increased obligations for poor performance, reduced obligations for high achievers. Should non-compliance rise to a level beyond such remediation, TMP District staff can initiate currently available non-compliance actions through the City Attorney’s office.

**Single Conduit for Compliance Information**

The TMP District can also be an effective conduit for providing information on the enforcement process – the same TMP District staff negotiating annual TMP plans with each employer will also be responsible for identifying consequences for poor- or non-compliance – ensuring that all participants are aware of the various levels of response to a lack of cooperation.

From the project interviews, it appears rare that the City currently has to do more than send out a letter from the City Attorney’s office in order to gain compliance from a non-participating or non-co-operative TMP. Should this fail, the issuance of a “zoning ticket” has proven to be effective in gaining compliance. The ability for a TMP District to inform members of the schedule of non-compliance responses, including details on the level of
non-compliance that will trigger them, can be expected to further prevent instances of non-compliance.

**Added Tools**
In addition to these broad, process-focused improvements in compliance monitoring, a number of specific compliance options are presented to focus on performance and accountability.

**The TMP District**
Consolidation into TMP Districts and TMA’s provides one critical new enforcement tool – performance accountability. Simply put, TMP District staff will be able to adjust annual TMP plans to reflect prior-year compliance levels. For instance, a TMP District can require an employer that failed to submit an acceptable volume of completed surveys to hire an outside firm to either complete surveys or conduct driveway counts in the following year’s TMP plan.

Should non-compliance continue, actions can be taken through the existing channels, such as involving the City Attorney’s office. In this way, options will be sufficiently flexible to match non-compliance levels with appropriate remediation actions. It is also worth reiterating here that the TMP District approach provides the capacity to reward standout compliance efforts through reduced obligations.

**The TMA**
The TMA option is essentially extended on credit. As long as the developments involved collectively meet performance targets, the autonomy and local control offered by this model are retained. The potential dissolution of any TMA becomes the main incentive to ensure compliance. TMA administrators will have the ability to address smaller levels of non-compliance as part of their efforts to meet their performance targets – providing them with flexibility to address various levels of non-compliance similar to TMP District staff.

**Pay-Only Option**
For residential TMP’s that remain with the traditional TMP model, non-compliance of a pre-determined level (i.e., two consecutive years of failing to provide surveys or invest funding) could result in the automatic conversion of that TMP to the pay-only model. This would likely require a City Council-approved change to the TMP ordinance.
SUMMARY OF RECOMMENDATIONS

Policy Goals
It is recommended that the City broaden its TMPSUP program goals and objectives to include reduced VMT and the many benefits tied to the current official goal of reducing VMT and peak congestion conditions, such as:

- Environmental benefits: improved air quality, reduced carbon emissions, reduced noise pollution;
- Improved roadway conditions: shorter travel times on local roads (for transit and private vehicles), fewer barriers to walking and biking, and reduced roadway wear and tear;
- Livability: improving the attractiveness of Alexandria as a Smart Growth community; and
- Social-Capital: community-building benefits of increased walking, biking, carpooling, and transit use.

This broadening of program goals and objectives would expand opportunities for quantifying program achievements, while underscoring the rationale for including residential developments in the program.

Program Structure and Implementation – Consolidation and Options
It is recommended that the City facilitate TMP consolidation by offering various TMP models and options to better fit the variety of affected developments. The recommended process can be summed up in three steps:

1. All new TMP’s are organized into TMP Districts (non-residential uses), or a pay-only model (residential uses) that directly supports consolidated TMP Districts.
2. Develop program options to better fit conditions of each existing TMP development – TMP District, TMA, or pay-only.
3. Attract existing TMP’s into a consolidated or a pay-only model.

Program Focus – Emphasize Results over Process
It is recommended that the City shift a focus on program processes (setting funding levels, ensuring compliance with surveying and investment requirements at each TMP) to mandating outcomes (setting broad performance targets on the District/ TMA level). To do so, the City should identify specific performance targets for each TMP District and TMA. Meeting these targets then becomes the primary compliance focus for the City.

TMP District staff and TMA administrators would then be freed to set funding, investment, survey, and reporting obligations for each participant as means for achieving performance targets – increasing obligations for under-performers and decreasing obligations for high-achievers. With such a change, participants will gain...
autonomy while the City gains accountability — as well as improved, goal-oriented program performance.

**Non-Compliance Enforcement**

Focusing on performance measures and targets, along with effective consolidation, will address many identified compliance enforcement issues and offer the following improvements for the City’s compliance efforts:

- Consolidation of compliance monitoring responsibilities via monitoring all program activities through the TMP District staff;
- Single-source of information for participants on both compliance requirements and non-compliance responses (TMP District staff or TMA); and
- Reduced compliance measures as the primary area of compliance becomes explicit targets.

Consolidation and accountability also add a number of new compliance tools, including:

- Performance accountability as TMP District staff will be able to adjust annual TMP plans to reflect prior-year compliance levels. For instance, a TMP District can require an employer that failed to submit an acceptable volume of completed surveys to hire an outside firm to either complete surveys or conduct driveway counts in the following year’s TMP plan.
- The TMA which would essentially be extended on credit. The potential dissolution of any TMA becomes the main incentive for participants' compliance.
Appendix A: Sample Plans and Supporting Documents from Reviewed Peers
City of Cambridge –
PTDM: Small Project Plan
Parking and Transportation Demand Management Small Project Plan

If project has a total (existing plus new) of 19 or fewer parking spaces, please attach Interdepartmental Parking Facility Approval form and provide the following information:

Property Owner: 
Facility Address: 
Contact Name: 
Phone: Fax: Email: 

Number of Spaces Requested: 

Select at least three (3) Transportation Demand Management / Trip Reduction Measures:

<table>
<thead>
<tr>
<th>Measure</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ MBTA pass subsidy (Must be at least 50%)</td>
<td>Amount of monthly subsidy:</td>
</tr>
<tr>
<td>☐ Charge drivers directly for cost of auto parking</td>
<td>Cost of parking charged directly to driver:</td>
</tr>
<tr>
<td></td>
<td>Percentage of full cost:</td>
</tr>
<tr>
<td>☐ Subsidy for other modes</td>
<td>Amount of monthly subsidy (indicate mode):</td>
</tr>
<tr>
<td>☐ Shuttle service to nearby MBTA station</td>
<td>Station(s) served:</td>
</tr>
<tr>
<td></td>
<td>Peak frequency:</td>
</tr>
<tr>
<td>☐ Reserved carpool parking program</td>
<td>Attach parking plan and application form for use of reserved spaces.</td>
</tr>
<tr>
<td>☐ Reduced rates for carpool parking</td>
<td>Cost of monthly parking for a carpool:</td>
</tr>
<tr>
<td></td>
<td>Attach application needed to qualify for reduced rates.</td>
</tr>
<tr>
<td>☐ Bicycle racks</td>
<td>Should accommodate at least 2 bicycles.</td>
</tr>
<tr>
<td>☐ Other measures (attach additional details)</td>
<td></td>
</tr>
</tbody>
</table>

OWNER SIGNATURE: _____________________________ DATE: _______________

FOR PTDM PLANNING OFFICER USE ONLY

☐ APPROVED  ☐ APPROVED WITH CONDITIONS (SEE ATTACHED)  ☐ DENIED

SIGNED: _____________________________ DATE: _______________

July 2005
City of Cambridge –
A19-Participation Thresholds
## Thresholds Requiring Article 19 Participation - City of Cambridge Zoning Ordinance

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Threshold - All land uses but those listed below</td>
<td>50,000 SF</td>
</tr>
<tr>
<td><strong>Transportation Communication &amp; Utility Uses</strong></td>
<td></td>
</tr>
<tr>
<td>Bus or Railroad Station</td>
<td>Required</td>
</tr>
<tr>
<td>Auto Parking</td>
<td>150 Spaces</td>
</tr>
<tr>
<td>Freight Rail Terminal, Yard, Shop</td>
<td>50 Acres</td>
</tr>
<tr>
<td>Truck or Bus Terminal, Yard, Service or Storage, Parking</td>
<td>Required</td>
</tr>
<tr>
<td><strong>Institutional Uses</strong></td>
<td></td>
</tr>
<tr>
<td>Religious Center</td>
<td>40,000 SF</td>
</tr>
<tr>
<td>Preschool, Day Care, Kindergarten</td>
<td>25,000 SF</td>
</tr>
<tr>
<td>Primary School/ Secondary School</td>
<td>40,000 SF</td>
</tr>
<tr>
<td>College/ University</td>
<td>150 New Parking Spaces, or 250 Relocated Parking Spaces</td>
</tr>
<tr>
<td>Vocational or Other School</td>
<td>40,000 SF</td>
</tr>
<tr>
<td><strong>Health Care Facilities</strong></td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td>35,000 SF</td>
</tr>
<tr>
<td>Infirmary</td>
<td>25,000 SF</td>
</tr>
<tr>
<td>Nursing Home</td>
<td>250 Beds</td>
</tr>
<tr>
<td>Clinic and Other Health Care Facilities</td>
<td>25,000</td>
</tr>
<tr>
<td>Social Service Facilities</td>
<td>40,000 SF</td>
</tr>
<tr>
<td>Public Parks, Playgrounds, Public Recreation Buildings</td>
<td>400 Acres</td>
</tr>
<tr>
<td>Cemetery</td>
<td>100 Acres</td>
</tr>
<tr>
<td>Other Institutional Uses</td>
<td>40,000 SF</td>
</tr>
<tr>
<td>Office and Laboratory Uses</td>
<td>25,000 SF</td>
</tr>
<tr>
<td>Retail Business and Consumer Service Establishments</td>
<td>25,000 SF</td>
</tr>
<tr>
<td><strong>Open Air or Drive-in Retail and Service</strong></td>
<td></td>
</tr>
<tr>
<td>Greenhouse, Garden Supplies, Flower Shop, Produce Shop</td>
<td>25,000</td>
</tr>
<tr>
<td>Drive-Through Fast Food Restaurant</td>
<td>Required</td>
</tr>
<tr>
<td>Drive-Through Bank</td>
<td>Required</td>
</tr>
<tr>
<td>Other Drive-Through Retail</td>
<td>Required</td>
</tr>
<tr>
<td>Outdoor Amusement Park/ Sports Facility</td>
<td>300 Seats</td>
</tr>
<tr>
<td>Drive-In Theatre or Open Air Entertainment Venue</td>
<td>300 Seats</td>
</tr>
<tr>
<td>Automobile Sales</td>
<td>25,000 SF</td>
</tr>
<tr>
<td>Automobile Service - No Major Repairs</td>
<td>5 Fueling Positions</td>
</tr>
<tr>
<td>Car Wash</td>
<td>Required</td>
</tr>
<tr>
<td>Light Industry, Wholesale, Storage</td>
<td>25,000 SF</td>
</tr>
</tbody>
</table>
Arlington County –
TDM Site Plan Condition Checklist
### TABLE III: TDM Site Plan Condition Checklist

<table>
<thead>
<tr>
<th>Checklist completed by</th>
<th>on Date</th>
<th>Site Plan Required</th>
<th>Being Done</th>
<th>Not Done</th>
<th>Need Assistance</th>
</tr>
</thead>
</table>

**A. Program Participation**
- 1. Maintain an active membership in Arlington Transportation Partners (ATP).
- 2. Designate and train the Property Transportation Coordinator (PTC).
- 3. Facilitate development of Employee Transportation Coordinator (ETC).

**B. Facilities and Improvements**
- 4. Provide Transportation Kiosk or information display.
- 5. Provide for bus stops improvement.
- 6. Maintain existing bus stops during construction.
- 7. Maintain an on-site business center (residential use only).
- 8. Bicycle facilities: bike storage/parking facilities, guest parking and showers.

**C. Parking Management Plan**
- 10. Provide a Comprehensive Sign Plan for the property.
- 11. Design for paratransit access at main entrance to building.
- 12. Provide reserved spaces for carpoolers and vanpoolers (commercial use only)
- 13. Establish market-rate pricing for SOV parking (commercial use only).
- 14. Provide registered vanpools with free parking (commercial use only).
- 15. Provide carpoolers with ½ off the rate for SOV parking (commercial use only).
- 16. Depict area parking plan for the site and adjacent street frontage.
- 17. Prohibit on-street loading during peak periods.

**D. Promotions, Services, Policies**
- 18. Provide a sustainable commute benefit program.
- 19. Provide transit benefit for a six-month period (commercial use only).
- 20. Provide SmarTrip cards.
- 21. Provide website hotlinks to CommuterPage.com™
- 22. Distribute transit and ridesharing information:
  - a. Participating in ATP staff programs.
  - b. Provide New-resident or tenant commuter information package.
  - c. Distribute transit and ridesharing information periodically.
  - d. Participate in Ozone Action Days and similar activities.
  - e. Reference adjacent metro stations in promotional materials.
- 23. Encourage flexible work strategies to/from property.
- 24. Encourage telecommuting (commercial use only).

**E. Performance, Monitoring and Funding**
- 25. Implement TDM plan.
- 26. Submit an annual letter of performance to the County Manager.
- 27. Conduct a transportation performance study.
- 28. Provide annual Contributions to ACCS
Arlington County –
Parking Report and Charge Summary
<table>
<thead>
<tr>
<th>Tenants</th>
<th># employees</th>
<th># tenant spaces</th>
<th># SOV parkers</th>
<th>Carpoolers /vanpoolers</th>
<th># bike room spaces</th>
<th># employees with transit benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short Term Guests</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL USED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL AVAILABLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TABLE VI: Parking Charge Summary**

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Tenant SOV</td>
<td>$ /mth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly Tenant HOV</td>
<td>$ /mth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly Tenant Vanpool</td>
<td>$ /mth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily Monthly Tenant</td>
<td>$ /mth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily Early Bird</td>
<td>$ /day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily Validated</td>
<td>$ /day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily Visitor</td>
<td>$ /day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hourly Validated</td>
<td>$ /hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hourly Visitor</td>
<td>$ /hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open at night? (Y/N)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 6pm till 2am</td>
<td>$ /hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Montgomery County –
Sample Traffic Mitigation Plan
**SAMPLE TRAFFIC MITIGATION PLAN**

Company/Organization: **Global Solutions, Inc.**

Address: 5555 County Drive, Silver Spring MD 20910

Number of Full-time Employees: **300** Part-time Employees **0**

Submitted by: Tom A. Jones

Title: President

Signature: __________________________________________ Date: May 1, 2003

Here’s our plan to reduce gridlock in Montgomery County by offering the selected transportation benefits to our employees. In the first column, we’ve placed an *E* next to the strategies that we already have in place, and *N* next to the strategies that we will implement with this year’s Traffic Mitigation Plan. In the last column, we’ve described our current or planned efforts.

**E** = Existing Strategy  **N** = New Strategy  ***** = Required Strategy

<table>
<thead>
<tr>
<th>Traffic Mitigation Strategy</th>
<th>Employer Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*E Contact person designated to receive and distribute information</td>
<td>Ellen Davis, Human Resources Director 301-555-5555; <a href="mailto:edavis@globalsolutions.com">edavis@globalsolutions.com</a> We will notify the TMD in writing of any changes in this information</td>
</tr>
<tr>
<td>*E Information on transit/pooling/other commute alternatives distributed/posted regularly (furnished by TMD)</td>
<td>Information on transportation services is posted in the employee break room.</td>
</tr>
<tr>
<td>*N Facilitate TMD staff presentations to employees and HR/Administrative staff on commute information/alternatives on periodic basis</td>
<td>We hold an annual benefits seminar in the fall. We would like TMD Staff to attend to display information and answer employee questions.</td>
</tr>
<tr>
<td>*N Guaranteed Ride Home Promotion (free regional program offering emergency rides)</td>
<td>We promote the Guaranteed Ride Home program to our employees. We provide brochures to employees with their monthly transit benefit.</td>
</tr>
<tr>
<td>*N Annual Commuter Survey distributed to employees (short survey of transportation– supplied by TMD)</td>
<td>[Please describe your approach to gaining 80 percent participation from your employees] We will distribute survey to our employees via e-mail from our company president. We will also send an e-mail reminder.</td>
</tr>
<tr>
<td>*N ADA information provided (transportation services for people with disabilities)</td>
<td>We will provide disabled employees with information on the regional Metro Access program and Montgomery County’s Same Day Access program.</td>
</tr>
<tr>
<td>*N Permanent display area for TMD-provided bus schedules and other transportation information</td>
<td>We plan to install a transit map and brochure racks in our employee break room.</td>
</tr>
<tr>
<td>*N Compile information on yearly TMP activities and submit Annual Report</td>
<td>We will maintain a file on the promotion and implementation of the strategies selected above and include in our Annual Report to DPWT.</td>
</tr>
<tr>
<td>N Attendance at free CSS-sponsored meetings/workshops permitted for designated contact person</td>
<td>Ms. Davis will be permitted to attend four such meetings per year.</td>
</tr>
<tr>
<td>Traffic Mitigation Strategy</td>
<td>Employer Description</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td><strong>E</strong> Information on commuting alternatives provided to new employees (TMD can provide materials and/or attend orientations)</td>
<td>We inform new employees of our transit subsidy program and provide Metro pocket guide and Ride On route maps to assist them in transit planning.</td>
</tr>
<tr>
<td>Free or reduced rate parking for car/vanpools offered to employees</td>
<td></td>
</tr>
<tr>
<td>Preferred location and/or reserved parking for car/vanpools offered to employees</td>
<td></td>
</tr>
<tr>
<td><strong>N</strong> Bike amenities at worksite, such as racks, lockers, and showers (TMD may be able to supply)</td>
<td>We will arrange to have bike racks installed in our garage.</td>
</tr>
<tr>
<td>Transit/pedestrian amenities at worksite, e.g. sidewalks, benches, etc.</td>
<td></td>
</tr>
<tr>
<td>Carpool matching for employees (as part of free region-wide matching program, or can be on-site only)</td>
<td></td>
</tr>
</tbody>
</table>
| **N** Alternative work schedules:  
  __ Flex Time    __ Jobsharing  
  X Compressed Work Week  
  X Telecommute/Teleworking | We allow teleworking for some employees in special circumstances. We would be interested in formalizing this program and making it available to more employees. |
| **E** Tax-free monthly transit subsidies provided to employees, including Super Fare Share, Fare Share and Metrochek. | We participate in the Super Fare Share program. We joined in September 2000. Fifty employees currently participate in the program. We inform new employees about the subsidy at orientation. |
| **N** Maryland State Commuter Tax Credit for employers | TMD Staff explained that we qualify for the State’s 50 percent tax credit on our contributions to employees commuting costs up to $30/month. We will apply for credit this tax year. |
| Pre-tax payroll deduction for transit costs offered to employees (Saves employer & employee money) | |
| Transit passes/tokens offered for purchase at worksite (at full or reduced price) | |
| Subsidize employee parking and transit equally (if employee parking is currently subsidized, offer equal subsidy for transit costs) | |
| Ozone Action Days participation (regional program to alert people to dangerous air quality days) | |
| Other : Please Indicate | |

Please attach to cover letter and submit to:

Albert J. Genetti, Jr., Director, Department of Public Works and Transportation  
c/o Sandra L. Brecher, Administrator, Montgomery County Commuter Services  
8401 Colesville Road, Suite 150, Silver Spring MD 20910—301-565-5890 (fax)
Montgomery County –
Sample Annual Commuter Survey
ANNUAL COMMUTER SURVEY

Please return completed survey WITHIN 1 WEEK to the person who gave it to you, OR send to: MONTGOMERY COUNTY COMMUTER SERVICES, 8401 Colesville Road, Suite 150, Silver Spring, MD 20910

Say “Cheese!”

This survey is our yearly ‘Snapshot’ of Montgomery County Commuters.

Your employer is working with Montgomery County Commuter Services to improve our transportation system.

Your answers to this survey are very important!

Print Name & Phone Number for a chance to win a fabulous prize!

Print CLEARLY

Company/Organization: ____________________________________________ Date: ________________

1. Did you work at your usual place of employment yesterday? □ Yes □ No
   If no, please check one of the following, then skip to question 4.
   I was: □ Telecommuting □ On regular day off (non-compressed sch.) □ On leave (vacation, sick, maternity, etc.)
   □ On company business □ On compressed work week

2. What were your worksite arrival and departure times yesterday?
   Arrival: ____________________ □ am □ pm
   Departure: __________________ □ am □ pm

3. How did you travel to work yesterday? If more than one mode, check only the final mode you used to reach your worksite. Do not check “walked” if you walked to or from your car, bus, train station, etc.
   □ Walked (as my only method from home to work)
   □ Drove Alone (do not check if you drove a motorcycle/moped)
   □ Carpool Driver Including you, how many persons were in the carpool? __________________________
   □ Carpool Passenger
   □ Vanpool Driver Including you, how many persons were in the vanpool? __________________________
   □ Vanpool Passenger
   □ Casual Carpool or Slug Passenger
     (I rode with someone with whom I do not have a regular carpool arrangement)
   □ Bus, Metrorail, Amtrak, MARC and/or VRE
     (includes drive, walk, or shuttle to bus stop, station, or park-and-ride lot)
   □ Bicycle (as my only method of travel to and from the worksite)
   □ Motorcycle/Moped (as my only method of travel to and from the worksite)

4. How far do you live from your worksite (in miles)?
   □ 0 - 9.9 □ 10 - 19.9 □ 20 - 29.9 □ 30 - 39.9 □ 40 - 49.9 □ 50 or more

5. What is your home zipcode? ____________ ____________ ____________ ____________

6. If you drive alone to work, do YOU pay for some or all of your worksite parking? □ Yes □ No
   If YES, what is YOUR monthly cost for parking at your worksite?
   □ $1-$20 □ $21-$40 □ $41-$60 □ $61-$80 □ $81-$100 □ $100+

   Does your EMPLOYER pay for some or all of your worksite parking? □ Yes □ No
   If YES, what is your EMPLOYER’S monthly cost for your parking space at your worksite?
   □ $1-$20 □ $21-$40 □ $41-$60 □ $61-$80 □ $81-$100 □ $100+ □ Don’t Know

7. If you commute by any means other than driving alone, how much per month does your employer reimburse of your commuting expenses? (bus, Metrorail, carpool/vanpool, Amtrak, MARC, VRE, bicycle or walking)?
   □ $0-No Reimbursement □ $1-$20 □ $21-$40 □ $41-$60 □ $61-$80 □ $81-$100 □ $100 +

   8. If you usually drive alone to work, how likely would you be to switch to an alternative method (public transit, carpool, vanpool, bicycle) if you were offered the following? Select all that apply:
   a. A guaranteed ride home in an emergency □ Very Likely □ Somewhat Likely □ Not Very Likely □ Not At All Likely
   b. Flextime or compressed schedule □
   c. A monthly transit allowance □
   d. A monthly vanpool allowance □
   e. Free parking for carpool/vanpool □
   f. Free assistance to find a carpool or vanpool □
   g. Transit route and schedule information □
   h. Bicycle storage/shower facilities □

OVER PLEASE
Your responses help to improve transportation in Montgomery County!

- New county-wide transportation options, including Ride-On, Metrobus/Metrorail, MARC, MTA/Eyre Bus and free downtown shuttles
- Express Bus Service from Germantown and Gaithersburg to Bethesda
- One-Stop Commuter Express Store in Downtown Silver Spring
- FARE SHARE & SUPER FARE SHARE Transit Subsidy programs

### COMPLETE ONLY IF YOU WOULD LIKE TO RECEIVE FREE INFORMATION ON CARPOOLSING, VANPOOLSING, TRANSIT, THE GUARANTEED RIDE HOME (GRH) PROGRAM OR OTHER ALTERNATIVES TO DRIVING ALONE.

<table>
<thead>
<tr>
<th>Name:</th>
<th>____________________________________________________________________________________________________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Address:</td>
<td>____________________________________________________________________________________________________________________</td>
</tr>
<tr>
<td>Number/Street</td>
<td>Apt. #</td>
</tr>
<tr>
<td>____________________________________________________________________________________________________________________</td>
<td></td>
</tr>
<tr>
<td>Name of Employer/Agency:</td>
<td>____________________________________________________________________________________________________________________</td>
</tr>
<tr>
<td>Work Address:</td>
<td>____________________________________________________________________________________________________________________</td>
</tr>
<tr>
<td>Number/Street</td>
<td>Apt. #</td>
</tr>
<tr>
<td>____________________________________________________________________________________________________________________</td>
<td></td>
</tr>
<tr>
<td>Work Phone Number:</td>
<td>Fax Number:</td>
</tr>
</tbody>
</table>

**I start work at _____ a.m.** I can arrive ______ minutes **before** and ______ minutes **after** my normal time.

**I stop work at _____ p.m.** I can arrive ______ minutes **before** and ______ minutes **after** my normal time.

**PLEASE SEND ME THE FOLLOWING INFORMATION/SCHEDULES:** *(check all that interest you)*

<table>
<thead>
<tr>
<th>I Commuter Rail: MARC/VRE</th>
<th>I Metrorail</th>
<th>I Metrocheck</th>
<th>I MD Transit</th>
<th>I Guaranteed Ride Home program</th>
<th>I Metrobus</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Bicycling</td>
<td>I Park &amp; Ride lots</td>
<td>I Local/commuter bus:</td>
<td>I Other (specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CAR/VANPOOL MATCHLIST.** I can prefer to be: *(check all that interest you)*

<table>
<thead>
<tr>
<th>Carpool:</th>
<th>Driver</th>
<th>Rider</th>
<th>Alternate Driver</th>
<th>Neither</th>
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</thead>
<tbody>
<tr>
<td>Vanpool:</td>
<td>Driver</td>
<td>Rider</td>
<td>Alternate Driver</td>
<td>Neither</td>
</tr>
</tbody>
</table>

For a carpool/vanpool, please specify pickup location(s): __________________________________________________________

List the closest landmark to your home *(i.e., mall, shopping center, school)*: __________________________________________

**PLEASE ADD YOUR SUGGESTIONS AND COMMENTS ON HOW COMMUTER SERVICES CAN SERVE YOU BETTER:**

___________________________________________________________________________________________________________
___________________________________________________________________________________________________________
___________________________________________________________________________________________________________
___________________________________________________________________________________________________________
___________________________________________________________________________________________________________

**CALL 301-770-POOL (7665)**

COMMUTER SERVICES
8401 Colesville Road, Suite 150
Silver Spring, Maryland 20910
Montgomery County –
Marketing Sample
How Employers Implement TMPs

**BETHESDA**

“As a retail outlet with several shifts and employees who live all over the area, it’s difficult for us to coordinate carpools. We’ve found that the best way to inform employees about transit and other commuter services is through paycheck inserts, which they’re sure to see. The Transportation Management District has been tremendous — sending materials and helping us create our traffic mitigation plan. I would encourage any small business to call them for assistance in understanding the new law and meeting the requirements.”

— Stephen M. Smith, Comptroller, Strosniders Hardware

**NORTH BETHESDA**

“The North Bethesda Transportation Management District sent samples of traffic mitigation plans so we would know exactly how to create one. They also made gave us suggestions on how to make sure that all levels of the corporation were involved. Our employees have responded very positively. They like having the information available to them so they can research different options. The most popular is the tax-free transit subsidy, which saves them a lot of money.”

— Wendy L. Mock, Human Resources Manager, Social & Health Services, Ltd

**SILVER SPRING**

“Our employees are very excited about our transportation benefits program, and are eagerly anticipating the development of the new plan. We post all information on bulletin boards throughout the company, and invite comments and suggestions. The Silver Spring Transportation Management District (TMD) has been very helpful, providing us with advice and tips which would encourage our employees to consider alternate commute options, including more carpooling, telecommuting and bicycling. We are also promoting expansion of all the existing programs.”

— Alfreda Thomas, MayaTech Corporation

**FRIENDSHIP HEIGHTS**

“Our employees especially like Super Fare Share, and so does the company. It’s a nice savings for us. We also post information on commuting alternatives on our bulletin board and have a dispensing unit in our lunchroom with handouts from the Transportation Management District. We’re very happy with the program, and we’re doing all we can to reduce traffic in Montgomery County.”

— Jack Kilgallen, Facilities Management Manager, F-D-C Reports, Inc.
Appendix B:
Stakeholder Interviews Guidelines
Appendix: TMP Study Task 3 - Questions for Interviews per Group

Interview - Planning & Zoning and Transportation & Environmental Services

Questions

1. What is your interaction/responsibility with the TMP process? Please describe your last experience with the process.

2. Are the following TMP elements providing the information necessary to assess their potential effectiveness in containing traffic?
   a. Application
      i. Traffic Impact Statement
      ii. TMP
   b. Compliance - How effective are the following reporting tools in measuring the goals of the TMP program?
      i. Reports/Surveys
      ii. Fund Reports
      iii. Annual Reports

3. What are your general observations about the TMP process?
   a. Is there enough funding for the prescribed transportation activities?
   b. Is the TMP administration effective?

4. Enforcement -
   a. Please describe the Zoning Violation procedures.
   b. In your opinion, are there any other actions that could be taken to enforce the TMPs?

5. In your opinion, what aspect of the TMP program should be changed?

6. What are your suggestions for changing the TMP program?

Interview – City Attorney’s Office

Questions -

1. What is your interaction/responsibility with the TMP process?

2. What are your general observations about the TMP process? (both administrative and effectiveness)

3. What do you think about the following specific TMP elements:
   a. Application
      i. Traffic Impact Statement
ii. TMP

b. Compliance and
   i. Reports/Surveys
   ii. Fund
   iii. General Effects

c. Enforcement
   i. Zoning Violation

4. In view of the general response that residents and businesses give to the plan, how would you consider modifying the ordinance to achieve the reduction in traffic envisioned by the City through the TMPs?

5. Could a one-time TMP fee be assessed at the time of initial application for residential properties rather than a fee into perpetuity?

7. Have you considered modifying the ordinance by collecting the TMP funds not being spent as agreed and establishing a city-wide TMP fund?

7. In your opinion, what aspect of the TMP program should be changed?

8. What are your suggestions for changing the TMP program?

Interview – Developers and Developers’ Attorneys

Questions

1. Is the TMP program effective in controlling traffic from new development?

2. Could you share any other programs for traffic control of new development known to you?

3. What is your experience with the TMP process?

4. What are your general observations about the TMP process?
   a. Is there enough funding for the prescribed transportation activities?
   b. Would you favor a one-time payment for new traffic generated by a new project?

5. In your opinion, what aspect of the TMP program should be changed?

6. What are your suggestions for changing the TMP program?
Interview - Office Buildings and Retail

Questions

1. What is your interaction/responsibility with the TMP process? Please describe your last experience with the process.

2. From your end, how effective are the following reporting tools in measuring the goals of the TMP program?
   i. Reports/Surveys
   ii. Fund Reports
   iii. Annual Reports

3. What are your general observations about the TMP process?
   a. Is there enough funding for the prescribed transportation activities?
   b. Is the TMP administration effective?

4. Are you aware of the enforcement procedures for the TMPs?

5. In your opinion, what aspect of the TMP program should be changed?

6. What are your suggestions for changing the TMP program?

Interview - Residential Developments and Mixed Development

Questions

1. What is your interaction/responsibility with the TMP process?

2. What are your general observations about the TMP process?
   a. Is there enough funding for the prescribed transportation activities?
   b. Is the TMP administration effective?

3. Please describe your last experience with the process.

4. What transportation activities are in place in your site?

5. If there are no transportation activities, could you indicate the reason for that?

6. Please give your views with the reporting requirements (fund report, annual report and survey).

7. In your opinion, what aspect of the TMP program should be changed?

8. What are your suggestions for changing the TMP program?
Appendix C:
Recommendations Summary Table
## Appendix - Table of Recommendations

<table>
<thead>
<tr>
<th>Issue Identified</th>
<th>Details - Strengths/Constraints</th>
<th>Addressing Recommendations</th>
<th>How Addressed</th>
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<tbody>
<tr>
<td><strong>Residential Participation</strong></td>
<td>Resistance to participation/obligation</td>
<td>Pay-Only option, TMA option</td>
<td>Provide options to current model</td>
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<tr>
<td></td>
<td>Difficulty in finding effective administrator</td>
<td>Pay-Only option</td>
<td>No administration for residential developments</td>
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<td></td>
<td>Smaller development TMPs and TMPs away from transit have difficulty finding effective investments</td>
<td>Pay-Only option</td>
<td>Investment go directly to TMP District where impact is more probable</td>
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<tr>
<td></td>
<td>Broadening Goals</td>
<td>TMA option</td>
<td>Can invest where impact most likely</td>
</tr>
<tr>
<td><strong>Site-Based TMPs</strong></td>
<td>Lack Efficiencies of Scale</td>
<td>TMP Districts, TMA option, Pay-Only option</td>
<td>Pool resources for scale-efficient investments</td>
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<tr>
<td></td>
<td>Difficulty in finding effective administrator</td>
<td>TMP Districts, TMA option, Pay-Only option</td>
<td>Administration is consolidated</td>
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<td></td>
<td>Smaller development TMPs and TMPs away from transit have difficulty finding effective investments</td>
<td>TMP Districts, TMA option, Pay-Only option</td>
<td>Pool resources for scale-efficient investments</td>
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<tr>
<td></td>
<td></td>
<td>TMP Districts, TMA option</td>
<td>Possible automatic conversion to pay-only model following chronic non-compliance</td>
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<tr>
<td><strong>Consolidation</strong></td>
<td>Economies of scale</td>
<td>TMP Districts, TMA option</td>
<td>Consolidation models</td>
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<tr>
<td></td>
<td></td>
<td>Pay-Only option</td>
<td>Consolidation support, attrition of individual residential TMPs</td>
</tr>
<tr>
<td></td>
<td>Supports performance focus</td>
<td>TMP Districts, TMA option</td>
<td>Goals set for TMD districts, TMAs</td>
</tr>
<tr>
<td></td>
<td>Streamlined administration</td>
<td>TMP Districts, TMA option, Pay-Only option</td>
<td>Fewer administrators needed, administrators that believe in and can sell program benefits</td>
</tr>
<tr>
<td><strong>Enforcement</strong></td>
<td>City lacks levels of non-compliance responses</td>
<td>TMP Districts</td>
<td>Options to increase annual obligations for non-compliance, poor compliance</td>
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<tr>
<td></td>
<td></td>
<td>TMA option</td>
<td>Increased obligations can be set to match level of compliance issue</td>
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<tr>
<td></td>
<td></td>
<td>Pay-Only option</td>
<td>Option taken away if performance targets are consistently unmet.</td>
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<td></td>
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<td></td>
<td>Reducing compliance to simple payment for least compliant types of TMPs</td>
</tr>
<tr>
<td><strong>Investment of TMP funds</strong></td>
<td>Funding obligations have been ineffective in ensuring mitigation investments, especially at residential TMPs</td>
<td>Pay-Only option</td>
<td>Investment shifted based on likely impact</td>
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<tr>
<td></td>
<td></td>
<td>TMP Districts, TMA option</td>
<td>Pools resources for scale-efficient investments</td>
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<tr>
<td></td>
<td></td>
<td>Performance focus</td>
<td>Focus on program goals rather than means</td>
</tr>
<tr>
<td><strong>Performance Measures</strong></td>
<td>Directly address program goals</td>
<td>TMP Districts, TMA option</td>
<td>Allow target-setting based on specifics of individual areas - transit adjacency, mix of uses, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TMP Districts, TMA option, Pay-Only option</td>
<td>Avoids having to set performance measures for development with least obvious travel patterns and least concentrated traffic impacts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TMP Districts, TMA option</td>
<td>Shifts funds to help establish and meet performance measures within development's district, TMA area.</td>
</tr>
<tr>
<td><strong>TMP Transition following Property Transfer</strong></td>
<td>New management sometimes needs assistance in taking over active TMPs, particularly when previous management has been remiss</td>
<td>TMP District, Pay-Only option</td>
<td>TMP District staff is single source of program administration, enforcement, outreach and promotion. The Pay-Only option also may become attractive as condominium boards/ board members turnover</td>
</tr>
<tr>
<td><strong>Marketing Program</strong></td>
<td>Opportunity to better sell program benefits to participants and community</td>
<td>Broadening Goals</td>
<td>Communicate the spectrum of benefits from reducing overall traffic congestion and SOV reliance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TMP Districts, TMA option</td>
<td>Professional administrators working directly with employer benefits coordinators to market commuter benefits of TMP investment options</td>
</tr>
</tbody>
</table>

Cambridge, MA

Memo

To: Robert W. Healy, City Manager
From: Stephanie Groll, PTDM Planning Officer
Cc: Brian Murphy, Asst. City Manager for Community Development
Date: April 9, 2012
Re: 2011 PTDM Monitoring

This memo provides an update, as required by the Parking and Transportation Demand Management (PTDM) Ordinance, on required monitoring of projects with approved Large Project PTDM Plans. Since November 1998, any non-residential project that has created new parking has been subject to the PTDM Ordinance. The ordinance requires that projects adding parking to its facility, whose total is twenty or more spaces, prepare a plan, which is approved by the City. Plans include a commitment for a numeric reduction in the percent of people accessing the project via single occupant vehicle (SOV). Monitoring and reporting to show whether the SOV mode split commitment has been achieved is a requirement of all plans. Monitoring begins approximately one year after the new facility is occupied. For Small Project PTDM Plans with a total of five to nineteen parking spaces, a commitment to implement three transportation demand management measures is required, but there is no SOV mode-split commitment or annual monitoring.

Thirty-seven projects with PTDM approvals completed monitoring in 2012. Eleven small projects did not have monitoring requirements.

Projects Monitored

A wide variety of projects are represented among those reporting this year. They include a hospital, a theatre and cultural arts facility, the retail and office portions of a mixed-used building, educational facilities, a city library, an R&D lab building and a large, multi-building office/R&D development. PTDM reports now cover the commuting activities of more than 26,594 employees and 8,540 graduate and primary school students. Fourteen of the 2010 Top 25 Cambridge Employers submitted PTDM monitoring reports. In 2011, the city monitored 16,728 parking spaces, which served 8,674,043 square feet of non-residential space.

Monitoring reliability

Response rates to 2011 employee mode split surveys were generally high. Of the thirty-seven projects conducting surveys, thirty-six had response rates of 60% or greater, with ten projects reporting response rates higher than 75%. This type of response, coupled with bi-annual driveway/parking utilization monitoring, gives us confidence that the results are reliable.
Mode Split Results

Sixty-two percent of the monitored projects (twenty-three) met their PTOM mode split commitments for 2011. Projects meeting their mode-split commitments all showed SOV driving rates of less than those projected. Compliant mode splits ranged from a low of 0% SOV to a high of 59%.

Several factors contributed to the challenges faced by the fourteen projects that did not meet their commitments. Eleven, or almost 80%, of the projects that failed to meet their mode split commitment are located more than 1/4 mile from rapid transit. Further, almost all of the ratios of employment to parking spaces at the sites, with current employment levels, are not conducive to meeting the mode split commitments set in the approved PTDM plans. Three of these sites have space that is either unleased or under-occupied due to reductions in staffing or slower than anticipated hiring. This has led to an imbalance in the employee-to-parking space ratios. This appears to confirm national research that over-supply of parking contributes to higher SOV rates.

Projects receive monitoring response letters noting whether a project is in compliance and offering technical assistance for non-compliant projects. In some cases when a property has implemented all of its plan required TDM elements and still does not achieve desired SOV levels, we work with them to develop additional reasonable TDM measures to promote non-SOV travel. This has been a mutually cooperative process, not yet necessitating the utilization of the enforcement provisions contained within the PTDM ordinance.

In addition, six projects with special permit requirements, but no PTDM requirements, submitted reports on the status of implementation of TDM measures and/or their mode splits. Five of these projects were required to complete mode split surveys and reported employee mode splits of between 32% and 83% SOV.

TDM Measures Implemented

A wide variety of measures have been implemented in order to meet these mode split goals. While all PTDM plans include measures to promote non-SOV travel, the ordinance allows property owners and employers some flexibility in determining which measures best fit their particular circumstances. Measures typically implemented include MBTA pass subsidies of varying levels, reserved parking for carpools, extensive bicycle parking, showers and changing facilities for walk/bike commuters, employee-paid parking, shuttles to the Red, Green, and Orange lines, as well as commuter rail. Some projects have also employed techniques such as providing financial incentives for walking and biking, combining summer picnics with transportation information fairs, offering alternative mode commuters the opportunity to park occasionally, and using car sharing to reduce the need for personal vehicles to run errands or see clients during the day.

If you have any questions, please feel free to contact me. Thank you very much.

---

* A project may have a special permit but no PTDM plan for one of three reasons: 1) It was permitted prior to November 1998; 2) It is residential or 3) It added no new parking.
Cambridge Parking and Transportation Demand Management Plan
Checklist

Please include the following elements in your PTDM Plan. These are general categories, so you will need to develop the detailed descriptions based on the site context and specific land use you are proposing.

☐ Project information
  o Project name
  o Project address
  o Owner
  o Contact person
  o Contact address, phone number, fax number, email
  o Project description
  o Summary table:
    ▪ Number of previously registered parking spaces
    ▪ Number of new parking spaces listed by parking type (categories listed in the Ordinance are: residential, commercial, non-commercial, customer, employee, patient, student, client, or guest)
    ▪ Square footage of building with breakdown of uses
    ▪ Number of vehicle trips expected to be generated by the R&D project (if project is required to complete traffic impact study)
    ▪ Estimated number of employees
    ▪ Census tract number

☐ Employee mode split
  o Each project subject to the Parking and Transportation Demand Management Ordinance is required to commit to a specific, numeric reduction in the percentage of trips made to the site by single-occupant vehicle (SOV). The employee mode split commitment is based on the 1990 Journey to Work data from the U.S. Census Bureau for your Census tract number—a 10% reduction from the 1990 mode split:

  1990 mode split % * 0.90 = mode-split commitment %

  o The final PTDM plan should state this number clearly as the mode split goal for the project, along with a commitment to make reasonable efforts to achieve this goal.

☐ Customer/Visitor/Other mode split
  SOV mode-split commitment for non-employee groups will be determined by other baseline measures.
□ Nearby transit services
  o List all buses and subway lines that serve the site, and their distance from the site.

□ Nearby bicycle and pedestrian links
  o Describe the network of nearby bike/ped facilities and the quality of the surrounding bike/ped environment (ex. broken sidewalks, good connection to Minuteman bike path, etc).

□ Sustainable-mode promotions and incentives
  o Describe what transportation demand management (TDM) measures the project owner will use to reduce the number of SOV trips and encourage people to walk, ride a bike, take transit, and car/vanpool.

□ Parking management and SOV disincentives

□ Marketing programs
  o Describe marketing and education programs that promote and publicize all of the TDM measures that are available.

□ Monitoring and reporting plan
  o Describe the program of surveys, car and bike parking counts, driveway counts, and other reporting documents that will be used to track, assess, and report on the implementation of the entire TDM program.

□ Office of Workforce Development
  o Include the required commitment that the applicant and tenants will work with the Cambridge Office of Workforce Development to encourage hiring Cambridge residents. Susan Walsh of OWD (617-349-6259) can discuss ways to accomplish this. Cambridge residents are more likely to use sustainable modes to travel to work.

□ Corporate Officer Certification

□ Maps/drawings showing:
  o Location of site
  o Location of transit
  o Parking layout (to be approved by TP&T). Show all parking spaces for bicycles and motor vehicles, following zoning requirements and the City of Cambridge Bicycle Parking Guide:

Contact:
Stephanie Groll, City of Cambridge PTDM Planning Officer
344 Broadway Street, Cambridge, MA 02139
(617) 349-4673
sgroll@cambridgema.gov
Elk Grove, CA

Introduction

The City of Elk Grove is submitting the start up Transportation Demand Management (TDM) Plan to the Sacramento Area Council of Governments (SACOG). This plan explains the programs that the City of Elk Grove will implement to promote and encourage the use of alternative transportation within the City, reduce single occupant trips to employers within the City and to promote SACOG’s 511 Sacramento Regional Traveler Information Program.

Since the City is seeking to start becoming a Transportation Demand Management Outreach Partner in the middle of the cycle for funding, the City is requesting $12,000 to help start up TDM activities within the City limits and portions of south Sacramento. The City will commit another $12,000 in its own funding to support TDM activities for this fiscal year.

This TDM program is in its infancy and staff will strive to implement the programs that are listed in this start up plan. Some programs may not get implemented until the next Federal Fiscal Year and the City will include those programs in its work plan as well.

The City will perform this voluntary service to its employers and residents. The City does not have any plans to assess any fees or require membership from employers and residents to participate in its TDM programs. The City is modeling its TDM program after the City of Roseville and transit agencies in Washington State. The City has plans to implement a TMA in the future and will strive towards the implementation of one, which would benefit the City and the south Sacramento area.

The TDM program will be managed in the City’s Development Services Department, Transit Services Division. Within this division, the City has employed one full time transit system manager, one full time assistant transit manager, three part time transit service aides and two part time transit surveyors.

Demographics

The City currently has 130,874 residents and is projected to increase at least 7% annually for the next five years. There are also approximately 969 employers employing 21,736 people. The City currently covers an area of 42 square miles, is located 11 miles south of Downtown Sacramento and 11 miles north of the City of Galt.

Background

Currently, the City of Elk Grove does not have a Transportation Management Association (TMA) or a TDM program to promote alternative transportation. The City has adopted the County of Sacramento’s Trip Reduction Ordinance to help promote alternative transportation within the City limits. An update Trip Reduction Ordinance will be developed in the next fiscal year. Elk Grove Promenade, a regional shopping mall is preparing to open in late 2007, early 2008 and as part of the Transportation Systems Management Plan and Environmental Impact Report, the mall in conjunction with the City must implement a TDM/trip reduction program.
Program Summary

Listed below are programs that the City will undertake in the implementation of its TDM Program for fiscal year 2006-2007. The City estimates that 1,200 hours will be spent on TDM activities.

Task # 1 – Hire Part Time Transit Service Aide to focus on TDM Activities

The City will hire a part time person to handle the implementation of the TDM plan. The City will strive to search for a local resident that is familiar with outreach, establishing relationships and is familiar with transportation issues. This person will perform employer outreach, continue to maintain and enhance the existing employer network, participate in TDM Task Force and subcommittee meetings monthly, promote SACOG 511 and regional rideshare program, prepare reports regarding the TDM program, manage the commuter club page, develop a new Citywide Park & Ride, Bike and Trails Map and participate in various alternative transportation related events.

The City is a current member of the Association of Commuter Transportation (ACT) and has been designated as a Best Workplaces for Commuters. The Transit Service Aide will participate in ACT events and continue to encourage alternative transportation options to the City employees and contractors to continue to maintain the Best Workplaces for Commuters designation.

Task # 2 – Implement Emergency Ride Home Program for residents and employees in the City of Elk Grove

Any resident or employee in the City of Elk Grove who uses alternative transportation methods to go to work or school (i.e. riding bus, walking, bicycling, carpooling and vanpooling) will be eligible for the Emergency Ride Home Program. The program will also be extended to e-tran riders that purchase a monthly pass. The City will enter into an agreement with a local taxi cab company and/or with a rental car company to provide the service. This program will only be available for the following emergencies:

- An immediate family member suffers and emergency and you can't wait for your normal ride home.
- A serious problem arises at your child's school or daycare center.
- Your home or property is damaged by burglary, fire, etc.
- You are sick and can't wait for your normal ride home.
- Your ridesharing partner has an emergency and you have no way to get home.
- Unscheduled, approved overtime.

A person would need to register for the program online at www.sacregioncommuterclub.com. Once approved, the registrant will receive a one voucher to use on the taxi and/or rental car. Once the voucher is used, the person would need to send in the pink copy of the voucher and answer the questions on the voucher to receive another one. Only six can be used per person, per calendar year.
Task 3 – Employer Outreach in the City of Elk Grove and South Sacramento Areas

The City will begin employer outreach to all employers in the City of Elk Grove and certain areas of south Sacramento. The outreach will include the following:

- Maintaining the Employer Transportation Network
- Conducting Transportation Fairs
- Distributing 511, Rideshare and Transit Information Citywide
- Developing and Maintaining “Transportation Kiosks” at employers
- Conducting Quarterly Meetings and Training Sessions with Employee Transportation Coordinators (ETC’s)
- Conducting various promotions with ETC’s and employers to encourage the use of alternative transportation
- Signing up employers onto www.sacregioncommuterclub.com
- Distribute the Regional Online Survey to Employers
- Promote the Sacramento Region Best Workplaces for Commuters Program

Task # 4 – Support SACOG Regional Programs

The City will support SACOG regional programs including participating in Bike Commute Month, distributing the 511 brochures (Bike Commuter Guide, Park and Ride Lot Guide, Travelers Information Guide and Rideshare Guide), promote the regional vanpool incentive program, promote the www.sacregion511.org website for ride matching and other travelers information, promote 511 for seeking additional travelers and ridesharing information, seek additional joint park and ride lots for the purposes of riding transit, carpooling and vanpooling, maintain and update www.sacregioncommuterclub.com for zip codes 95615, 95624, 95632, 95638, 95639, 95641, 95693, 95758, 95823, 95829, 95832, participate in the regional online survey and develop campaigns to reduce the use of single occupant vehicles driving along State Route 99 and Interstate 5 from Elk Grove and South Sacramento residents.

Task # 5 – Seek to Form a Transportation Management Association, Develop a New City Trip Reduction Ordinance and Enforcement of the Current Trip Reduction Ordinance

The City will work towards the establishment of a Transportation Management Association (TMA) which may encompass the south Sacramento area and the soon to be develop County Service Area -3 (CSA-3). CSA – 3 has some ongoing funding to develop and implement a trip reduction plan and services for that specific area. The City will work to establish a steering committee to help facilitate the development of a TMA.

In conjunction with developing a TMA, the City will also work to develop a new City Trip Reduction Ordinance that would replace the currently adopted County of Sacramento Trip Reduction Ordinance.

Transit Services staff will continue to work with the Planning Department in the interim to enforce the current trip reduction ordinance. The current trip reduction ordinance
developed by the County of Sacramento requires developers constructing projects that exceed 100,000 square feet to provide various Transportation System Management and Trip Reduction elements, such as hiring an employee transportation coordinator, having alternative transportation information readily available, install bicycle amenities and facilities and developing joint use park and ride lots or providing preferential parking for vanpools and carpools. Transit Services staff will also work with existing projects that had conditions imposed on them to ensure compliance with the current Trip Reduction Ordinance.

**TDM Budget – Fiscal Year 06/07 – Program will begin January 2, 2007- September 30, 2007**

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<thead>
<tr>
<th>Task</th>
<th>Budget Amount</th>
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<tr>
<td>Task #1 – Hire Transit Service Aide</td>
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<td>Task # 2 - Emergency Ride Home</td>
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<td>Task # 3 – Employer Outreach</td>
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<td>Task # 4 – Regional Programs</td>
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<tr>
<td>Task # 5 – TMA</td>
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<tr>
<td>Request to SACOG</td>
<td>$12,000</td>
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<tr>
<td>City Match (included development of Ordinance)</td>
<td>$12,000</td>
</tr>
<tr>
<td><strong>Grand Total for TDM Activities</strong></td>
<td><strong>$24,000</strong></td>
</tr>
</tbody>
</table>

Each task will include City administrative time and marketing/promotional activities.

**Appendix**

A  Zip Code Map and Limits of the TDM Program in Elk Grove and South Sacramento Area

B  Local Employment Statistics

C  City of Elk Grove Adopted County of Sacramento Trip Reduction Ordinance
September 14, 2006

STAFF REPORT

APPLICATION RZ/FDP 2004-PR-044

PROVIDENCE DISTRICT

APPLICANT: Tyson Corner Holdings LLC and Tysons Corner Property Holdings LLC

PRESENT ZONING: C-4 – 4.9 acres
C-7 – 73.75 acres
Total – 78.65 acres

REQUESTED ZONING: PDC

OVERLAY DISTRICTS: Highway Corridor (HC) and Sign Control (SC)

PARCELS: 29-4 ((1)) 35A & 35C
39-2 ((1)) 2, 4 & 5

ACREAGE: 78.65 acres

FLOOR AREA RATIO (FAR): 1.76 (Development with Rail Option)
1.10 (Pre-Rail Option without subsequent phases)

OPEN SPACE: 19.4 acres – 25 percent (Development with Rail Option)
15.6 acres – 20 percent (Pre-Rail Option)

PLAN MAP: Mixed Use
PROPOSAL:  

*Development with Rail Option* – Redevelop the Tysons Corner Center as a 6,013,035 sq. ft. Transit Oriented Mixed-use Development consisting of 2,474,135 sq. ft. in the existing Regional Mall; 1,389,438 sq. ft. Office Development in Four Buildings; 266,513 sq. ft. in a Hotel (up to 300 rooms); 1,685,275 sq. ft. Residential Development yielding 950 to 1345 Multi-family Dwelling Units in Four Buildings; and, 197,674 sq. ft. of new Retail-type Commercial phased to the Future Extension of Metrorail through the Tysons Corner Urban Center.

*Development Prior to Rail Option* – In addition to the existing Regional Mall, permit an additional 490,076 sq. ft. Office, 266,513 Hotel and 480,875 sq. ft. Residential (up to 340 Multi-family Dwelling Units) prior to the Future Extension of Metrorail should that project be delayed.

STAFF RECOMMENDATIONS:

Staff recommends approval of RZ 2004-PR-044 subject to the execution of proffers consistent with the draft proffers contained in Appendix 1 and approval of the Conceptual Development Plan.

Staff also recommends approval of the following requested waivers and modifications:

- Waiver of the service drive requirement along Leesburg Pike (Rt. 7) and Chain Bridge Road (Rt. 123)
- Modification of the minimum 8-foot planting width for trees per Sect. 12-0702(2) of the Public Facilities Manual (PFM) to allow the planting areas that are less than 8 feet wide
- Waiver of the barrier requirement along the eastern boundary (adjacent to the Capital Beltway)
- Modification of the transitional screening yard requirements along the eastern boundary (adjacent to the Capital Beltway)
- Modification of the peripheral parking lot landscaping requirement for the parking structures located adjacent to Chain Bridge Road
- Waiver of the transitional screening yard and barrier requirements internal to the project
- Waiver of the interior parking lot landscaping requirements for the existing parking structures identified as Parking Terrace B, Parking Terrace C and Parking Terrace E
- Waiver to allow the use of underground stormwater management facilities with residential development pursuant to Par. 6-0303.8 of the PFM (see the report prepared by the Site Review Division, DPWES in Appendix 7)
- Approval by the Board of Supervisors pursuant to Sect. 2-414 of the Zoning Ordinance to allow a commercial building within 75 feet of the right-of-way of an interstate highway (the Capital Beltway – I-495)
• Modification to allow the pedestrian pathways shown on the CDP/FDP (sidewalks, the 25 foot wide sidewalk within the bus plaza and an internal loop trail) to meet the requirement for a trail along Chain Bridge Road west of Tysons Boulevard (With Rail CDP/FDP only)
• Waiver of the trail requirement along Chain Bridge Road between the site entrance opposite Tysons Boulevard and the ramp for the Capital Beltway
• Modification of the trail along Leesburg Pike to allow combined sidewalk/trail that is consistent with the streetscape recommendations for the Tysons Corner Urban Center
• Waiver of the trail requirement within the right-of-way of the Beltway
• Modification of the recommended on-road bike trail on ShopsTysons Boulevard to allow a ten foot wide off-road bike trail
• Modification of the number of loading spaces required on site

Staff further recommends that the Final Development Plan be approved by the Planning Commission subject to the approval of the rezoning by the Board of Supervisors.

It should be noted that the main/trunk sewer lines serving this property may be inadequate. Should the Board approve this application, that approval does not guarantee that sewer capacity will be available to serve this site, at such time as the applicant elects to develop the property.

It should be noted that it is not the intent of staff to recommend that the Board, in adopting any conditions proffered by the owner, relieve the applicant/owner from compliance with the provisions of any applicable ordinances, regulations, or adopted standards.

It should be further noted that the content of this report reflects the analysis and recommendation of staff; it does not reflect the position of the Board of Supervisors.

For information, contact the Zoning Evaluation Division, Department of Planning and Zoning, 12055 Government Center Parkway, Suite 801, Fairfax, Virginia 22035-5505, (703) 324-1290.
DESCRIPTION OF THE APPLICATION

The applicant, the owner of the existing approximately 2.5 million sq. ft. super-regional mall, known as the Tysons Corner Center, is proposing to redevelop the mall property as a mixed-use development by adding new uses along the periphery of the existing mall building. The applicant has proposed a transit-oriented mixed use project in four phases that will add four office buildings, four high-rise residential buildings, a hotel and retail-type commercial uses to the property. The proposed development is oriented toward the planned future Metrorail station to be located at the intersection of Chain Bridge Road (Rt. 123) and Tysons Boulevard. The applicant has filed a rezoning application to rezone 78.65 acres currently zoned C-4 (4.9 acres) and C-7 (73.75 acres) to the PDC (Planned Development – Commercial) District. Portions of the application property are also located in the Highway Corridor (HC) and the Sign Control (SC) Overlay Districts.
The applicant has filed two alternative Conceptual/Final Development Plans. One, Development with Rail ("Rail CDP/FDP"), is phased to future rail service to Tysons Corner. The draft proffers state that the first phase of the Rail CDP/FDP could be implemented upon the finalization of a financing agreement for the proposed extension of Metrorail through the Tysons Corner Urban Center. Development of the subsequent phases, Phases 2 through 4, is tied to the actual construction and operation of the rail project.

The proposed development program for the Rail CDP/FDP is summarized in the following chart.

<table>
<thead>
<tr>
<th>TYSONS CORNER CENTER – WITH RAIL CDP/FDP</th>
<th>Gross Floor Area (GFA) In Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing 2,474,135²</td>
</tr>
<tr>
<td></td>
<td>Main Mall Building 2,474,135³</td>
</tr>
<tr>
<td></td>
<td>Residential¹ 791,331³</td>
</tr>
<tr>
<td></td>
<td>Office 551,638</td>
</tr>
<tr>
<td></td>
<td>Hotel² 266,513</td>
</tr>
<tr>
<td></td>
<td>Retail Type Commercial 25,274</td>
</tr>
<tr>
<td></td>
<td>Total Phase in 1,342,700</td>
</tr>
<tr>
<td>Phase 1</td>
<td>499,275</td>
</tr>
<tr>
<td>Phase 2</td>
<td>518,000</td>
</tr>
<tr>
<td>Phase 3</td>
<td>298,000</td>
</tr>
<tr>
<td>Phase 4</td>
<td>320,000</td>
</tr>
<tr>
<td>Totals</td>
<td>2,474,135³</td>
</tr>
</tbody>
</table>

1) The total number of dwelling units is a range of 950 to 1345 dwelling units.
2) The hotel is to have a maximum of 300 rooms.
3) The GFA for the existing mall building includes a planned but un-built addition to the existing Macy’s building of up to 75,000 sq. ft. allowed under the current zoning envelope. It does not include the strip shopping center building (42,922 sq. ft.) near Chain Bridge Road that currently contains Circuit City, which is proposed to be demolished. Site Plan approval for 47,578 sq. ft. of the 75,000 sq. ft. addition to the Macy’s building noted above is pending.
4) Phase 2 also includes a 10,000 sq. ft. transit pavilion not included in this chart.
5) The Rail CDP/FDP includes an option to allocate an additional 50,000 sq. ft. within Phases 3 and/or 4. This additional gross floor area is included in the total residential GFA for residential and in the total GFA for the project.

The second, Development Prior to Rail ("Pre-rail CDP/FDP"), addresses the limited possibility that the planned extension of Metrorail service through Tysons Corner does not go forward, or does not do so on the current schedule. The Pre-rail CDP/FDP proposes three buildings, an office building, a high rise residential building and a hotel in the location of Phase 1 of the Rail CDP/FDP. After the Pre-rail CDP/FDP is developed, once a rail project is funded, constructed and in operation through Tysons Corner, the draft proffers would allow the phases 2, 3 and 4, respectively of the Rail CDP/FDP to proceed.

The Pre-rail CDP/FDP would allow the applicant to construct a mix of uses not allowed under the current C-4 and C-7 zoning, and also would limit the additional Gross Floor Area (GFA) to the amount of GFA allowed but un-constructed under by the current zoning. The Pre-rail CDP/FDP includes: the existing mall building – 2,474,135 sq. ft.,
residential – 480,875 sq. ft. (up to 340 multi-family dwelling units), office – 490,076 sq. ft., hotel – 266,513 sq. ft. (300 rooms) and 25,274 sq. ft. of retail-type commercial uses.

Pre-rail CDP/FDP

Waivers and Modifications

The following waivers and modifications are requested with both scenarios.

- Waiver of the service drive requirement along Leesburg Pike (Rt. 7) and Chain Bridge Road (Rt. 123)
- Modification of the minimum 8-foot planting width for trees per Sect. 12-0702(2) of the Public Facilities Manual (PFM) to allow the planting areas that are less than 8 feet wide
- Waiver of the barrier requirement along the eastern boundary (adjacent to the Capital Beltway)
- Modification of the transitional screening yard requirements along the eastern boundary (adjacent to the Capital Beltway)
- Modification of the peripheral parking lot landscaping requirement for the parking structures located adjacent to Chain Bridge Road
• Waiver of the transitional screening yard and barrier requirements internal to the project
• Waiver of the interior parking lot landscaping requirements for the existing parking structures identified as Parking Terrace B, Parking Terrace C and Parking Terrace E
• Waiver to allow the use of underground stormwater management facilities with residential development pursuant to Par. 6-0303.8 of the PFM (see the report prepared by the Site Review Division, DPWES in Appendix 7)
• Approval by the Board of Supervisors pursuant to Sect. 2-414 of the Zoning Ordinance to allow a commercial building within 75 feet of the right-of-way of an interstate highway (the Capital Beltway – I-495)
• Modification to allow the pedestrian pathways shown on the CDP/FDP (sidewalks, the 25 foot wide sidewalk within the bus depot and an internal loop trail) to meet the requirement for a trail along Chain Bridge Road west of Tysons Boulevard (with rail CDP/FDP only)
• Waiver of the trail requirement along Chain Bridge Road between the site entrance opposite Tysons Boulevard and the ramp for the Capital Beltway
• Modification of the trail along Leesburg Pike to allow combined sidewalk/trail that is consistent with the streetscape recommendations for the Tysons Corner Urban Center
• Modification of the recommended on-road bike trail on ShopsTysons Boulevard to allow a ten foot wide off-road bike trail
• Modification of the number of loading spaces required on site.
• Waiver of the trail requirement within the right-of-way of the Beltway

Reduced copies of the two proposed combined Conceptual/Final Development Plans are included in the front of this report. The Rail CDP/FDP is presented first and the Pre-rail CDP/FDP is second. The applicant’s draft proffers are included as Appendix 1. The applicant’s affidavit is Appendix 2 and the applicant’s statements regarding the application are included in Appendix 3.

An application for a Planned Development District, such as the PDC District is subject to the General Standards and the Design Standards found in Part 1 of Article 16, Development Plans. The most relevant standards are contained in Appendix 15: Selected Excerpts from the Zoning Ordinance.

LOCATION AND CHARACTER (See Graphic on page 6)

The 78.65 acre application property is the major portion of the 102-acre area bounded by the Capital Beltway (I-495) on the east, Chain Bridge Road (Rt. 123) on the north, International Drive (Rt. 6034) on the west and Leesburg Pike (Rt. 7) on the south. (This area is also identified in the Comprehensive Plan as Land Unit P of the Tysons Corner Urban Center). The properties located along Towers Crescent Drive and the office building at 8116 Leesburg Pike are also located within the area bounded by the above noted roads and are also within Land Unit P. The application property is currently developed with the approximately 2.5 million square foot Tysons Corner Center mall. Access to the property is
from Chain Bridge Road, International Drive and Leesburg Pike; I-495 is a limited access facility. The following chart addresses the surrounding area; additional description regarding the surrounding development is provided following the chart.

<table>
<thead>
<tr>
<th>Direction</th>
<th>Use</th>
<th>Zoning</th>
<th>Plan Map</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North</strong> (Rt. 123)</td>
<td>Future Tysons Central 123 Transit Station</td>
<td>N/A</td>
<td>Rail Station</td>
</tr>
<tr>
<td></td>
<td>Tysons II (Undeveloped, but proffered as Office and Residential Uses Service Stations)</td>
<td>PDC</td>
<td>Mixed Use</td>
</tr>
<tr>
<td><strong>South</strong> (Rt. 7)</td>
<td>Fairfax Square (Office and Retail)</td>
<td>PDC</td>
<td>Office</td>
</tr>
<tr>
<td></td>
<td>Retail (Service Station, Fast Food Restaurant and Retail)</td>
<td>C-5</td>
<td>Office</td>
</tr>
<tr>
<td></td>
<td>Towers Crescent (Office)¹</td>
<td>C-4</td>
<td>Office</td>
</tr>
<tr>
<td><strong>East</strong> (I-495)</td>
<td>Regency &amp; Encore (High Rise Residential) Across I-495</td>
<td>R-30</td>
<td>20+ du/ac</td>
</tr>
<tr>
<td><strong>West</strong></td>
<td>8116 Leesburg Pike (Office)</td>
<td>PDC</td>
<td>Mixed Use</td>
</tr>
<tr>
<td></td>
<td>Retail, Eating Establishment, Financial Institution</td>
<td>C-7 &amp; C-4</td>
<td>Retail &amp; Other</td>
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</tbody>
</table>

¹ Towers Crescent is also located east of the southern wing of the property that extend to Leesburg Pike.

**Metrorail Station:** The planned Tysons Central 123 Transit Station is to be located on the northern side of Chain Bridge Road. The current plans for the Metrorail extension through Tysons Corner show the rail line to be elevated at this station, although an underground alternative is under study. The pedestrian entrance to the station is to be located in the northwestern quadrant of the intersection of Tysons Boulevard and Chain Bridge Road. The plans for the Metrorail extension include a pedestrian bridge over Chain Bridge Road to the application property, and a bus transfer area on the application property.

Tysons II: Tysons II is a mixed use project that covers approximately 106 acres located north of Chain Bridge Road, across from the application property. Current development within Tysons II includes office buildings, the mall known as the Galleria/Tysons II, and a hotel. In 2003, pursuant to the approval of PCA 84-D-049-5, the development permitted within Tysons II was increased to reflect the rail-related intensities and land uses contained in the adopted Comprehensive Plan. The accepted proffers for Tysons II allow the rail related development to proceed only if the Full Funding Grant Agreement is finalized for the extension of rail.

Tysons II is divided into four land bays. The two land bays, Land Bay II and Land Bay IV, immediately across Chain Bridge Road from the application property, are undeveloped at this time. Approximately 1.6 million square feet of office space in four buildings up to 26 stories in height were approved in Land Bay II, with an option to convert
one of the buildings to a hotel. Approximately 725,000 square feet of high rise multi-family residential was approved in Land Bay IV.

Other Development to the North: There are two service stations located on the south side of Chain Bridge Road and east of its intersection with International Drive that are not part of the application property. These properties are accessed from Chain Bridge Road and from a service road located on the southern side of the service stations.

East

Capital Beltway: The eastern boundary is largely formed by the Capital Beltway (1-495) which is a ten-lane divided, limited access facility that is shown on the Transportation Plan to be widened to 12 lanes. High-occupancy vehicles lanes (HOV) are also included on the Plan, and there is a proposal under consideration by VDOT for the construction of high-occupancy toll (HOT) lanes. Two high rise multi-family residential projects, the Encore and the Regency, are located across the Capital Beltway from the application property.

South

Towers Crescent: The Towers Crescent development is located to the east and south of the application property where the property does not abut the Capital Beltway or Leesburg Pike. Towers Crescent is zoned C-4. It is approved pursuant to RZ 1998-PR-058 for development of seven office buildings, with a total of 1.33 million square feet of office, including retail uses on the lower levels, at 1.71 FAR. The Towers Crescent property is approximately 30 feet above the grade of the portion of the application property that is adjacent to it. Of the seven office buildings, three have been constructed. The office buildings adjacent to the mall property are either constructed or are to be constructed on top of a five level parking facility, increasing the difference in grade between the two properties.

In order to provide a pedestrian connection between these two main components of Land Unit P, the accepted proffers for RZ 1998-PR-058 include a commitment to create a plaza, with stairs and an elevator down to the level of Fashion Boulevard in the northwest corner of Towers Crescent, which is in the vicinity of the southeast corner of the Nordstrom's building in the Tysons Corner Center. This commitment is phased to occur with the construction of Building F within the Towers Crescent development. The proffers also include a commitment to cooperate with the owners of the Tysons Corner Center with regard to the construction of a pedestrian bridge across the mall ring road to connect to the mall's parking structure, identified as Parking Terrace C on the CDP/FDP submitted by this applicant. A proffered condition amendment has been submitted by the owner of Towers Crescent to convert the un-built area to multi-family residential buildings. The application has been accepted and is scheduled for a public hearing before the Planning Commission on ---.

Across Leesburg Pike: The area across Leesburg Pike from the application property includes Fairfax Square, a mixed use development that includes offices, with ground floor retail, and a movie theater. Some small retail properties are located to the west of Fairfax Square. Access to Fairfax Square is located at the traffic signal that also controls the
intersection of Fashion Boulevard and Leesburg Pike. The smaller retail properties include a service station, two fast food restaurants and a jewelry store. There is a service drive in front of this block, which is located between Aline Drive and Old Gallows Road.

West

The western boundary is formed by International Drive, a six-lane divided facility with turn lanes. There are two access points to the application property from International Drive. One is located opposite Fletcher Street and the second is opposite the entrance to the Crate and Barrel store located at the intersection of International Drive and Chain Bridge Road. The portion of the application property located adjacent to International Drive is developed with a parking garage, Parking Structure D. The site’s frontage on International Drive does not include a sidewalk. The area across International Drive from the mall is identified in the Comprehensive Plan as Land Unit O.

BACKGROUND

Zoning

<table>
<thead>
<tr>
<th>Application</th>
<th>Zoning</th>
<th>Area</th>
<th>Action</th>
<th>Date</th>
</tr>
</thead>
<tbody>
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<td>RZ A-404</td>
<td>R-1 to C-D</td>
<td>82 acres</td>
<td>BOS approval</td>
<td>7/18/62</td>
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<tr>
<td>RZ B-332</td>
<td>R-1 to C-D</td>
<td>4.17 acres</td>
<td>BOS approval</td>
<td>3/9/66</td>
</tr>
<tr>
<td>RZ B-786</td>
<td>C-D to OH</td>
<td>8.55 acres</td>
<td>BOS approval</td>
<td>2/7/68</td>
</tr>
<tr>
<td>RZ 1999-PR-024</td>
<td>C-4 to C-7</td>
<td>4.09 acres</td>
<td>Dismissed</td>
<td></td>
</tr>
</tbody>
</table>

The initial zoning approval for a regional shopping center at this location occurred in 1962; the mall opened for business in the late 1960s. Subsequently, the mall was expanded several times, by converting the former truck tunnel under the mall to a second, lower level of shops, by adding anchor stores such as Nordstrom’s and Lord & Taylor’s, through the construction of parking garages around the perimeter of the mall building, and other small expansions to the mall building. The latest expansion of approximately 310,000 square feet replaced the former department store space on the easternmost end of the mall building and opened in 2005. The existing conditions on site are shown on Sheets 62 and 63 of the Rail CDP/FDP. A site plan, 006399-SP-015-2 is pending bonding approval to allow an expansion of the Macy’s building on the westernmost end of the mall building. The existing zoning allows an expansion to the Macy’s building of up to 75,000 sq. ft. Currently, there are no proffers that govern the Tysons Corner Center property.

Signage

In addition to signs that are otherwise permitted by Article 12, Signs, of the Zoning Ordinance, signs not otherwise allowed by the Zoning Ordinance have been approved for the site pursuant to the provisions of Par. 2 of Sect. 12-304. This paragraph allows the
Board of Zoning Appeals to grant a special permit to allow additional sign area, additional sign height, or a different arrangement of sign distribution for a regional or super-regional shopping center. With the approval of SPA 89-P-034 on May 18, 2005, two previous special permits addressing individual signs (SP 88-P-006 and SP 89-P-034) were consolidated into one approval affecting the whole shopping center, including the recent addition noted above. The approved special permit amendment included two sign plans. One addressed wayfinding signage that exceed the size normally permitted (2 sq. ft.) consisting of three types of signs – pole mounted signs that are 7.5 sq. ft. in size and two sizes of pylon signs, 23 sq. ft. and 39 sq. ft. The second addressed signs located on the shopping center building that exceed the 200 sq. ft. maximum area permitted for an individual sign area which identify Tysons Corner Center, the major anchor stores and the new multi-plex theater signs and any signs that are located on the façade of a parking garage that identify the shopping center and individual stores, which would not otherwise be permitted. The records regarding these applications are on file with the Department of Planning and Zoning.

The two existing free-standing signs at the main entrances to Tysons Corner Center, one located on Leesburg Pike and the other on Chain Bridge Road, exceed the current limitations on the size of free-standing signs (they are 569 sq. ft. in sign area each – 40 sq. ft. is permitted in a Sign Control Overlay District). These signs were installed pursuant to permits issued prior to the adoption of the current provisions related to signs contained in Article 12, Signs, and are grandfathered. However, some of the road improvements included in the draft proffers would require that these signs be relocated. The applicant has filed a comprehensive sign plan application to allow these signs to be relocated and to incorporate the signage approved pursuant the last special permit amendment. The application states that the proposed signs would be 556 sq. ft. in sign area and 34 feet tall. This application, CSP 2004-PR-044, is scheduled for a public hearing before the Planning Commission on January 18, 2007.

Parking Reduction

On July 21, 2003, the Board of Supervisors approved a parking reduction for the Tysons Corner Center. This approval was amended September 12, 2005, to allow a minimum of 10,300 parking spaces as the required parking for the Tysons Corner Center (see Appendix 4). The amended parking reduction was approved based on the parking accumulation pattern for the expanded mall building, including the new multi-plex movie theater and the existing 60,000 sq. ft. of office that is part of the mall building. The parking reduction included development conditions that allowed for the expansion of the Macy’s building and some changes of uses within the mall without requiring that the parking reduction be amended when “it is determined by the Director that those increases do not affect the parking accumulation associated with the parking reduction.”

Dulles Corridor Metrorail Expansion

The Dulles Corridor Metrorail project, an extension of the Metrorail system through Tysons Corner to the Dulles International Airport (IAD) and Loudoun County, is proposed currently to be constructed in two phases (see graphic below). Phase I will start from the
Orange Line between the East Falls Church Station and the West Falls Church Station and will generally follow the Dulles Airport Access Road (DAAR) to Chain Bridge Road (Rt. 123); from there, the extension will go through the Tysons Corner Urban Center, first along Rt. 123 and then along Rt. 7 before returning back to the DAAR. Four stations are proposed within Tysons Corner: two stations on Chain Bridge Road (Rt. 123): Tysons East Station and Tysons Central – Rt. 123 Station; and two stations along Leesburg Pike (Rt. 7): Tysons Central – Rt. 7 and Tysons West Station. A station at Wiehle Avenue and the DAAR will be the terminus for Phase I. Phase I construction is anticipated between 2007 and 2012, with revenue operations expected to commence in mid to late 2012. Fairfax Connector and Metrobus service is expected to be adjusted to serve the stations and 2,300 parking spaces will be available at the Wiehle Avenue station; commuter parking will not be provided within Tysons Corner.

Phase II of the Metrorail extension will include three additional stations along the DAAR within Fairfax County at Reston Parkway, Herndon/Monroe and Rt. 28. Another station will be located at the main terminal of Dulles International Airport and two stations will be located along the DAAR in Loudoun County. Phase II construction is anticipated to occur between 2008 and 2012. Phase II Metrorail service may begin operations in 2013.
The project has recently completed Preliminary Engineering for Phase I. An application has been submitted to the Federal Transit Administration (FTA) to commence Final Design for Phase I. The project anticipates submitting an application for a Full Funding Grant Agreement (FFGA) for Phase I to the FTA in early 2007, with execution of the FFGA in late spring of 2007. The execution of the FFGA will ensure that funding is available for construction. In addition, the Governor of Virginia and the Metropolitan Washington Airports Authority (MWAA) are finalizing an agreement for MWAA to takeover completion of the Metrorail Extension through the Dulles Corridor.

Tysons Corner Study

The current Comprehensive Plan provides a vision for substantial change in the Tysons Corner Urban Center so that it will become more pedestrian and transit oriented. The current Comprehensive Plan recommendations for the Tysons Corner Urban Center contain numerous objectives including to:

- Create an improved sense of place and function,
- Create centralized areas of relatively more intense development,
- Encourage development of additional housing, including affordable units,
- Encourage mixed-use development,
- Develop a cohesive pedestrian system, and
- Develop mass transit options as well as other transportation strategies.

On March 21, 2005, the Board of Supervisors established the Tysons Coordinating Committee to work with staff on a special study to evaluate and review the rail related land use recommendations of the current Comprehensive Plan for the Tysons Corner Urban Center. On May 23, 2005, the Tysons Coordinating Committee’s role was clarified and its membership was expanded by the Board of Supervisors. The Tysons Coordinating Committee’s mission is to formulate Plan revisions that will: promote mixed use, facilitate transit-oriented development, enhance pedestrian connections throughout Tysons, increase the residential component of the density mix, improve the functionality of the area, and provide for amenities and aesthetics such as public spaces, art and parks.

COMPREHENSIVE PLAN PROVISIONS (Appendix 5)

Plan Area: II
Planning District: Tysons Corner Urban Center
Land Unit: Land Unit P, Sub-unit P-1

The pending application for the redevelopment of the Tysons Corner Center from a regional mall to a mixed use transit-oriented development has been filed pursuant to the current Comprehensive Plan recommendations.

The Comprehensive Plan provides the following guidance on the land use and the intensity/density for the property. In the Fairfax County Comprehensive Plan, 2003 Edition,
Area II, Tysons Corner Urban Center, as amended through January 27, 2003, Land Unit Recommendations, Land Unit P, Sub-unit P1, pages 135-137 state:

“Land Unit P is comprised of about 107 acres, bounded by Route 123 on the north, the Capital Beltway on the east, Route 7 on the south and International Drive on the west. Existing development is predominantly retail and office use, including Tysons Corner Center, the region's first super-regional mall which draws thousands of shoppers from the metropolitan area and beyond. The land unit also contains a hotel and Tycon Tower, the largest office building in Tysons Corner.

Land Unit P comprises the majority of the Tysons I Activity Center in the Core, the largest activity center with about 130 acres. The land unit includes Tysons Corner Center (a super-regional mall), an office development, a hotel, and some community retail uses. Because properties in the area were developed individually over time, the existing uses function as separate entities. The vision for the entire Activity Center (including Land Units P and O) is to use redevelopment as an opportunity to interconnect all portions of the Activity Center with the dominant element, the shopping mall. The purpose is to create a mixed-use area that integrates all components: regional retail, office, hotel, community retail, as well as possible future convention facilities and housing. In the event rail is extended through Tysons Corner, a rail station might be planned in proximity to Land Unit P.

A major plaza should be provided within this Activity Center that is large enough for open-air activities such as musical performances by small groups before a lunchtime audience. A variety of benches, low walls and/or steps would provide abundant seating. Public art is encouraged to make the space appealing and attractive. Landscaping should be provided that is attractive in all seasons and shades the seating in the summer. Water features such as fountains and pools are encouraged because of their cooling effect in hot weather. When new development or redevelopment is considered in a development proposal within this land unit, the appropriateness of providing a major plaza should be evaluated as part of the development proposal's urban design analysis.

Circulation improvements for this land unit should occur only if development intensifies on the Tysons Corner Shopping Center site. Improvements to the private road that is part of the Tysons Corner Loop Road at the eastern edge of the property should be made, if feasible, including limiting access points from parking lots to the road.

Guidance for evaluating development proposals for this land unit is contained in the Area-wide Recommendations, the Land Unit Recommendations and the Development Review Guidelines Sections of the Plan. Specific Guidance for uses and intensities as envisioned in the Plan are provided in the sub-unit text below. Achieving planned intensity is predicated
upon successfully incorporating these recommendations and guidelines into development proposals. In addition, urban design and transportation guidelines are set forth in the Development Review Guidelines Section.

**SUB-UNIT P-1**

Sub-unit P-1 is planned for retail, office, hotel, support retail and service uses up to 0.8 FAR. Also encouraged are public/semi-public uses, a conference center and/or convention center, as well as flexibility to include recreational uses. The existing super-regional shopping center, Tysons Corner Center, is a significant component of Tysons Corner which should be encouraged to expand, modify and diversify its structures and uses as appropriate in order to remain a vital component of the metropolitan area’s retail sector.

![FIGURE 35](image)

**LAND UNIT P**

**TYSONS CORNER URBAN CENTER**

**Option Without Rail**

As an option, the sub-unit is appropriate to intensify as a mixed-use development with office, hotel, retail, support retail and service uses (such as daycare) up to 1.2 FAR (for all nonresidential uses). In any development proposal submitted under this option, planned nonresidential intensity can be
replaced by residential use as provided under the Alternative Land Use Guidelines in the Area-wide Recommendation section. Also encouraged are public/semi-public uses, a convention center and/or conference center, as well as flexibility to include recreational uses.

Under this option, this area offers significant opportunities to provide urban design amenities which could better integrate development in this land unit. Development proposals should show how new development will integrate with surrounding areas through the provision of pedestrian linkages and urban design amenities. The portion of the private road that is part of the Tysons Corner Loop Road in this sub-unit should be improved by limiting the number of access points from adjacent parking lots on the shopping center site, if feasible, when significant intensification occurs adjacent to this private road. (See Area-wide Recommendations, Transportation, for Collector Roads.)

Option with Rail

If a rapid rail station site is selected and programmed for design and construction in proximity to this sub-unit, mixed-use development with an intensity (for all nonresidential uses) up to 2.0 FAR is appropriate for the area within 1,000 feet of the station platform. Sites between 1,000 and 1,600 feet of the station platform are appropriate for mixed-use development with intensities (for all nonresidential uses) between 1.2 and 1.65 FAR. Compatible transitions of height, bulk and intensity to adjacent development should be considered within the 1,600 feet area. In any development proposal submitted under this option, planned nonresidential intensity can be replaced by residential use as provided under the Alternative Land Use Guidelines in the Area-wide Recommendations section.

Height Limit: Up to 270 feet located near Route 123, but not exceeding 150 feet adjacent to Land Unit O and along Route 7. On the east side of the mall, buildings facing across the Capital Beltway (I-495) to the Regency or Encore Apartments should be oriented so that the longest dimensions of the buildings do not parallel I-495. No building on the east side of the mall should exceed the height of the Tycon Towers office building (at 205 feet) or otherwise undermine the character of that building as a gateway to Tysons Corner. A variety of building heights should be provided with buildings adjacent to Route 123 at or near the greatest height in order to provide a major focal point for the core area. Building heights at or near the top of the limit can be achieved if the result is more usable open space, improved pedestrian circulation and urban design amenities. If a rapid rail station site is located in proximity to this Sub-unit, maximum building heights within 1,600 feet of the station platform may increase up to 30%. All transit related height increases should be consistent with the Building Height Guidelines and the resultant height should not adversely impact the character and development of adjacent and nearby lands or neighborhoods. (See the Building Heights Map, Figure 10, and Building Heights Guidelines)."
The Comprehensive Plan Map shows this property to be planned for Mixed Use. Plan Citations from the Area Wide Recommendations are included as part of Appendix 5 attached at the back of this report.

CONCEPTUAL/FINAL DEVELOPMENT PLANS (Reductions at front of staff report)

As noted above, the applicant has submitted a two part CDP/FDP one that is identified by this report as the Rail CDP/FDP; and, other as the Pre-rail CDP/FDP.

Description of the Rail CDP/FDP

Title of CDP/FDP: Tysons Corner Center (Development with Rail Option)
Prepared By: Patton Harris Rust & Associates
Original and Revision Dates: November 15, 2004 as revised through September 1, 2006

The following describes the Rail CDP/FDP in five parts: a general description followed by detailed descriptions of each of the four phases.

Description of Project

The redevelopment of the Tysons Corner Center from an automobile oriented regional shopping center to a mixed-use transit oriented development is based on the addition of several urban design and land use elements. These include: 1) adding new residential and office uses, that are in proportion to the existing retail uses; 2) focusing the development near the future rail station; 3) providing enhanced pedestrian connections to the future rail station, within and through the approximately 78.65 acre application property, and to adjacent properties; 4) integrating useable open space into the new development through plazas and park spaces; and, 5) adding retail-type commercial uses required by residents and office tenants to the site. These changes are proposed to occur while retaining the existing mall, allowing the mall to operate during the redevelopment of the property, and allowing it to continue to function as the successful major draw to the application property it is currently.

The proposed development will occur in four phases, located at various locations around the periphery of the mall building application property, as illustrated on page 1 of this report. The draft proffers commit that the phases would not be constructed until certain events associated with the implementation of the future rail project occur. Phase 1 can be constructed only after funding for the rail project is assured, and an agreement is executed between the rail project team and the applicant with regard to coordination of the two projects. Phase 2 may be constructed only after construction of the rail project has commenced. The third phase may be constructed when the rail project through Tysons Corner is in operation, and the fourth phase may be constructed when the rail project has been operating for two years. The third and fourth Phases may be reversed in their order of development.
The existing approximately 2.5 million square foot mall building and the general pattern of the private roads around the site will remain largely unchanged. The proposed development is concentrated near the future Metrorail Station, as demonstrated by the following chart, which shows that Phases 1 and 2 include over 70 percent of the proposed development.

<table>
<thead>
<tr>
<th></th>
<th>Residential</th>
<th>Percentage of Residential</th>
<th>Office &amp; Hotel</th>
<th>Percentage of Office &amp; Hotel</th>
<th>Percentage of Office Hotel and Residential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>499,275</td>
<td>31 %</td>
<td>818,151</td>
<td>50 %</td>
<td>41 %</td>
</tr>
<tr>
<td>Phase 2</td>
<td>518,000</td>
<td>31 %</td>
<td>530,400</td>
<td>31 %</td>
<td>31 %</td>
</tr>
<tr>
<td>Phase 3</td>
<td>298,000</td>
<td>18 %</td>
<td>26,100</td>
<td>2 %</td>
<td>10 %</td>
</tr>
<tr>
<td>Phase 4</td>
<td>320,000</td>
<td>19 %</td>
<td>281,300</td>
<td>17 %</td>
<td>18 %</td>
</tr>
<tr>
<td>Total</td>
<td>1,636,275</td>
<td></td>
<td>1,655,951</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Rail Orientation:** As described above and illustrated in the plan view of the pedestrian elements of the Rail CDP/FDP on Page 17, the proposed development is oriented towards the proposed rail station at the intersection of Tysons Boulevard and Chain Bridge Road. Chain Bridge Road in this area is an eight-lane road, with dual left turn lanes and right-turn lanes, for a total of a fourteen lane section. Additionally, the ramps to and from the Capital Beltway end and/or begin near the intersection of Tysons Boulevard/Chain Bridge Road/Tysons Corner Center entrance. Given this circumstance, the pedestrian environment at the street level is adversely affected by the number of lanes, the number of turning movements, the volume of vehicles and the speeds the vehicles are traveling. Therefore, the plans for the rail project include a bridge over Chain Bridge Road to provide a safe crossing for pedestrians to move between the station and Tysons Corner Center. However, the rail project’s alignment of the bridge reflects the existing development at Tysons Corner Center; the Rail CDP/FDP proposes to relocate the on-site landing of the bridge closer to the entrance road. The relocated bridge would connect to the application property at a multi-level entrance pavilion to be constructed by the applicant in the northeastern corner of Phase 2. The realignment of the pedestrian bridge has been discussed with the project team and is to be addressed by the agreement with the rail project team that is referenced in the draft proffers.

**Pedestrian Access:** The upper level of the mall is above grade at the northern end of the site and essentially at grade at the southern end of the site. The Rail CDP/FDP provides a two tiered pedestrian circulation system to connect the various portions of the property; this consists of elevated connections primarily in the northern portions of the site, and a street level system. These two levels of pedestrian circulation are connected both visually and physically. The visual connections include the entrance pavilion, a water feature near the Chain Bridge Road entrance that consists of a waterfall cascading down steps from one of the new elevated plazas to the street level and a staircase in front of the office building in Phase 2. Physical connections
include the staircases, elevators that connect the pedestrian level to the parking under the buildings, and the elevator and escalators in the entrance pavilion.

The Rail CDP/FDP provides a continuous elevated pedestrian pathway from the rail station to the existing shopping center, as well as to Phases 1 and 2 of the proposed development. The pedestrian bridge that will connect to the rail station over Chain Bridge Road is at approximately the same elevation as the upper level of the mall. A second elevated walkway connects this bridge to Phase 1. This elevated system has been designed to physically separate pedestrians from the main vehicular travelways at the entrance to the site, so as to provide a safe and attractive means of walking to and around the site. In addition, an elevated connection will be provided between the site and the adjacent Towers Crescent development. Furthermore, the applicant has committed to keep the mall open to pedestrian traffic at least one hour before and after the operating hours of metro. As such, the mall itself becomes part of the site’s comprehensive pedestrian system. The second tier of the pedestrian network consists of the street level sidewalks, which occur internal to the site, as part of the larger streetscapes at the peripheries of the site, and as connections to off-site properties. The two levels of the pedestrian network merge at the southern end of the mall. Sheets 9 (illustrated below) and 10 of the CDP/FDP depict the pedestrian network.
The street level pedestrian network also includes the trail links through the site including the bike path along the eastern boundary and across the Westpark Drive bridge; the missing links along the site’s frontage on International Drive; trail connections to the future bus depot; and a loop trail to provide a continuous loop trail for the future residents and office tenants.

Integration with Adjacent Properties: The draft proffers and the Rail CDP/FDP include enhanced pedestrian connections to adjacent properties, as follows. The connection across Chain Bridge Road will be enhanced by the widening of the Westpark Drive Bridge to include sidewalks on both sides of the road, and an additional on-road bike lane, and by the pedestrian bridge to the rail station. Along International Drive, the proffers include a commitment to provide an interim sidewalk on the site’s frontage where there is no sidewalk currently, and to provide an urban streetscape, a pedestrian signal and an enhanced crosswalk at the Fletcher Street intersection with Phase 4, when that phase is constructed. As part of Phase 3, an urban streetscape is to be created along Leesburg Pike, with connections from that sidewalk into the site. As discussed previously, the applicant has also proffered to participate in the construction of an elevated pedestrian bridge between the mall property and the Towers Crescent property. The draft proffers also provide for the possibility of an alternative location for that connection provided that the two property owners agree on a mutual proposal to submit for review and approval by the County.

Parking: The redevelopment of this property to a mixed-use transit-oriented development will displace some of the existing parking. The displaced parking and the new parking required for the new uses will be provided within new parking structures constructed with Phases 1, 2 and 3, and with the expansion of the Parking Terrace A, located adjacent to International Drive, and parking underneath the residential building in Phase 4. The construction of new parking will be staged so as to ensure that adequate parking is provided for all uses prior to the demolition of existing parking spaces. This is illustrated by the parking tabs and other information on Sheet 3 of the CDP/FDP.

The two existing parking terraces located adjacent to the new wing of the mall building, Parking Terraces C and E, and Parking Terrace B, located adjacent to Leesburg Pike, will be retained. The parking for Phase 1 will be located under the new buildings and the elevated plaza level, with seven levels below grade and 2 above ShopTysons Boulevard. Prior to the demolition of Parking Terrace D (where Phase 2 is proposed), Parking Terrace A, located adjacent to International Drive, will be expanded by adding five levels on top of the existing four levels. Parking for Phase 2 will be located under the elevated plaza for that phase, with three levels generally above grade and six levels below grade. Six underground levels of parking are proposed under the portion of Phase 3 to be located adjacent to the mall building. Most of the parking for Phase 4 will have been constructed with the expansion of Parking Terrace A; however, two levels of underground parking will be constructed under the residential building to serve that use.

Plazas and Active Recreation Facilities: As noted above, one of the major benefits associated with the conversion of the site to a mixed use, transit oriented
development is the provision of useable outdoor spaces. Within each of the Phases, the Rail CDP/FDP includes plazas that will contain public amenities such as outdoor gathering and seating areas, fountains, public art, private and public recreation areas, and what are described as “animated façade areas”. The animated façade areas are illustrated on the CDP/FDP and further described in the draft proffers as areas along the new buildings and the existing mall building that are designed to provide visual interest to passing motorists and pedestrians by including entrances into an individual establishment and/or windows that provide views into the retail spaces. Animated façade areas are also located at the lower level of the residential buildings in Phases 3 and 4, along Leesburg Pike and along International Drive. Illustrations of animated façade areas are included with the illustrative graphics provided for Phases 1, 2 and 4 in the CDP/FDP.

The plazas and animated façade areas in Phases 1 and 2 are generally placed along the main elevated pedestrian pathways; the Phase 2 plaza is located one story above those pathways. The main plaza in Phase 3 is a “Community Green” located at street level that includes a water feature. Phase 4 contains a large public plaza, the Sky Terrace, to be constructed on top of the parking garage. The Sky Terrace is shown with a restaurant, an outdoor performance area, a children’s play area and gardens. A dog park is proposed at one of the entrances to the site from International Drive. The following illustrates the overall recreation facilities to be included in the Rail CDP/FDP.
Each of the proposed phases will contain a combination of public and semi-private active recreation facilities. The public recreation facilities include the ice skating rink, two children’s play areas, the dog park and other facilities that will be open to the public. Semi-private facilities include recreation facilities for the residents, including a swimming pool and other private open space adjacent to the each residential building. Basketball and tennis courts, open to all residents, are proposed within Phase 2 and on top of the parking garage in Phase 4 (the courts in Phase 4 will be installed with the construction of the expanded garage prior to the demolition of Parking Terrace D for Phase 2). Additionally, the draft proffers include a commitment to provide a limited service fitness center (equipment and facilities but not staffing) that is not less than 1,000 sq. ft. in size within each office and residential building.

**Transportation:** Notwithstanding that the rail station is planned adjacent to Tysons Corner Center, the impacts of the additional vehicular traffic generated by the proposed mixed use development on the road network in Tysons Corner were also addressed. Based on a traffic study prepared for the applicant, then further refined to address the comments of staff, the draft proffers address the impacts of the proposed development utilizing four different strategies.

The first strategy is expanding the transportation options available at Tysons Corner Center. The site currently contains a major bus depot for eight bus routes. The rail station will provide another transit option, as will the additional bus connections to be available at the new bus depot on Chain Bridge Road, and the bus routing changes resulting from the construction of rail. In addition, the draft proffers include a commitment to fund a study of the existing shuttle programs in Tysons Corner, and of the feasibility of creating a circulator system within Tysons Corner. Furthermore, the pedestrian improvements discussed above will better connect this site to the development north of Chain Bridge Road, across International Drive, and to Towers Crescent. Bicycle paths through the site will provide planned trail links through the site interconnecting the portion of Tysons Corner south of Leesburg Pike with the portion located north of Chain Bridge Road. As a result, Tysons Corner Center will become more readily accessible by many modes of transportation.

Second, because Tysons Corner Center will no longer be primarily just a single shopping center use, more activities will be available for residents, office workers and shoppers. Therefore, the proposed mixed use project will provide a synergistic combination of uses on site: work, play, entertainment, daily shopping needs, other types of shopping, and other services, which would typically be reached by driving but which will now be accessible by walking.

The third element is a proffered commitment to support a significant transportation demand management (TDM) program to reduce the number of vehicle trips on the nearby roadway network. While the first two items listed above are major components of a successful TDM program, a successful TDM program should also include strategies to further reduce reliance on single occupant vehicles. In addition, a TDM program must include the monetary resources and staff to provide marketing, information, transportation benefits or subsidies, branding, coordination among
various stakeholders, tele-work opportunities, coordination with regional efforts, among other items. In addition, it is critical for such a program to include specific trip reduction goals. The applicant’s program, as discussed in more detail in the transportation section of this report does all that and more. The TDM program also provides for resources to remedy any shortfalls in the proffered goal for the reduction in the number of trips, and for a penalty to be paid by the developer if goals are not met. Most importantly, the drafts proffers state that if the proffered trip reduction goals are not met, the third and fourth phases of development cannot be built until such time as the proffered goals are met. This is the first instance where an applicant has made a commitment to limit future development if the proffered TDM goals are not satisfied; and, in staff’s opinion, this sets an important precedent. The TDM plan will be subject to the review and approval of the County, includes monitoring to determine whether the goals are being met, requires periodic coordination, review and approval of revised plans by the County, and requires that any changes to the program to address shortfalls in meeting the trip reduction goals be approved by the County.

Finally, the draft proffers and the development plans include road improvements and on-site signalization to allow vehicles to move onto, off of and through Tysons Corner Center more easily. Proffered improvements to the roads immediately adjacent to the property include widening the Westpark Drive bridge to four lanes with on-road bicycle lanes, widening Chain Bridge Road and International Drive, widening on both sides of Leesburg Pike between International Drive and the interchange with the Beltway, and signal modifications associated with those improvements. The draft proffers include commitments to funding the design of the interchange at International Drive and Chain Bridge Road shown on the Comprehensive Plan and to review and, if approved by VDOT, re-time the signals along Leesburg Pike between Old Gallows Road and the DAAR.

Stormwater and BMPs: When the site was initially developed in 1968, detention was not required; the proposed redevelopment will not result in an increase in the amount of impervious area, so additional detention is not required. Nevertheless, the applicant has proffered to a thirty (30) percent reduction in the peak flows from the site with the development of the rail related development program. In addition, the draft proffers commit the applicant to reduce the phosphorous loading in water discharged from the site by fourteen (14) percent. To accomplish these proffered goals, the Rail CDP/FDP includes several locations for underground sand filters and Filterra devices. In a separate commitment, the draft proffers also commit to provide certain Low Impact Development (LID) techniques on the property; the detention and water quality treatment achieved by these features is to be in addition to the other proffered goals. The (LID) techniques include designing the Community Green in Phase 3 with the features of an intensive green roof; the installation of eight cisterns within the property, the use of porous pavement within a surface parking lot; the provision of an infiltration facility on the site; and, the use of plaza landscaping to reduce the heat island effect. The proposed locations of these features are shown on the sheet entitled “Preliminary Stormwater Management Plan”.
Phase 1

*General Description:* Phase 1 is to include three new high-rise buildings and a one story addition to the mall building at the plaza level, as summarized below:

1. a 351 foot tall, up to 26-story, residential building with up to 355 dwelling units and 13,116 sq. ft of retail-type commercial in a 499,275 sq. ft. gross floor area building, Building 1A;
2. a 320 foot tall, up to 18-story, office building (551,638 sq. ft.), Building 1B;
3. a 300 foot tall, up to 20-story hotel with a maximum of 300 rooms and 4,400 sq. ft. of retail-type commercial in a 266,513 sq. ft. building, Building 1C; and,
4. 7,756 sq. ft. of retail-type commercial added to the exterior of the mall building, Building 1D.

The northern boundary of Phase 1 is Chain Bridge Road and the ramp to the Capital Beltway. As discussed above, there is a grade change of up to approximately 45 feet between Chain Bridge Road and the plaza level for Buildings 1A and 1B. This grade differential is accommodated by an architectural block wall that is constructed in tiers.
that contain niches. The niches are planted with vines or other plant material that will form horizontal elements along the edge of each tier. Further, each tier is to be lit to provide night-time views of the breaks in the height of the wall. Finally, to soften the edge of the wall, ornamental trees are proposed to be planted along the fire lane at the top of the wall to screen the wall of the parking garage. A portion of the wall includes a sound attenuation wall.

Pedestrian Movements: The street level of Phase 1 is generally located at the elevation of ShopTysons Boulevard, elevation 434 (identified in the diagram as “Grade Level”). As discussed previously, the street level pedestrian pathways are not intended as the primary pathways; the main pedestrian movements occur at the elevated plaza level. Vertical circulation points are identified by circles on the diagram at the right.
The portion of the Loop Trail in this phase follows the fire lane. Where the fire lane ends, the loop trail is cantilevered from the retaining wall.

The loop trail connects to the pedestrian and bike paths proposed as part of the widening of the Westpark Drive bridge, and to the bike trail along the eastern boundary of the property. As part of the reconstruction of the Westpark Drive Bridge, pedestrian elements will be added to the signal and crosswalks will be installed where Westpark Drive and ShopTysons Boulevard intersect.

In addition, as part of this phase, the applicant has proffered to construct a pedestrian bridge from Parking Terrace C to Towers Crescent. The proffers and the CDP/FDP include two alternative alignments, one that reflects the location of the bridge connection proffered with Towers Crescent; the second is this applicant’s preferred alignment. The draft proffers state that the applicant will cooperate with Tower Crescent to choose the preferred alignment, subject to the County’s approval, and to jointly fund construction of the bridge.

**Vehicular Circulation:** All vehicular access to the parking garages, the common access/drop off area for Buildings 1A and 1B and the drop off area for the hotel, is from ShopTysons Boulevard, as shown on the diagram to the right. A traffic signal is proposed to be installed on ShopTysons Boulevard (identified as “Ring Road” to the right), just east of the portion of the mall building that currently is occupied by Lord & Taylor.

**Parking:** As noted above, parking for Phase 1 is located in two parking garages; one common 9-level garage located under the plaza platform for Buildings 1A (residential) and 1B (office). Six of the levels are underground and three are above the street level. A second six level parking garage is proposed under the hotel. The hotel parking includes three underground levels (below street level) and three partial levels above street level but below the elevated plaza that connects to the mall. Street level drop off areas for each building are also provided. There are two access points to the parking garages under Buildings 1A and 1B. The garage under the hotel is to be
accessed from an entrance under the plaza between the hotel and Lord & Taylor. There is no access into the parking garages for Phase 1 from Chain Bridge Road or from the entrance road into the site from Chain Bridge Road. There are to be a total 2,541 parking spaces provided in the two garages, approximately 242 spaces will be available for parking for the mall.

Plazas: There are four elevated plazas in Phase 1: 1) the plaza in front of Buildings 1A and 1B; 2) an open area behind Buildings 1A and 1B overlooking Chain Bridge Road; 3) a semi-private terrace for the residential building; and, 4) the main plaza located near the mall and adjacent to and west of the hotel building, as described below.

The bridge linking Phase 1 and Phase 2 across the main entrance road into Tysons Corner Center connects to Phase 1 at the plaza level and adjacent to the proposed residential building (Building 1A). This connection occurs at a 50 foot wide public plaza area, part of which is covered by an overhang of Building 1A, below the semi-private recreation area for that building. An animated façade area with retail-type commercial uses is included in Building 1A at the plaza level. An elevator with access to the public spaces and separate from the main core of the building is shown at the eastern end of this building, providing access to the parking garage below the buildings. The semi-private plaza with a swimming pool and outdoor seating areas is to be located one level above the plaza. The lobby for the office building is located at the southwestern corner of that building. On the north side of Buildings 1A and 1B, along Chain Bridge Road, is a thirty
foot wide area that will contain a fire lane and be planted with trees. This is illustrated above as part of the discussion of the northern edge of Phase 1.

The main plaza for Phase 1 extends from the plaza in front of Buildings 1A and 1B, across ShopTysons Boulevard to the mall. The area over the road is eighty (80) feet wide and is to be planted with trees. A special pavement treatment extending from between Buildings 1A and 1B to the mall entrance identifies the pathway. Between the hotel and the shopping center, this plaza widens to approximately 110 feet and includes a seasonal ice rink with a shade structure and art installations in front of the hotel. Approximately 4,400 sq. ft. of retail-type commercial uses are to be placed within the hotel building, along the exterior of the existing mall building. The plaza also includes an outdoor seating area.
Phase 2

General Description: Phase 2 is located to the west of the main entrance road to the site from Chain Bridge Road. It includes two high-rise buildings near Chain Bridge Road and two one-story commercial structures adjacent to the existing mall on either side of a new entrance to mall (near Macy's):

1. Building 2A is an 351 foot tall, up to 26-stories, multi-family residential building with 518,000 sq. ft. of GFA and a maximum of 408 dwelling units;
2. Building 2B is a 320 foot tall, up to 18-story office building, with 520,400 sq. ft. GFA. The lower two levels include 23,800 sq. ft. of retail-type commercial uses; and,
3. Buildings 2C and 2D contain a total of 24,700 sq. ft. of retail-type commercial uses and will be constructed on either side of a new entrance to the second level of the mall.

Phase 2 also includes the 10,000 sq. ft. entrance pavilion that is the terminus for both the pedestrian bridge that crosses Chain Bridge Road to the rail station and the pedestrian bridge to Phase 1. Both pedestrian bridges will be at level with the second level of the shopping mall or what is described in this report as the plaza level. A new bus depot is proposed at street level, along Chain Bridge Road.
Pedestrian Circulation: Pedestrian activities in Phase 2 occur at various elevations. The first is the street level which descends approximately 20 feet in grade along Chain Bridge Road from the western boundary of the site to the entrance road. The second is the main pedestrian level which is at the same level as the elevated plazas and includes a covered pedestrian path along the office building (Building 2B) between the entrance pavilion and the new entrance to the mall. The third is the plaza between Buildings 2A and 2B, which is one level above the plaza level.

The following section through the plaza between the two high rise buildings from the entrance pavilion to the mall illustrates the various levels where activities occur in Phase 2.

The following illustration shows the change in grade and the animated façade along the north/south façade of the Phase 2 office building. The lower level is the entrance road from Chain Bridge Road to the ring road. The elevated pedestrian pathway, the second level, connects the entrance pavilion on the right of the illustration and bridge over the ring road to the entrance to the mall on the left side of the illustration.
The following illustrates the entrance pavilion toward the bus depot as seen from Chain Bridge Road. The segment of the loop trail from the westernmost end of Phase 2 (the right hand side of the illustration) is shown connecting to the entrance pavilion. Below the cantilevered pedestrian walkway are canopies covering the bus depot. Left of the entrance pavilion are the bridge to the rail station and the elevated pedestrian path to the mall. The left side of the illustration includes the pedestrian bridge across the entrance road to Phase 1.

Vertical connections include steps along the entrance road, and steps and elevators at the southwest corner of the office building and within the entrance pavilion. In addition, the loop trail can be used to access International Drive and Phase 4. In addition, a trail connection westward along the ring road and up to the northernmost entrance to Tysons Corner Center from International Drive allows a pedestrian to climb the grade between the new bus depot and International Drive. From this point, a pedestrian can also access the plaza between the two buildings via the fire lane that meets the ring road adjacent to the lobby to the residential building.

_Vehicular Circulation:_ As part of the construction of Phase 2, the entrance to the site from Chain Bridge Road is to be reconfigured. The new layout was designed to simplify the decision making process for the driver entering the site and to allow more time for a decision, thus reducing the possibility of interference with through traffic on Chain Bridge Road. After entering the site, traffic will be directed to the area between Lord & Taylor and Phase 2, where a vehicle can either go to the west on the ring road or circle back to ShopTysons Boulevard to the east. In the alternative, traffic can continue to the ring road and travel westward...
between Phase 2 and Macy’s. Traffic on the ring road will also be able to access ShopTysons Boulevard at the western edge of Phase 1.

All access to the parking garage under Buildings 2A and 2B will be from the segment of the ring road between Phase 2 and the Macy’s building. The ring road in this area has a raised median and median breaks are provided at each of the proposed entrances to the garage. Each building includes a drop-off area outside of the main travel lanes. The drop off area for Building 2A, the residential building, is at the western end of that building; it is a loop driveway located at the lobby entrance to that building and provides access to the grasscrete fire lane behind the buildings. The drop off for Building 2B is located along the main entrance road approximately 120 feet from the intersection.

**New Bus Depot:** Access for transit vehicles to the new bus depot is directly from Chain Bridge Road; use by other vehicles will be precluded. The transit vehicles will enter the bus depot from the west and exit the bus depot at the eastern end onto the entrance road into Tysons Corner Center. From there, the transit vehicles will utilize the internal circulation to access the surrounding public street network. Direct egress onto Chain Bridge Road is not desirable because that would interfere with the intersection of the entrance road and Tysons Boulevard. A bus stop area sufficient for up to four buses is shown. Shrubs and a barrier are proposed in the median separating the bus lane from the main travel lanes of Chain Bridge Road to deter pedestrians from crossing this section of Chain Bridge Road.

As illustrated below, the bus depot will be adjacent to the northern wall of the Phase 2 parking deck. A twenty-five foot wide area between the bus stops and the wall will provide for pedestrian circulation and will be partially covered by canopies that are to be attached to the garage wall. The bus depot can be accessed at street level by pedestrians. The vertical circulation within the entrance pavilion will allow pedestrians coming from the mall, Phase 1 and the rail station to reach the bus depot.

**Parking:** Parking will be provided in a parking garage located under the main portion of Phase 2. Seven levels of parking are proposed to be underground and three levels above ground. To ensure that there is adequate parking on-site during the
construction of Phase 2, prior to the demolition of existing Parking Terrace D, five levels of parking will be added to Parking Terrace A. There are a total of 2,494 parking spaces shown in the Phase 2 garage; approximately 2,000 parking spaces are required to meet the Zoning Ordinance requirements for the office and residential buildings (the exact number is dependent on the types of uses located within the animated façade areas in the office building).

Plazas: There are two main plazas proposed with this phase, the plaza at the reconfigured entrance to the mall near Macy’s, and a plaza between the two high rise buildings.

The plaza at the new entrance to the mall will be located above the southern end of the entrance road. A cascading water feature that is to be a signature feature along the entry road from Chain Bridge Road starts at the plaza level and then descends to an island within the entrance road. This cascading water feature will also provide a visual connection between the elevated pedestrian level and the street level.

The first illustration that follows depicts the plaza at the new mall entrance and the water feature as seen from the pedestrian bridge across the main entrance in the distance and a portion of the plaza between the two Phase 2 buildings. The second illustration is a portion of the cover illustration that includes the water feature at the entrance road and a view of the plaza between the two buildings and illustrates the pedestrian connections to the rail station and to Phase 1.
The open space plaza between the two buildings will contain both public space and semi-private recreational space associated with the residential building. The public open space will consist of a grassy area between the two buildings with an approximately 25 foot wide area between the residential building and the edge of the parking deck. This will allow pedestrians to travel between the ring road at the western end of this phase and the entrance pavilion. A sound attenuation wall is proposed to screen this area from highway noise. The required fire lane will be surfaced with grasscrete or other similar treatment. The semi-private area will be segregated from the rest of the plaza by a “green screen divider” and will contain a swimming pool and half court basketball for the residents of that building, as illustrated in the following section.

Phase 3

General Description: Phase 3 is located on the west side of Fashion Boulevard, the access into Tysons Corner Center from Leesburg Pike and is split into two parts.

The first part, illustrated on the right, includes a 205 foot tall, sixteen story residential building (Building 3A) with up to 282 dwelling units (298,000 sq. ft.) and 25,800 sq. ft. of retail-type commercial uses on the first level. This building will be constructed south of Nordstrom’s and east of the wing of the mall containing LLBean and Bloomingdales. Another major feature of this portion of Phase 3 is the Community Green to be constructed concurrently with the residential building. It is located immediately south of Building 3A and on top of a six level parking structure.
The second part of Phase 3 is depicted in the illustration to the right. Building 3B fronts onto Leesburg Pike and is located between that road and Parking Terrace B, in the northwest quadrant of the intersection of Fashion Boulevard and Leesburg Pike. It includes a 65 foot tall, 2-story building with office (26,100 sq. ft) on the second floor and retail (30,000 sq. ft.) on the first floor.

Pedestrian Circulation: The pedestrian circulation for this Phase occurs at street level, which is at the same general elevation as the second level of the mall. A new mall entrance is proposed in the corner of the mall adjacent to the residential building. The new entrance will provide the most direct link between the Phase 3 residential building and the future rail station.

A sidewalk along Fashion Boulevard will connect the two parts of Phase 3 and improve pedestrian access from Leesburg Pike through the application property. A second connection from Leesburg Pike into the application property is shown west of Parking Terrace D. There is an existing stairway and sidewalk providing access from the existing office building at the intersection of Leesburg Pike and International Drive.

The loop trail also runs along this portion of Fashion Boulevard, on the side of it that is to be developed in Phase 3. The loop trail will include bike lanes and a separate pedestrian path along Fashion Boulevard.
**Vehicular Circulation:** The existing vehicle circulation along Fashion Boulevard and the road between Bloomingdale’s and Parking Terrace B will be generally unchanged, except for the addition of turn lanes, the addition of a traffic signal at the intersection of those two roads, and the widening of the outer lanes to fifteen feet wide to accommodate bicycles. Vehicular access to the parking deck under Building 3A and to the Community Green will be provided from an entrance off Fashion Boulevard; a second entrance is shown from the travel aisle between the mall building and the Community Green. Access to the existing loading area under the mall building will be retained under Building 3A. A drop off area for the residential building is shown on the north side of that building and opposite the Community Green.

There are no vehicular access points to Building 3B from Leesburg Pike; all access to that building will be from the rear and through Parking Terrace B. Loading access is shown from Fashion Boulevard and behind the building.

**Streetscape:** Along Leesburg Pike, the applicant is proposing a streetscape that complies with the current Comprehensive Plan streetscape recommendations along Leesburg Pike, including a double row of large deciduous trees and the inclusion of street activities, including outdoor dining, as shown below.

**Parking:** As noted above, parking for the residential building will be located under the building and the Community Green in a six level garage containing approximately 1,376 spaces. Of these, 452 spaces are required to meet the parking requirements for the residential building. The ground floor retail —type commercial uses in this building requires approximately 104 spaces, depending on the specific uses within that space. The remaining parking will be available for shoppers at the mall.
The required parking for Building 3B, will be located in the existing parking in Parking Terrace B, which contains 1,630 parking spaces. The parking requirement for Building 3B is 68 spaces for the office use and 120 spaces for the retail space.

Plazas: A semi-private terrace with a swimming pool, seating areas and a small active/passive activity area is proposed to provide recreational space for the residential building. This terrace will be located one level above the street level and will be accessible only through Building 3A.

The primary outdoor public space is the Community Green noted above. This space is approximately two-thirds of an acre in size and will resemble a town square. The draft proffers state that it is to include a “Central focal water element/interactive water feature” in the center. The site is to be ringed with sidewalks and street trees. Pathways are shown leading to the center from each corner. Shrubs are proposed to further screen the center area from the adjacent roadways. The lobby for the residential building is to be opposite the Community Green. The Community Green is illustrated on page 33 of this report.

Phase 4

General Description: Phase 4 is located adjacent to International Drive and includes existing Parking Terrace A. As noted above, Parking Terrace A is to be expanded to nine levels above grade prior to the construction of Phase 2. The following buildings are proposed to be constructed around the expanded Parking Terrace A in Phase 4:

1. a 195 foot tall, 15-story, 320,000 sq. ft. residential building (Building 4A) with up to 300 dwelling units on the south side of the parking terrace, with 17,500 square feet of retail-type commercial uses on the first floor;
2. a 160 foot tall, 7-story, 235,400 sq. ft. office building (Building 4C) with 23,000 sq. ft. of retail-type commercial uses on the first floor between the parking terrace and the northernmost entrance to Tysons Corner Center from International Drive; and,
3. a 4-story, 54,300 sq. ft. office (45,900 sq. ft) and retail (8,400 sq. ft.) building (Building 4B) between Buildings 4A and 4C.

As part of Phase 4, the upper level of Parking Terrace A will be converted to a Sky Terrace, a 2.66 acre open plaza for the use of the residents and the public. In addition to the semi-private recreational facilities (the tennis court and the basketball court) constructed with Phase 2, the public portion of the Sky Terrace will include walking paths, gardens, seating areas, a children’s play area and a seasonal performance area. A 9,600 square foot restaurant is proposed on the northern side of the Sky Terrace. It will be accessed via an elevator that connects to the ground level, where an additional 9,600 sq. ft. of retail-type commercial uses are proposed to be inset into the parking terrace, which are identified as Building 4D on the Rail CDP/FDP. The primary access to the Sky Terrace will be via an atrium area to be constructed in the center of office Building 4B, which faces onto International Drive. The Sky Terrace can be accessed from the mall via the existing pedestrian bridges connecting to the parking terrace. The following is a perspective drawing of Phase IV that shows the Sky Terrace and the restaurant.
The larger office building (Building 4C) is proposed at the northern end of Phase IV, in the southeast quadrant of the intersection of the mall entrance from International Drive. Building 4B is immediately south and is to be a four story office building with retail-type commercial building on its first floor facing onto International Drive. Building 4B will include an atrium that will provide a visual and a physical (stairs and elevators) connection to the Sky Terrace, which is approximately six parking levels above International Drive. The residential building is proposed to face onto the entrance road located opposite the intersection of Fletcher Street and International Drive. The following is the landscape plan for Phase 4.

**Pedestrian Circulation:** There are two types of pedestrian circulation in Phase 4 – the vertical circulation to the Sky Terrace, which is described above, and the street level pedestrian network. The street level network includes a streetscape in front of the residential building. The pedestrian path is also part of the loop trail and International Drive. The loop trail continues along the entrance road from International Drive past the dog park, connecting to the portion of the loop trail to the built Phase 2. The street level pedestrian network also includes the
sidewalks between Parking Terrace A and the existing mall buildings as illustrated below.

The streetscape along International Drive in front of Buildings 4A and 4C includes a double row of deciduous trees, with a 35 foot distance between the curb and the building, as illustrated below.

In front of Building 4B, the streetscape is constrained by the existing site conditions associated with adding a building along the face of the existing parking terrace. As such, the streetscape has been modified to include a single row of large deciduous trees, with smaller evergreen trees adjacent to the building; the distance between the curb and the building is twenty-two feet.
**Vehicular Circulation**: The existing vehicle circulation pattern will be generally unchanged; however, the existing travelway between Parking Terrace A and International Drive will be eliminated. The access points into Tysons Corner Center from International Drive will not be changed, except to improve turning movements and the pedestrian crossing at the southernmost entrance. International Drive is proposed to be widened by one lane along the site’s frontage, which will necessitate that the traffic signals be modified. Access to Parking Terrace A will be from the ring road between the parking structure and the mall building. A drop off/pick-up area will be provided for the residential building under the building and north of the parking structure. A similar drop off/pick-up area is proposed for the office building at the end of the ring road near the southwest corner of the Macy’s building.

**Parking**: Parking will be provided in the expanded Parking Terrace A, which will contain 3350 spaces. In addition, there are two levels of underground parking proposed under Buildings 4A and 4B. All access to this parking will be from the ring road.

**Plazas**: As described and illustrated above, one of the main features of Phase 4 is the proposed Sky Terrace to be located on top of Parking Terrace A. In addition, a semi-private plaza is to be included with the residential building. This semi-private plaza will be located on the southern side of the building and will be located approximately 20 feet above street level. This approximately 7,000 square foot semi-private space will include a pool, informal passive recreation space and seating and will be accessed through the residential building.

**Description of the Pre-rail CDP/FDP**

**Title of CDP/FDP**: Tysons Corner Center (Development with Rail Option)

**Prepared By**: Patton Harris Rust & Associates

**Original and Revision Dates**: November 15, 2004 as revised through September 1, 2006

**Description of the Pre – Rail CDP/FDP**

The Pre-rail CDP/FDP proposes to develop only the Phase 1 portion of the site with a development program that contains the same uses in the same basic layout as that proposed with Phase 1 in the Rail CDP/FDP; however, the amount of gross floor area is reduced to the amount that would be allowed under the existing C-4 and C-7
zoning. Pursuant to the draft proffers, the Pre-rail CDP/FDP would only be developed if a Full Funding Grant Agreement (FFGA) or similar funding mechanism for the first phase of the Dulles rail project is not executed at the time that the property owner is ready to proceed with the development of Phase 1. Under this proffered scenario, the later phases of the Rail CDP/FDP could be implemented in accordance with the proffered development with rail phasing schedule when funding for the extension of rail through Tysons Corner is secured.

The layout of the Pre-rail CDP/FDP is exactly the same as that proposed for Phase 1 under the Rail CDP/FDP, except for the size of the office and residential buildings. The footprints of the buildings are slightly smaller, which affects the amount of retail-type commercial to be located in the office building. The hotel building remains the same size – up to 300 rooms in a 260,200 sq. ft. building. The proposed plaza areas, animated façade areas and other amenities included in the Rail CDP/FDP are also included in the Pre-rail CDP/FDP. The following chart includes a comparison of the respective plans. There is an illustration of the Pre-rail CDP/FDP on Page 3 of this report.

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**ANALYSIS**

The following analyses pertain to both the Rail CDP/FDP and the Pre-rail CDP/FDP; however, where a comparison or contrast is needed, it will be so labeled.

**Land Use Analysis** (Appendix 5)

The application property is Sub-unit P-1 of Land Unit P of the Tysons Corner Urban Center, which is one of the core areas identified within the Tysons Corner Urban Center. Sub-Unit P-1 comprises the majority of the Tysons One Activity Center in the Core. The Development with Rail Option is filed pursuant to the Comprehensive Plan’s Option with Rail, the most intensive of the three development options provided for Sub-Unit P-1 in the Tysons Corner Urban Center. The alternative development option submitted by the applicant, the Pre-rail Option, is also compatible with the Development with Rail Option. In addition to the site specific text regarding Sub-unit P-1, there are a number of planning elements applicable to the Tysons Corner Urban Center addressing land use, urban design, transportation, among other things, as discussed in the following sections of this report.
**Mix of Uses/Intensity of Development**

The Comprehensive Plan envisions the Tysons Corner Center as a mixed-use area with retail, office, hotel and residential uses, with or without rail. The Plan option with rail recommends that a “mixed-use development with an intensity (for all nonresidential uses) up to 2.0 FAR is appropriate for the area within 1,000 feet walking distance of the station platform; sites between 1,000 and 1,600 feet of the station platform are appropriate for mixed-use development with intensities (for all nonresidential uses) between 1.2 and 1.65 FAR. Compatible transitions of height, bulk and intensity to adjacent development should be considered within the 1,600 feet area. In any development proposal submitted under this option, planned nonresidential intensity can be replaced by residential use as provided under the Alternative Land Use Guidelines in the Area-wide Recommendations section.” The Alternative Land Use guidelines allow residential uses to replace nonresidential gross floor area at a ratio of 3 to 1, provided that the increase in intensity does not exceed 50 percent of the planned non-residential intensity.

The Plan’s intent is to create a mixed use area that integrates the existing shopping mall with office, residential, hotel and community retail uses. In this application, a mix of uses is proposed in each of the four proposed phases; all four phases include a mix of office, residential and retail uses. In addition, Phase 1 includes a hotel.

As recommended in the Comprehensive Plan, the area with the highest development intensity is nearest to the future rail station platform, and likewise, the lowest intensity is proposed in the area farthest from the station platform. The area located within 1,000 feet of the future rail station platform (Phases 1 and 2) has a proposed FAR of approximately 1.43 including the existing mall (residential is 44.08% of new GFA). Area 2, located within 1,000 and 1,600 feet of the station platform (Phase 4), has a proposed FAR of approximately 0.92 (residential is 47.80% of new GFA), and the area beyond 1,600 feet (Phase 3) has a proposed FAR of approximately 0.83 (residential is 78.44% of new GFA).

The proposed development meets the Plan regarding both the mix of uses and intensity. The Pre-rail option likewise conforms to Plan guidance.

**Phasing of Development with Future Rail**

As the applicant has chosen the development option which is predicated on the existence of rail, the proposed project must be phased in relation to the advent of rail. The proffers indicate that a Full Funding Grant Agreement or similar funding commitment to finance the Metrorail extension through Tysons Corner must be executed prior to any construction of the proposed Rail CDP/FDP. If a funding agreement has not been signed, the applicant may pursue development under the Pre-rail CDP/FDP. The draft proffers state that construction of Phase 1 cannot commence until a funding agreement has been executed and that Phase 2 cannot begin until the commencement of the construction of the Metrorail extension through Tysons Corner. The proffers also require that an agreement be reached between the applicant and the rail project regarding the installation and operation of an elevated...
pedestrian bridge connection between the subject property and the Tysons Central 123 Metro Station; the installation and operation of the entrance pavilion and the bus depot in the vicinity of Parking Terrace D; the dedication by the applicant of land area and the granting of easements along Route 123 for the depot; and, the maintenance of these facilities. Phase 3 can be developed when the rail station and the bus depot are open and in operation, and Phase 4 can occur once the metro has been operational for at least two years.

The proposed phasing plan complies with the Comprehensive Plan’s Option with Rail. The Pre-rail Option conforms to the Comprehensive Plan by limiting development to a 1.08 FAR. In addition, since this option consists of essentially the same uses and a similar footprint and intensity as Phase 1 of the Rail CDP/FDP, it will be compatible with Metrorail should it be funded through Tysons Corner at a later date. Staff has concluded that the issue has been addressed.

**Design Interface with Rail**

As discussed previously, the project has been designed to provide the appropriate coordination and interface with the various components of the rail project.

**Height Limits**

Within Sub-unit P-1, the Plan recommends that buildings along Chain Bridge Road not exceed 270 feet in height, and that buildings on the east side of the mall not exceed the height of the Towers Crescent office building or 205 feet. The plan further states that if a transit station is located near the Sub-unit, building heights may be increased by 30 percent within 1600 feet of the platform and that a variety of building heights be provided along Chain Bridge Road. All transit height increases should not adversely affect the character and development of adjacent and nearby lands or neighborhoods.

The Rail CDP/FDP depicts building heights consistent with the Comprehensive Plan. In Phases 1 and 2, the height of all five buildings is based on the 30 percent height bonus, with two buildings at the maximum recommended height of 351 feet (270-foot base height plus 81-feet additional height allowed near a transit station). The building heights in Phases 1 and 2 vary from 320 to 351 feet maximum and will serve to provide a major focal point at the transit station for the Tysons Corner core area. In Phase 3, the only high-rise building is located on the east side of the mall near the Towers Crescent office building and will be a maximum of 205 feet in height. The proposed building is the same as the Towers Crescent building; however, the building’s highest elevation above sea level is lower than the Towers Crescent building’s highest elevation because the Towers Crescent site is at a higher elevation than the mall property. Two of the three high-rise buildings located adjacent to Land Unit O in Phase 4 employ the height bonus for being within 1600 feet of a transit station. Building 4A, the residential building, is to be a maximum of 195 feet tall and Building 4C, an office building, is to be a maximum of 160 feet tall. This portion of the site is identified in the Comprehensive Plan for building heights of 150 feet, which can be increased to 200 feet when a building is located near a transit station.
The three buildings proposed in the Pre-rail Option will be a maximum height of 270 feet, the maximum height recommended along Chain Bridge Road without the existence of a rail station. Staff believes that the intent of the Plan regarding a variety of building heights along Chain Bridge Road is met, since the site is part of a larger context which includes the approved development plans for Tysons II located immediately north of Route 123, and the Towers Crescent development located to the south which include several buildings at variable heights.

The draft proffers include a limitation on the height of penthouses, which are treated by the Zoning Ordinance as a feature that can extend above the maximum height specified for the building (see Sect. 2-506). Penthouses are limited to 25 feet tall; however, an increase to thirty feet may be permitted as necessary to accommodate mechanical equipment for an elevator.

Staff has concluded that both development proposals are consistent with the height recommendations contained in the Plan for Land Unit P of the Tysons Corner Urban Center.

Plazas/Recreational Amenities

One of the important elements of converting the existing automobile oriented regional shopping center to a mixed use transit oriented development is to provide useable open space. Currently, all social activity occurs along the corridors internal to the mall. Under Open Space/Parks/Recreation, the Plan recommends that the core area include larger urban plazas as focal points for use during lunch and after work. The transformation of the Tysons Corner Urban Center into a more urban environment with amenities for persons who live, work, shop and play in Tysons Corner is a challenge. In both versions of the CDP/FDP, the proposed design successfully integrates such amenities by including plazas and other urban open spaces that provide a sense of place and contribute to creating a quality urban environment. These plazas and open space areas are integral to each phase and will provide significant active and passive recreation opportunities for both the general public and for the residents of the site. In addition to a proffered commitment to provide an indoor children’s play area(s) in the existing shopping mall, the proposal provides a variety of different urban type environments on a site that does not have useable outdoor spaces at this time. The plazas vary in size and functions from hardscape areas to formal pocket park areas and all include various features, such as fountains, play areas, seating, performance spaces, etcetera that help create the individual character of each space. Further, the plazas/recreational amenities are well distributed throughout the application property. The applicant has addressed fully this recommendation of the Plan.

Pedestrian Circulation

The proposed development has met the Plan language regarding the provision of a pedestrian circulation system linking open spaces and facilitating walking and biking. A cohesive pedestrian circulation system links open spaces, facilitates walking, and
reduces reliance on private automobiles. As discussed previously, the site as a whole, as well as each of the four phases, includes a pedestrian circulation system that serves to integrate the development both internally and externally, resulting in a transit- and pedestrian-friendly environment.

Landscaping and Streetscaping

One of the most basic elements of the Comprehensive Plan’s Urban Design Guidelines for Tysons Corner is its recommendations for appropriate landscaping and streetscaping. The Rail CDP/FDP includes a landscape plan for the proposed development consisting of an overall plan, detail sheets for each phase, and details regarding streetscapes, plazas and other features. Similar plans are provided for the Pre-rail CDP/FDP. The applicant proffers to provide streetscapes along all frontages of the application property that are in substantial accordance with the guidelines set forth in the Comprehensive Plan for the core area of the Tysons Corner Urban Center, with one exception. There is one area where the streetscape has been modified along a portion of the International Drive frontage of Phase 4 due to site constraints. Existing Parking Terrace A prevents a sufficient setback to meet the Plan recommendation for this portion of the International Drive streetscape. To address this issue, the applicant has provided an alternative streetscape that satisfies the Plan by providing evergreen trees on the building-side of the sidewalk rather than the recommended canopied street trees. Trees located within 15 feet of proposed buildings may be shifted to address the tenant program and avoid conflicts with such urban design elements as outdoor cafes, entry doors and facilities/structures, subject to approval from the Zoning Administrator.

The applicant has identified in both of the CDP/FDPs a number of animated façade areas throughout the new development and existing shopping mall which are also important elements of the pedestrian-friendly, urban environment. The applicant will require new tenants located in those areas to create an external streetscape presence through the use of transparent exterior storefront façades and entries, landscaping, seating areas, canopy and awning shade elements and other techniques.

Based on the foregoing, staff has concluded that the streetscapes, landscaping and animated façade areas not only address the Urban Design Guidelines contained in the Comprehensive Plan text for the Tysons Corner Urban Center, they set a new bar to which future development applications will be encouraged to emulate.

Due to the urban nature for the development, the applicant is requesting a modification of the minimum planting area requirements of the PFM to allow smaller planting areas in conjunction with the use of structural soils – soils that have been engineered to provide support of sidewalks and other similar features while also providing a growing media for landscaping, primarily trees associated with streetscaping where such landscaping is located in relatively urban situations. Details of the structural soil planting areas are contained on Sheets 55 – 56 of the Rail CDP/FDP, including locations where structural soil is likely to be employed. The draft proffers include appropriate commitments to provide an acceptable growing
medium for the plant material. As such, and given the move urban nature of the development and that the proposed structural soil will support healthy plants and trees, staff supports the requested modification.

**Lighting and Signage**

To minimize nighttime light pollution and glare, the proffers commit that all parking lot and building mounted security lighting shall utilize full cut-off fixtures. Wall-washer type lighting will be shielded such that the lamp surface is not directly visible. New parking garage lighting fixtures (located at the top levels of the new garages) will also use full cut-off exteriors. Full cut-off street lighting fixtures are required by the Zoning Ordinance for new fixtures. To address the impacts of lighting within the parking structures on adjacent or nearby residences, the draft proffers state that full cut-off, low-intensity or recessed lighting will be used along the perimeter of the parking structures. The proffers also require that, during construction, lighting will be shielded or otherwise attenuated, including dimming or extinguishing lighting outside the operating hours of the shopping center to limit the impacts on adjacent residences. It is recommended that the applicant’s make a similar commitment with regard to the interior lighting of the proposed office structures to ensure that those buildings are not fully lit at all hours.

With regard to signage, as discussed in the Background Section of this report, a sign program for the mall property was approved by the Board of Zoning Appeals pursuant to SPA 89-P-034 in 2005. That approval consists of two signage packages: one addressing signs that do not comply with the size and location requirements of Article 12, Signs, and one addressing wayfinding signs. In addition, the applicant has proffered to provide a wayfinding sign plan during site plan review for each phase of the proposed development to direct pedestrians, bicyclists and drivers around the development. The signage is also proffered to include signs identifying the loop trail around the project. The applicant has filed a comprehensive sign plan (CSP) to allow the two existing free-standing signs at the entrances to the mall to be relocated or reconstructed because these signs will be displaced by proffered road improvements. The public hearing on the CSP will be held by the Planning Commission subsequent to the Board’s action on the rezoning. It is currently scheduled for January, 2007.

Staff has concluded that the proffered commitments regarding signage and lighting will result in the installation of appropriate signage and lighting.

**Residential Unit Size**

Given the project’s proximity to transit and employment opportunities, staff recommended that a variety of unit sizes be provided to accommodate a diversity of income ranges. The Rail CDP/FDP proposes a total of 1,701,500 square feet of multifamily residential units to be spread among the four phases. The proffers provide for a minimum of 950 units and a maximum of 1,345 units. Therefore, the average unit size ranges from 1,265 to 1,791 gross square feet, with common areas included in the calculation of average unit size. The Pre-rail CDP/FDP proposes 459,700 square feet of residential units, with a minimum of 259 units and a maximum
of 340 units. The average unit size ranges from 1,352 to 1,775 gross square feet including common areas.

The draft proffers also include commitments that the average size and minimum size of affordably priced residential units will be a minimum 400 sq. ft., with a maximum of 900 sq. ft. and average size of 550 sq. ft.

**Parking**

The Plan states: “Parking should be located at the side, back or underneath the building. Parking in front of the building may, however, be appropriate in several circumstances: limited parking for visitors and ground-floor retail customers, possible parking needed for retail expansions at the regional malls, and other existing retail within the Core which is primarily along Route 7. New retail buildings and centers should be designed with limited parking in the front; where this is not feasible due to site constraints, landscaping and other appropriate techniques should be used to achieve, to the extent possible, the design objectives of the Tysons Corner Plan.”

In the Rail CDP/FDP, four new parking structures and the expansion of one existing parking structure are planned. Almost all parking will be provided in above ground and below ground parking structures. The proposed parking structures address the recommendations of the Plan with regard to the location of the parking for the additional transit related development proposed to be added to Tysons Corner Center. The draft proffers recognize that the existing parking reduction for the mall will have to be amended to reflect the changed conditions on the property. In addition, the proffers anticipate the future evaluation and request for parking reductions given the application property’s proximity to the future Tysons Central 123 Metro Station, current and future bus facilities on the property, the character of the proposed development as a mixed-use transit-oriented development, and the intended effects of the Transportation Demand Management (TDM) Plan. A stronger commitment to pursue a parking reduction would be desirable because parking reductions can be part of a stronger TDM program for the site.

**Trails Shown on the Comprehensive Plan**

**Chain Bridge Road Trail:** The Trails Plan includes a major trail (8 – 12 feet wide and paved of asphalt) along the site’s frontage on Chain Bridge Road and two on-road bicycle trails on either side of the road. The application includes a request for a modification of this requirement along the portion of the site located west of the site’s entrance from Chain Bridge Road and a waiver east of the entrance road. The modification is requested in favor of the trail provided along the ring road from International Drive to the bus depot. This ten foot wide asphalt trail will provide a trail link from International Drive to the future bus depot and to the rail station, substituting for the trail segment that is planned in front of the two gas stations that are not part of the application property. Along the bus platform area, a walking/bus waiting area that is twenty feet wide is shown in the plan views and the following section views of the bus depot. There is also a barrier between the bus depot and the road.
The segment of the Chain Bridge Road trail located to the east of the entrance road would lead a pedestrian directly to the ramp leading to the Capital Beltway, at which point there are no links providing a safe pedestrian pathway towards McLean. The draft proffers proposed to escrow the funds required to build this link so that those funds can be utilized to build the frontage trail in the future in the event a solution has been established and adopted by the County. Staff has concluded that the application addresses the trails issues on Chain Bridge Road and supports the requested modification and waiver.

Leesburg Pike: The streetscape conforms with the streetscape recommendations for Leesburg Pike contained in the Comprehensive Plan, which includes sidewalks that function also as a trail. The streetscape extends for approximately 20 feet from the face of curb to the building, which meets or exceeds the recommendations of the Trails Plan. Further, the draft proffers state that the streetscape may be altered if the Comprehensive Plan is amended to change the streetscapes in the Tysons Corner Urban Center. An illustration of this streetscape is provided in the description of Phase 3.

International Drive: The Trails Plan includes a major trail along International Drive. The Plan includes a streetscape design for streets in the Core area that functions as a trail. At this time, there is no sidewalk along the site's frontage on International Drive between the entrance opposite Fletcher Street and the entrance near Chain Bridge Road. The draft proffers state that a six foot wide sidewalk will be provided at the time of the construction of Phase 1 along this link of International Drive. This
sidewalk will be in place until such time as Phase 4 is constructed, when the sidewalk in this area will be replaced by the proposed streetscape. As described above, while the depth of the streetscape along International Drive varies, the walkway portion is a minimum 12 feet wide in all circumstances, which adequately provides for pedestrian movements. Illustrations of the International Drive streetscape are provided in the description of Phase 4.

**Fashion Boulevard and ShopTysons Boulevard:** In response to comments of the Trails Committee, the Rail CDP/FDP includes bicycle trails along these internal roadways, which are in addition to the trails contained on the Trails Plan. In accordance with the draft proffers, this link between Leesburg Pike and Chain Bridge Road through the application property will be constructed in two parts. The first portion, a ten foot wide off-road bike trail, is to be constructed along the link of ShopTysons Boulevard that parallels the Beltway and between Kidwell Drive and the Westpark Drive bridge concurrent with the development of Phase 1. In addition, the widening of Westpark Bridge will include bicycle lanes on both sides of the bridge linking to this trail. With the construction of Phase 3, Fashion Boulevard will be widened to include fifteen foot wide lanes along both sides of that roadway to provide room for bicycles.

**Capital Beltway Trail:** The Trails Plan includes a regional serving trail along the Capital Beltway that is shown on the Trails Plan within the right-of-way for the Capital Beltway. Constructing a regional trail along the alignment of the Beltway is not appropriately implemented in an incremental fashion; if this segment were to be constructed incrementally, it would not connect to other trail segments and would place recreational trail users unsafely within the limited access area associated with the interstate highway. Staff has concluded that the regional trail along the Beltway would be most appropriately constructed as part of the construction of a larger project to construct a trail along an interstate highway, such as part of a project to widen the Beltway or to include High Occupancy Toll (HOT) lanes on the Beltway. Where such an issue has been addressed along the Dulles Airport Access Road (DAAR), a waiver of this requirement has been granted typically, and staff supports a waiver in this instance.

**Residential Development Criteria (Appendix 16)**

Fairfax County expects new residential development to enhance the community by: fitting into the fabric of the neighborhood, respecting the environment, addressing transportation impacts, addressing impacts on other public facilities, being responsive to our historic heritage, contributing to the provision of affordable housing and, being responsive to the unique site specific considerations of the property. To that end, the Board of Supervisors adopted the Residential Development Criteria, which are contained in Appendix 9 of the Land Use Section in the Policy Plan to be used in evaluating zoning requests for new residential development.

In this instance, because the residential component is integrated within each phase and cannot be considered in isolation from that phase or from the development proposal as a whole, the criteria will be addressed for the project as a whole,
including the non-residential elements. Further, the development criteria provide an appropriate framework for the analysis of the application because the criteria address planning issues common to all land use applications as reflected in the following statement found in Appendix 9 under the heading, NON-RESIDENTIAL DEVELOPMENT CRITERIA:

“While the Comprehensive Plan has no direct equivalent to the residential density range in areas planned for non-residential or mixed uses, each rezoning application for such uses will be evaluated using pertinent development criteria, as found in the Residential Development Criteria, as a basis for such evaluation.”

Site Design & Neighborhood Context:

Development Criterion Number 1, entitled ‘Site Design,’ recommends that developments address the consolidation goals in the Comprehensive Plan, and further the integration of the proposed development with adjacent planned and existing development. Additional elements of this criterion applicable to this proposal to redevelop Tysons Corner Center as a mixed use development include: providing convenient access to transit facilities; providing open space that is usable, accessible and integrated with the proposed development; and, providing appropriate landscaping and amenities.

The following discussion also includes a discussion of the Criterion #2, Neighborhood Context, which recommends that all applications, regardless of the proposed density or intensity, be designed to fit into the community within which the development is to be located as evidenced by an evaluation of: transitions to abutting and adjacent uses; bulk and mass of the proposed development; setbacks; architectural elevations; connections to non-motorized transportation facilities; and, the existing topography and vegetative cover. It is noted in this criterion that it is not expected that developments will be identical to their neighbors and that the individual circumstances of the property will be considered.

Many of the elements of these two criteria have been discussed elsewhere in this report; others that have not are discussed below.

Lot Consolidation

The application property includes all of the property bounded by International Drive, Leesburg Pike, the Capital Beltway and Chain Bridge Road, with the exception of two small parcels, Parcels 29-4 (((1)) 17 and 18, which are developed with service stations, and the office building at 1861 International Drive. The office building is integrated with the shopping center by a pedestrian connection from its elevated plaza to the area adjacent to Parking Terrace B (near Bloomingdale’s) and access the parking garage under the office building is from the access road into the application property located opposite Fletcher Street. It would be desirable, but is not critical, for the two gas station properties to be consolidated with the application to
allow the southeastern quadrant of the intersection of International Drive and Chain Bridge Road to be integrated into Tysons Corner Center.

**Site Layout/Urban Design/Neighborhood Context**

Unlike other areas where mixed use redevelopment has been proposed as a redevelopment of a property, this property is the site of an existing highly successful shopping center that is a major economic asset to the County and to the property owners and that will be retained in its entirety. The redevelopment of the Tysons Corner Center is predicated at each phase upon retaining the functionality and viability of the existing mall. Accordingly, the proposed redevelopment of the site occurs around the periphery of the property on areas currently used for parking or as peripheral strip shopping center uses. However, rather than just adding buildings along the ring road, in a manner similar to Fair Oaks Mall, the new development is integrated with the mall building through the creation of a two level pedestrian network that works with the topography of the site, and by the construction of new plazas connecting to the mall in three of the four phases. In addition, the corridors in the mall will be open during the time period that rail transit is operating, resulting in the mall itself being connected to, and becoming an integral part of, the site’s pedestrian network as well as the large pedestrian network of this part of the Tysons Corner Urban Center. As a result covered pathways are provided for large portions of the overall pedestrian network in the mall, under building overhangs, the covered bridge across Chain Bridge Road and the pathway across the top of Parking Deck C. The pedestrian improvements at street level within the site and around its periphery enhance the site significantly. The new plazas are major amenities that will change the entire character of the site by providing pedestrian friendly spaces where parking lots now exist. Sheets 9 and 10 depict the overall pedestrian network, the detail sheets within each phase, and the interconnections with the mall building.

While the retention of the existing mall building precludes the creation of a grid pattern of streets, traffic through the site and to the various elements or phases of the project is collected internally on the ring road, rather than dispersed on the public street network. The system of elevated pedestrian pathways and plazas is a creative and appropriate solution to create a safe pedestrian-oriented environment that is separated from the main vehicular movements. At the southern end of the site, the street level pedestrian network allows for integrated pedestrian facilities with wide, urban style streetscapes and street level retail-type commercial uses.

The relationship of each of the new proposed phases to the adjacent development is also an important element of the site layout/neighborhood context:

- Phases 1 and 2, which include approximately 70 percent of the proposed additional development, are located appropriately near the future rail station and will be connected to the rail and to the Tysons II development via the pedestrian connections to the rail station and across the Westpark Drive bridge;
- A portion of Phase 3 is located near the intersection of Fashion Boulevard and the ring road, near the pedestrian bridge to the Towers Crescent project, and
the office building is located on Leesburg Pike creating a street edge along this portion of the road where there is currently a parking garage; and,

- Phase 4 proposes to create an activated streetscape along International Drive, where there is currently only a parking garage and no sidewalk.

The area adjacent to the Capital Beltway, where the mall building was recently expanded, is not proposed to be changed with this application, that roadway presents a major barrier to providing connections to the development on the other side of the road.

The overall result is the conversion of an inwardly oriented, automobile dependent development to one that provides a variety of land uses and, most importantly, types of environments. Further, this large portion of the core area of the Tysons Corner Urban Center will become part of the fabric of the area rather than an island unto itself. The edges along Leesburg Pike and International Drive will be transformed from edges that draw a strong, almost impenetrable, boundary to edges that are transitions and invite interactions, because a streetscape will be introduced that is pedestrian friendly and that provides street life that can reflect or transition to a street life across the road, especially along International Drive. An essential element of the streetscape contained in the Urban Design Element of the text for the Tysons Corner Center is having the buildings located near the street rather than away from the street with parking between the street and the building. Where the edge presents a strong gap to the adjacent property through topography, whether it is a change in grade such as with Towers Crescent or a roadway as with Chain Bridge Road, the project proposes to literally bridge itself to the adjacent properties.

The proposed building heights and relationship of the buildings to the street reflect the pattern recommended in the Urban Design element for the Tysons Corner Urban Center in the Plan. While the applicant has not provided specific architectural details at this point, the applicant has committed to use materials consistent with Class A office space. In addition, the draft proffers require that the architecture for each building be reviewed and approved by the Planning Commission prior to the issuance of the building permit.

Environment (Appendix 6)

Development Criterion 3 recommends that all rezoning applications respect the environment. The criterion enumerates several principals that should be addressed:

a) natural environmental resources should be preserved;

b) existing topographic conditions and soil characteristics should be considered;

c) off-site impacts on water quality should be minimized by commitments to state of the art best managements practices and low impact site design techniques;

d) the volume and velocity of stormwater runoff should be managed to avoid impacts on downstream properties;

e) future and current residents should be protected from the adverse impacts of transportation generated noise;

f) any exterior lighting fixtures should minimize neighborhood glare and impacts to the night sky; and,

g) site design techniques to achieve energy savings and to encourage and facilitate walking and bicycling should be employed.
Preservation of Natural Environmental Resources & Consideration of Existing Topographic Conditions

With the existing level of development on the site, there are no environmental resources to be preserved on the site. Similarly, the existing man-made topography reflects the previous development activity on the property.

Stormwater Management/Best Management Practices:

Sheets 57-61 of the Rail CDP/FDP address stormwater management and best management practices (SWM/BMPs) and the outfalls for the property. Similar information is provided in the Pre-rail CDP/FDP. The applicant has filed a request to include underground detention with residential development.

Stormwater Management: The existing site is largely paved and the proposed new development will occur on previously developed portions of the site. With the original development of the site, stormwater management and best management practices were not required to be provided and the majority of the site is impervious. Off-site stormwater from the Towers Crescent development and the adjacent roadways passes through the site. The natural water courses have been replaced by a closed conduit system; the stormwater is discharged into an existing outfall that crosses the Capital Beltway after it leaves the site. The draft proffers include a commitment to provide an overall stormwater management plan prior to the approval of the first site plan. The proffers further commit to reduce the amount of water currently discharged from the site by thirty (30) percent at the conclusion of building out all four phases, which is significantly in excess of the requirement specified in the Public Facilities Manual (PFM) for a redevelopment site, which requires detention for the increased amount of impervious surface only. The proffered reduction is accomplished by providing underground storage in each phase, thereby achieving part of the proffered reduction with each phase of development.

Best Management Practices/Low Impact Development: The applicant has proffered to treat the stormwater leaving the site to provide phosphorous removal of 14 percent; the analysis provided by the applicant indicates that 11.85 % phosphorous removal is required by the PFM. This level of removal will be achieved from two types of facilities currently included in the PFM, sand filters and Filterra devices. These best management practice facilities will be installed with each phase and ultimately meet the proffered goal with the completion of Phase 4.

In addition, the applicant has proffered to construct a number of low impact development techniques on-site. These proffered facilities are not currently recognized phosphorous removal techniques in the PFM; as such, they have not been assigned a phosphorous removal rate and will not be utilized to meet proffered 14% reduction. These facilities include: green roof areas, located mainly on the plazas above parking garages; stabilized turf areas on the fire lanes for Phases 1 and 2; pervious pavers in the limited amount of surface parking that will remain on-
site; and, an underground infiltration device at the dog park, provided that the soils test indicate that this is a suitable location for infiltration.

Outfall: The Tysons Corner Center property is located in the upper reaches of the Scotts Run watershed. The stormwater is collected in a closed conduit system that was constructed as part of the existing shopping center. This system discharges into an existing closed conduit system that crosses the Beltway to the east to connect to a tributary of Scotts Run. Scotts Run has been degraded by the impacts of the existing development in its watershed through undercutting, and the channel is incised. The applicant is addressing this by reducing the stormwater peak flow from the property to Scotts Run as discussed above.

Underground Detention Waiver (Appendix 7): In conjunction with the approval of a rezoning application, the Board of Supervisors may grant a waiver of Section 6-0303.8 of the PFM to permit underground stormwater management facilities in residential developments. The waiver may be granted by the Board after taking into consideration possible impacts on public safety, the environment and the burden placed on future homeowners for maintenance. If waived, the underground stormwater management facilities will be privately maintained pursuant to a private maintenance agreement in a form acceptable to the Director, DPWES, be disclosed to future owners in the chain of title, and not be located in a County storm drainage easement.

The Rail CDP/FDP includes six underground detention vaults, eight underground sand filters and eight underground cisterns, in addition to the low impact design features. The proposed underground facilities are located along travelways, and adjacent to buildings and parking structures, and will be equipped with double locked BILCO doors. Staff has concluded that the proposed underground detention is appropriate in this instance because the site is in an urban environment, the costs will be shared among all of the on-site uses and the proposed facilities provide detention beyond the minimal requirements of the PFM. Therefore, staff recommends that the Board grant the waiver subject to the proposed development conditions contained in Attachment A to Appendix 7. The proposed development conditions require (among other things) that:

- the underground stormwater facilities be maintained by all components of the proposed development, not just the residential component;
- a reserve fund be established for replacement of the facilities;
- the underground facilities be constructed of reinforced concrete products;
- liability insurance in the amount of $1,000,000 against claims associated with the underground facilities be provided and that the County be held harmless for any liability associated with the underground facilities; and,
- an annual maintenance budget be established.

Transportation Generated Noise:

The property abuts an interstate highway – the Capital Beltway (I-495); two major arterials – Leesburg Pike (Rt. 7) and Chain Bridge Road (Rt. 123) and International
Drive – a six-lane divided highway. Each of these sources produces highway noise that need to be addressed for the interior of the residential buildings and the hotel, and for exterior recreation spaces. The Policy Plan states that new residential development should not occur in areas with projected highway noise exposures above DNL 75 dBA based on traffic projections to 2026. The applicant has submitted a noise study (Appendix 3j) for review by County staff that demonstrates to staff’s satisfaction that this standard will be met. In addition, the draft proffers state that if subsequent proffered noise studies show noise levels above DNL 75 dBA, the residential building will not be constructed and a proffered condition amendment will be sought to locate other uses in the affected area.

The second element of the County’s noise policy is to ensure that noise levels between DNL 60 dBA and DNL 75 dBA are attenuated so that interior living spaces are at or below DNL 45 dBA and outdoor recreation areas are attenuated to DNL 65 dBA or less. The draft proffers include a commitment to provide noise attenuation measures to ensure that highway noise in the interiors of the residential units and the hotel rooms will be less that DNL 45 dBA. The proffer also requires that the affected buildings be identified on each site plan and that the affected units be identified on the building plans.

With regard to outdoor recreation areas, the noise study identifies areas where structural noise attenuation will be provided to shield areas identified for outdoor recreation spaces and includes copies of the sheets of the CDP/FDP that include noise attenuation structures. The noise attenuation structures are designed to be an integral part of the site design by adding additional height (approximately 4 feet) to the walls along Chain Bridge Road or by using the noise attenuation structure to segregate the semi-private open space for the residential building in Phase 2 from the more public elements of the upper plaza in that phase.

The application includes a request for a waiver of the requirement found in Sect. 2-414 that commercial buildings be located a minimum of 75 feet from the edge of an interstate highway right-of-way. In this instance, Building 1B is located adjacent to the ramp from northbound Chain Bridge Road (Rt. 123) to the outer loop of the Capital Beltway (I-495). Building 1B is located 40 feet from the edge of the right-of-way adjacent to the ramp, approximately 140 feet from the pavement for the ramp and approximately 575 feet from the main travel lanes. While Building 1B is located less than 75 feet from the right-of-way line adjacent to the ramp, it is well beyond 75 feet from the main line of the road. Staff has concluded that the draft proffer that requires that noise within the office building be attenuated to 50 dBA addresses the noise impact and furthers the intent of the Zoning Ordinance and the Comprehensive Plan policies regarding highway noise; and, therefore recommends that the Board approve the requested deviation from this requirement in accordance with the provisions of Par. 3 of Sect. 2-414.

Tree Preservation/Landscaping

Development Criterion 4 states that all residential development should be designed to take advantage of existing quality tree cover.
Given the existing development on this property, tree preservation is not an issue for this application. However, as discussed elsewhere in this report, the applicant proposes to dramatically increase the amount of landscaping on the site through additional plantings along new pedestrian pathways through the site, streetscaping along the public roads and within the application property, and within the various plazas.

**Transportation** (Appendix 8)

Development Criterion 5 states that, regardless of the proposed density, development should implement measures to address planned transportation improvements and should offset impacts to the transportation network. The criterion notes that not all principles contained in the criterion will be applicable in all instances. The following is an evaluation of those principles that are applicable in this instance.

The size and location of the application property in the Tysons Corner Urban Center presents unique and challenging transportation issues. The approximately 79 acre site occupies a significant amount of land area in the Urban Center. The site is surrounded on three sides by arterial and interstate roadways, with 2 interchanges from the interstate to the arterial roadways providing convenient vehicular access. It is further served by a number of WMATA and Fairfax Connector bus lines. In addition, as discussed, a metro rail is slated to be placed in operation opposite the site in the Route 123 corridor by approximately 2011. The future presence of heavy rail, the existing high level of transit service to the site, and the mixed-use nature of the proposed development create significant possibilities for an aggressive Transportation Demand Management (TDM) program. All these factors played important roles in the evaluation of the application.

**Internal Circulation**

The retention of the existing mall impacts the manner in which circulation through the site and connections to adjacent properties and the adjacent road network could occur, and how new traffic enters and exits the site. As a result of the retention of the mall, it was necessary to maximize opportunities for effective internal circulation into, through and out of the property for automobiles, trucks and transit vehicles. To address this, the draft proffers include the following:

- Increasing the capacity of the internal streets through widening them and adding turn lanes at critical intersections.

- Adding signalization to a number of internal intersections and committing to allow County and VDOT to review the signalization plans.

- Reconfiguring significantly the vehicular entry to the site from Route 123 to improve traffic movement internally within the site, as well as to counter possible degradation of Route 123 with spillover traffic.
Impacts on the Adjacent Network of Public Streets

The construction of an additional 3.5 million square feet of development in the Tysons Corner Urban Center could, if not mitigated, degrade levels-of-service on the public roads located throughout the Urban Center. During the weekday peak hours, and frequently on weekend mid-days, the surrounding road network exceeds its capacity under today’s conditions. A comprehensive program is needed to address the traffic impact of the proposed development both programmatically and through construction of infrastructure. A proffered three-prong approach addresses this issue through phasing the proposed development to the availability of rail, implementing an aggressive TDM program, and constructing roadway improvements, as discussed below.

Phasing to Rail/Transit: Extension of Metro construction of rail from the West Falls Church Metro station to Dulles Airport on an alignment through the middle of the Tysons Corner Urban Center is expected to significantly reduce the number of future vehicle trips in Tysons Corner as a whole. Under the selected Comprehensive Plan option, the proposed redevelopment of the Tysons Corner Center to a mixed use project is contingent on a direct connection to the planned rail service, including a convenient means for residents, employees and customers to maximize usage of this alternative to the automobile. This integration is a key component of transit-oriented development. As described previously in this report, the applicant has integrated the development with future rail service to maximize opportunities for its use as an alternative to private vehicles.

While the implementation of the Rail CDP/FDP is tied to the availability of rail, the applicant is seeking an option to construct 1.2 million additional square feet of mixed-use development prior to funding for the rail project, as shown on the Pre-rail CDP/FDP. Although funding agreement is not currently in place and is not expected to occur until 2007, design and engineering of the rail project has progressed significantly and, it is anticipated that the Phase 1 will likely be developed as shown on the Rail CDP/FDP. However, should that not occur, the level of development shown on the Pre-rail CDP/FDP can be accommodated with the improvements proffered to be constructed with that option, as discussed beginning on page 62 of this report.

With the Rail CDP/FDP, the applicant has proffered that all phases of the development will be tied to various phases of rail project to ensure that the appropriate relationship between development and rail occurs, as detailed below.

- Phase 1 of the rail-related development consisting of 1.3 million square feet cannot be initiated until a funding agreement for rail is in place.

- Phase 2 of the rail-related development is the most critical development stage because it is where the connection to the future rail station is to occur and because, when combined with Phase 1, over 1 million square feet of additional
development will be constructed. Under the proffers, Phase 2 cannot be initiated until each of the following is achieved:

i. Commencement of construction of the first phase of the rail line extension to Dulles Airport and,

ii. An agreement is completed between the applicant and the rail project on the issues of mutual concern including access to the rail line.

• Phase 3 of the rail-related development cannot be initiated until each of the following is achieved:

i. The Tysons 123 rail station in the vicinity of the site is operational and,

ii. A pedestrian bridge or tunnel connecting the site to the station is operational and,

iii. A bus depot adjoining the property is in operation.

• Phase 4 of the rail-related development cannot be initiated until the following is achieved:

i. The three elements described in Phase 3 have all been operational for 2 years.

To further foster transit-oriented development, the applicant is also proposing several measures to enhance access to rail and bus service at the site. In addition to the previously discussed pedestrian improvements designed to provide safe and efficient foot access to the rail station, the applicant’s commitments include:

• Construction of a pavilion that accommodates vertical circulation at the on-site terminus of the pedestrian bridge connecting the rail station, the ground-level bus depot, the mall, and the rest of the development.

• Dedication and construction of a bus depot adjoining the site on the Route 123 frontage.

• Continued access by public transit providers to the existing bus stops located on the site, including provision of a sidewalk along International Drive for access to that bus stop.

• Retention of the existing on-site bus stop and bus layover area near the Nordstrom store.

• Establishment of a new internal bus stop with shelter with Phase 1 of development.

• Provision of construction of bus shelters and funding of off-site bus shelters along the public roadways on the perimeter of the site.
• Agreement to fund a study to determine the parameters of implementing a bus circulator system within the Tysons Urban Core and if that system is implemented, fund start-up and operating costs to a total of $1.25 million dollars.

Transportation Demand Management (TDM): A major component of this transit-oriented development is the establishment by the applicant of a TDM program to reduce the impact of the proposed development on the transportation infrastructure of Tysons Corner. The basic premise of the TDM program is to reduce vehicle trips to and from the site through the use of alternatives to single-driver private vehicles for activities that have increasingly relied on that mode of transportation in the past. Use of rail is the most obvious TDM activity; however, any alternatives that substitute for the use of a single-occupant vehicle (SOV) are important elements of a TDM program. These include carpooling, telecommuting, using other forms of transit, bicycling, and walking, as well as the creation of a synergistic range of uses on the site. Typically the goal of a TDM program is to reduce AM and PM peak hour trips; however, given the urban location of the site, and the daily traffic demands associated with the Tysons Urban Center, a program that will reduce trips at all hours will be of notable benefit.

The proposed mix of uses is a major factor in the ability of any development or area to be able to reduce trips. Within a development that has an appropriate mix of uses in sufficient amounts, the need for people within the development to use their private vehicles to drive outside that area for services will be reduced, which effectively reduces the demands on the surrounding road network. In addition to the existing 2.5 million square feet of retail type uses in the mall, the applicant is proposing the construction of 1.4 million square feet of office use, 1.7 million square feet of residential use, a 260,000 square foot hotel and 182,000 square feet of new retail-type commercial uses located primarily on the lower floors of the new buildings. The resulting diversity of uses, particularly the nearly 50% split in residential and office development, will create a strong synergistic relationship. In addition to the retail, entertainment and recreational opportunities within the existing mall, the new retail uses in particular are designed primarily to provide services for people who live and work at the development; this is enhanced by the proffered commitment to provide a small grocery store and a child care center on site.

TDM programs in Fairfax County have grown through an evolutionary process, increasing in complexity and scope in recent years as more aggressive approaches to offsetting traffic generated by developments on an already saturated road network have been sought. The program proposed with this application, developed jointly by the applicant and the County, represents the most aggressive and comprehensive TDM program proffered to date, and includes benchmarks for achievement and significant precedential incentives/penalties related to achievement of those benchmarks. Important elements of the program include:

• A commitment to specific trip reduction goals for that are individually tied to the office, residential and hotel uses, and that are specific to both the am and pm peak periods. The goals are adjusted based on the limited possibility that the
Pre-rail CDP/FDP is constructed. The following chart, copied from the draft proffers, sets forth the goals for the Rail CDP/FDP after build-out of all four phases.

### Phases 1 through 4 After Rail is Operational

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<th>PM PEAK HOUR</th>
</tr>
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</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>126</td>
</tr>
</tbody>
</table>

- A detailed strategic plan for implementation and administration of the program has been developed and is referenced in the proffers.

- Specific techniques to be used for implementation of the TDM program, include, but are not limited to: branding the program; meeting with stakeholders; development of a website, outreach and other forms of information dissemination including within the mall; transit benefits for workers; promotion of telework to tenants in the offices; provision of telework sites; car sharing programs, taxi stands, ride matching for vanpools and carpools; a parking management plan; van and/or shuttle drop-off points; pre-wiring residential units for internet access; sales and marketing of residential units to TDM oriented buyers; sales promotion of the residential component with other employers in Tysons Corner; use of promotions and discounts to encourage workers to remain at the site during the peak hours rather than travel.

- A TDM program designed specifically for mall employees that encourages the use of carpooling, van pooling and the use of mass transit, and that provides for subsidies to encourage the use of these and other non-SOV modes of transportation.

- A transportation coordinator will be retained to administer the TDM program.

- The applicant will be obligated to provide annual studies and reports to the County to verify compliance with the vehicle trip reduction goals and to demonstrate the TDM program’s viability and effectiveness.

- The TDM program and yearly budget will be subject to the review and approval of the County staff. An initial funding of $200,000 is required to be increased as necessary to implement the agreed upon program. The initial funding amount is based on the review of a projected budget by staff.

- The developer, not the successor condominium and/or other owners, will remain responsible for the funding, administration, remedies and applicable penalties of the TDM program through the “Developer Control Period” which is
defined as two years of successfully meeting the proffered goals after Phase 4 is “stabilized” as defined in the proffers as when RUPs and Non-RUPs have been issued for 100% of the proposed buildings. The responsibility for the TDM program will then be turned over to the unit owners’ association, which will include all uses on site.

- If the proffered vehicle trip reductions are not met, the applicant will be required to implement measures to remedy any shortfall in meeting the goals, including the infusion of additional monies to initiate these measures. The so called “remedy fund” is to be $400,000 (adjusted for inflation) initially and is to be replenished on an annual basis as necessary. The extent of the remedy fund ($400,000) is based on a preliminary budget for the TDM program reviewed and approved by staff.

- If the proffered vehicle trip reductions are not achieved, the developer will be required to pay a penalty for each additional trip generated by a specific use, even if other uses are meeting the proffered goals, with the penalties increasing as the extent of any failure increases. For example, if the proffered reduction goal is exceeded by up to 2%, the penalty amount is $4,000 per vehicle; between 2% and 5%, the penalty amount is $6,000 per vehicle; and if the failure exceeds 5%, the penalty amount will be $12,000 based on the number of vehicles that represent a 5% failure. A chart at the end of the proffers provides examples of the penalties that could result from a hypothesized failure. The penalty funds are to be used for transportation improvements in the area – not to assist in remediying the shortfalls of the TDM program. The penalty fund is to be secured with a letter of credit that escalates from $2,000,000 to $4,000,000 depending on the number of completed phases. The penalties will cease after the TDM program is turned over to the future unit owners’ association.

- Perhaps the most punitive aspect of the TDM program is the applicant’s commitment that if the proffered trip reductions for all uses within Phases 1 and 2 combined are not being met, the developer cannot proceed to Phase 3; a similar limitation is proffered for Phase 4, which is precedential.

This program provides very significant commitment to reduce traffic generated by the proposed development and a precedential means to address the possibility of a failure of that program to work, in case that was to occur.

Off-site Road Improvements: As previously stated, the surrounding road network is already saturated during the weekday peak hours and frequently on weekend driving midday. Therefore, implementation of road improvements to address the traffic impact of the development is a critical element in the applicant’s transportation program.

The applicant has proposed the following road improvements to be constructed in the various phases of development, which address all of staff’s requests.
The proffered commitments with the Rail CDP/FDP include:

- **Widening of Chain Bridge Road including:**
  
  i. dedication of the right-of-way for the proffered improvements (Phases 1 and 2)
  
  ii. construction of four through travel lanes along the property’s frontage, a dedicated right-turn lane, capacity for dual left turns into Tysons Boulevard opposite the Mall site, and signal modifications (Phase 1)
  
  iii. subject to provision of property acquisition and construction funds by the County, construction of off-site improvements to International Drive and Chain Bridge Road to provide an additional lane of traffic on each roadway, replacement of the signal at that intersection, and construction of pedestrian improvements (Phase 2).

- **Widening of Route 7 including:**
  
  i. dedication of the right-of-way for the proffered improvements (Phase 1)
  
  ii. provision of four through travel lanes along the property’s frontage resulting in four continuous westbound lanes from I-495 to International Drive. (Phase 1)
  
  iii. construction of a 4th eastbound lane from the Gallows Road/International Drive intersection to Old Gallows Road. (Phase 2)
  
  iv. contribution of an additional $70,000 for road improvements in the corridor. (Phase 3)

- **Widening of the Westpark Drive bridge to a 4-lane undivided cross-section including modifications to the intersection of Westpark Drive and ShopTysons Boulevard to enhance through traffic movement. The value of the bridge improvement (currently $8.2 million) is creditable against the Tysons Transportation Fund contribution. (Phase 1)**

- **Widening of International Drive along the property’s frontage to three through northbound travel lanes. (Phase 4)**

- **Designing of the planned interchange at Route 123 and International Drive. The value of this improvement (currently $1.2 million) is creditable against the Tysons Transportation Fund contribution. (Phase 2)**

- **After the stabilization of each phase, the draft proffers require that a corridor evaluation of the signals along Leesburg Pike or Chain Bridge Road (depending on which phase is completed) be undertaken to determine appropriate signal timing modifications. The signal timing plans will be subject to the review and approval of VDOT and will be implemented by the applicant.**

The proffered improvements with the Pre-rail CDP/FDP include the following:
• Widening of Chain Bridge Road to a four lane section across the site’s frontage (including a right-turn lane), including dedication of the required right-of-way.

• Widening of the Westpark Drive bridge to a 4-lane undivided cross-section including modifications to the intersection of Westpark Drive and ShopTysons Boulevard to enhance through traffic movement.

• Reconstructing the Chain Bridge Road/entrance road intersection to provide three lanes of storage within the property and adjust the existing signal as required.

• Installing traffic signals at three intersections along the ring road.

• Improving the existing signals to include pedestrian heads at intersections adjacent to the application property.

• Adding a westbound land along the property’s Leesburg Pike frontage to tie into the existing turn lane at International Drive.

• Conducting a corridor evaluation of the signals along Leesburg Pike to determine appropriate signal modifications subject to the review and approval of VDOT.

Service Drive Waiver

The application includes a request to waive the service drive requirements along the Leesburg Pike (Rt. 7) and Chain Bridge Road (Rt. 123) frontages of the application property. These locations do not include service drives at this time. The draft proffers include commitments to widen both of these facilities, including providing turn lanes into the entrances to the application property from these roadways. An urban streetscape is being provided along Leesburg Pike that is consistent with the urban boulevard treatment contained in the Comprehensive Plan. Along Chain Bridge Road, a bus depot that is associated with the planned extension of rail through Tysons Corner is being provided between the site’s entrance and International Drive; to the east on Chain Bridge Road is the ramp to the Capital Beltway. Given these factors, and the fact that a service drive is not necessary to manage circulation on these frontages, staff supports the requested waiver of the service drive requirement along the site’s frontages.

Public Facilities

Residential Development Criterion 6 states that development is expected to offset its public facility impact.

*Park Authority Analysis (Appendix 9)*
Impacts on Park Authority Facilities: The residents of this development will use outdoor recreational facilities. Typical recreational needs include open play areas, tennis and volleyball courts and athletic fields. Based on the Zoning Ordinance Sections 6-209 and 16-404, the applicant must provide $955 per non-ADU (affordable dwelling unit) residential unit for outdoor recreational facilities to serve the development population.

The recreational needs of the future residents are addressed in five ways in the proffers and on the CDP/FDP. (See appropriate portions of the section entitled “Description of the CDP/FDP” for a more detailed description of the individual recreation facilities and their locations). First, there are common recreation facilities open to the public; second, there are semi-private recreation facilities for the future residents; third, the draft proffers include a commitment to contribute to the County an additional $493 per dwelling unit (escalated) prior to site plan approval for the residential component of each phase to be used for the provision of off-site outdoor recreation facilities. (The Park Authority requested $265 per estimated resident; which at Park Authority’s estimate of 1.7 residents per multiple family dwelling unit, equates to $450.50 per unit; and fourth, a contribution of $500,000 will be made within 30 days of the final, un-appealable approval of the rezoning application to the Board of Supervisors for improvements to public athletic fields. The draft proffers also provide that if the $955 expenditure for recreation facilities required pursuant to Sect. 6-209 is increased by the Board in the future, the on-site expenditure for recreational facilities will equal the increased amount. If the proffered on-site recreational facilities do not meet fully the monetary requirements of Sect. 6-209, the draft proffers include a provision that the balance would be contributed to the Park Authority. In addition, the public plazas proposed with each phase will provide passive recreation opportunities. These include performance spaces in the public plaza and a performance lawn with stage to be provided as part of the Sky Terrace in Phase 4. The draft proffers require that bicycle racks be provided with each phase and that shower and locker facilities be provided in one of the office building in Phases 1 and 2, and in the office buildings in Phases 3 and 4. Thus, the recreation needs of the residents, workers and visitors to the site are well accommodated by the proffered commitments and the recreational and other amenities shown on the CDP/FDP.

Loop Trail: The Park Authority comments were based on a previous version of the CDP/FDP and state that the proposed loop trail should be designed to be accessible and the route easy to follow through the use of wayfinding signage, distinctive pavers or other marking, direction and distance markers. The comments also raised a concern that the loop trail could be built in segments and thus may never be completed if the later phases are not constructed.

The loop trail has been designed to address accessibility issues by shifting the trail from the elevated plaza in Phase 2, so that it will cantilevered from the parking garage wall adjacent to the bus depot and connect directly to the entrance pavilion, and, by designing a ramp system to address the change in grade at the eastern end of Phase 1, in combination with a more direct stairway. The draft proffers include a commitment to provide signage and mileage markers along the loop trail.
The issue of phasing of the loop trail has been addressed through a commitment to provide an interim trail link along International Drive currently with Phase 1. While this will not provide for a full loop until Phase 3 is constructed, existing sidewalks and internal roadways can temporarily substitute for the link between the ring road along the Capital Beltway and International Drive.

Staff has concluded that the applicant has adequately addressed the issues associated with the proposed loop trail.

**Dedication of a Park to the Park Authority:** Park Authority initially requested that approximately 1 acre of land be dedicated to it for an urban park that would include features such as an amphitheater, hardscape plaza areas, open green spaces, a water feature and an outdoor kiosk. The applicant’s proposed plazas include all of the above noted features thereby providing the appropriate outdoor areas and recreational amenities. However, the proposed plazas and other amenities are generally located on top of parking structures, which are located in portions of the site that were previously developed. The site does not contain a contiguous acre of relatively undeveloped property that could be appropriately dedicated in fee simple to the County for park purposes. With the open spaces generally located on top of structures, staff has concluded that it is most appropriate that the sites not be dedicated to the County.

**Schools Analysis (Appendix 10)**

The residential portion of the proposed mixed-use development is anticipated to generate:

- 85 elementary students who would attend Westbriar Elementary School, which is projected to operate within its capacity of 424 students through the school year 2010 – 2011;
- 15 intermediate students who would attend Kilmer Intermediate School, which is projected to exceed its capacity of 850 students through the school year 2010 – 2011;
- 38 high school students who would attend Marshall High School, which is projected to operate within its capacity of 1500 students through the school year 2010 – 2011.

Since the current zoning does not permit residential uses, an additional 138 students will be generated by the proposed development. While there is currently sufficient capacity projected for the high school level, Kilmer Middle School is currently experiencing a capacity deficit which is projected to remain through the 2010-2011. The anticipated student yield at the elementary school level could create a capacity deficit at the elementary school level, based on current projections. Special programs in the Marshall High School pyramid include a full day kindergarten at Westbriar Elementary, and Gifted and Talented and special education programs at Kilmer, all of which impact capacity at both schools. Marshall High School renovation planning funds were approved in the 2005 Bond Referendum.
Based on the guidelines for addressing school impacts, based on the students generated by the maximum number of dwelling units proposed by this application (1345 dwelling units), contribution of $1,035,000 for schools (138 students x $7,500 per student) was requested. The draft proffers commit to providing $7,500 for each student generated with the first building permit for each residential building. In addition, the draft proffers include a commitment to raise the amount of the schools contribution if a new guideline is adopted by the Board of Supervisors.

The proposed development provides for safe school bus drop off and pick up for students at each of the residential buildings by providing a drop-off and pick-up area with each residential building in each phase.

**Sanitary Sewer Analysis (Appendix 11)**

The property is located in the Scotts Run (E1) watershed and would be sewered into the Blue Plains Treatment Plant. At the request of the Wastewater Planning and Monitoring Division, the applicant performed a Preliminary Sanitary Sewer Capacity Analysis. Excerpts of that analysis are included in Appendix 3i. This analysis demonstrated that, while the existing development is adequately accommodated, prior to full build out of the proposed redevelopment, two pipes located off-site and in an easement will have to be upgraded from 12 inch pipes to 15 inch pipes to accommodate peak flows. The draft proffers include a commitment to upgrade the sanitary sewer system in accordance with the recommendations of the sanitary sewer study.

Should the Board approve this application, that approval does not guarantee that sewer capacity will be available to serve this site when the applicant seeks to develop the property.

**Fire and Rescue Department Analysis (Appendix 12)**

This property is serviced by Station 29, Tysons Corner. This service currently meets fire protection guidelines.

The applicant has coordinated with the Fire Marshal on several issues regarding this project including, but not limited to, the provision of fire lanes within Phases 1 and 2, fire equipment access in Phases 3 and 4 and the requirements to allow the proposed Sky Terrace, a public assembly use, to be located on top of a parking garage as part of Phase 4. Confirmations that these issues have been adequately resolved with that office was transmitted to the Department of Planning and Zoning by e-mail and are included in the files for this application in that office.

In addition, the draft proffers include a commitment to continue to provide a 1700 square foot community space within the mall for use by County public safety agencies including providing basic office furniture. The mall already includes such a facility.
Water Service Analysis (Appendices 13 & 14)

The property is located within the service area of the City of Falls Church, which notes that adequate domestic water service is available. The adequacy of water service will be re-evaluated at the time of site plan approval and, it may be determined at that time that the size of water mains may be required to be increased. See Appendix 13.

The property also contains a 24-foot wide Fairfax Water easement with a 42-inch water main (see Appendix 14). This easement will require that the water authority review any site plans for impacts to the easement and water main. The 10 foot wide trail proposed along ShopTysons Boulevard runs along this easement. The applicant has coordinated with the Fairfax Water, which has determined that the trail alignment within the easement is acceptable subject to certain conditions. The draft proffers state that if Water Authority does not grant permission to re-grade in the easement, the funds to construct the trail would be contributed to the Providence District Trail Fund. The Rail CDP/FDP includes an alternative design that would not affect the easement. This alternative is not the preferred outcome because it would shift the ring road further into the site and diminish the amount of green space between the ring road and Parking Terrace E.

Affordable Dwelling Units

Criterion 7 of the Development Criteria states that ensuring an adequate supply of housing for low and moderate income families, those with special accessibility requirements and those with other special needs is a goal of the County. The applicant can elect to fulfill this criterion by providing affordable units that are not otherwise required by the ADU Ordinance. As an alternative, land adequate and ready to be developed for an equal number of units may be provided to the Fairfax County Redevelopment and Housing Authority or to such other entity as may be approved by the Board. Satisfaction of this criterion may also be achieved by a contribution to the Housing Trust Fund or, as may be approved by the Board, a monetary and/or in-kind contribution to another entity whose mission is to provide affordable housing in Fairfax County, equal to 0.5% of the value of all of the units approved on the property except those that result in the provision of ADUs. This is also a recommendation contained in the Plan guidance for the Tysons Corner Urban Center.

Given the type of residential buildings that are to be constructed, Par. 1 of Sect. 2-803 of the Zoning Ordinance does not require that affordable dwelling units be provided.

To address this criterion and the Comprehensive Plan guidance for the Tysons Corner Urban Center which states that “for all development proposals with a residential component, affordable housing should be provided in accordance with the Affordable Dwelling Unit Ordinance and/or other Board-adopted policies regarding affordable housing,” the draft proffers state that 8 percent of the proposed residential units will be provided as what the proffer identifies as affordably priced rental housing
units (APRUs). APRUs would be provided under both development options with a minimum of 8 percent provided with each phase. These units will be provided for 30 years as rental units that are affordable to individual and families at 70 percent of the Washington D.C. Standard Metropolitan Statistical Area median household income. The proposed units will number a maximum of 108 APRUs and will be one bedroom, studio and efficiency units. The size of the units will range from 400 to 900 feet, with an average size of 550 feet. Up to 30 percent of APRUs can be provided off-site in Tysons Corner if approved by the Zoning Administrator. Staff believes that the aforementioned commitment is very responsive to the issue.

Heritage Resources

Criterion 9 of the Residential Development Criteria states that heritage resources are those sites or structures, including their landscape settings that exemplify the cultural, architectural, economic, social, political or historic heritage of the County or its communities.

The application property does not contain any identified heritage resources.

ZONING ORDINANCE PROVISIONS (Appendix 15)

Minimum District Size/Minimum Lot Size Requirements (Sect. 6-207):

This section contains minimum size parameters that a proposed PDC District must meet. The proposed PDC District exceeds the parameter established in Par. 1A, in that it exceeds 100,000 sq. ft. of GFA.

Par. 2 of Sect. 6-207 states that there is no minimum lot size for any building.

Bulk Requirements (Sect. 6-208):

Pars. 1 and 2 refer to the Design Standards contained in Part 1 of Article 16, Development Plans, with regard to the standards for maximum building height and minimum yard requirements. The design standards will be addressed below under Standards Applicable to all P-District.

Par. 3 addresses the maximum allowable floor area ratio (FAR) and sets a maximum FAR of 1.5. However, this paragraph also allows the Board to approve, at its discretion, up to a maximum of 2.5 FAR when the development meets one or more of the four standards outlined therein.

The proposed FAR of the Pre-rail option is 1.08. The FAR of the Rail option will be 1.77 with the completion of Phase 4. The proposed redevelopment of Tysons Corner Center includes all four of the features that must be included to qualify for the increase above 1.5 FAR:
1. open space in excess of the requirement – fifteen percent (15%) is required and twenty-three percent (23%) is provided;
2. “unique design features such as, but not limited to, terraces, sculpture, reflecting pools and fountains” are provided;
3. below surface parking spaces are provided; and,
4. structured above ground parking spaces are provided.

The Rail CDP/FDP meets these requirements; therefore, staff has concluded that the requested FAR above 1.5 is appropriate in this instance.

Transitional Screening Yards & Barriers

As described in the Description of the Surrounding Area section above, the property is bounded on four sides by divided roadways that are four or more lanes wide with turn lanes, and the Capital Beltway, an interstate highway. The uses across these roadways consist primarily of other commercial uses that are similar to those proposed on the site except for two existing high rise multi-family buildings located to the east across the Capital Beltway, and one planned high rise multi-family building to be constructed to the north across Chain Bridge Road that, pursuant to the matrix included in Article 13, Landscaping and Screening, should be buffered by transitional screening and barriers.

Where offices and retail establishments abut high-rise residential buildings, a transitional screening yard 1, twenty-five feet wide, and barriers D (a 42 to 48 inch tall chain link fence), E (a six foot tall brick or architectural block wall), or F (a six foot tall wooden fence) are required. Some of the allowed uses listed in the draft proffers would require transitional screening yard 2, which is thirty-five feet wide and the same barrier requirement.

The application includes a request to modify the transitional screening yard requirement along the northern and eastern boundaries pursuant to the provisions of Par. 3 of Sect. 13-304, which allows such modifications when the property has been designed to minimize adverse impacts. Given the application property is located in the Tysons Corner Urban Center which has specific streetscape provisions, which are being met, and given the more urban character of the area, staff concurs with the requested modification of the transitional screening yard requirement along the northern boundary. The width of the Capital Beltway obviates the effectiveness of screening, and staff concurs in the requested modification to the east. However, staff recommends that trees be planted along the trail to the extent that the existing Fairfax Water easement does not preclude such plantings, which are not currently shown on the Rail CDP/FDP. The application also includes a request to waive the barrier requirements along these boundaries. Par. 12 provides for a waiver of the barrier requirement when the topography between the affected lots is such that the barrier would be ineffective, such as, as is the case in this instance, a ten-lane divided road and an interstate highway. For this reason, staff also concurs with the request to waive the barrier requirement along the eastern and northern boundaries.
A modification of the transitional screening yard requirement and a waiver of the barrier requirement have also been requested with regard to the area between of the proposed high-rise multi-family buildings and the commercial structures proposed within Tysons Corner Center. Par. 1 of Sect. 13-304 provides for such modifications and waivers on a site that is to be developed under a common development plan within the PDC District when compatibility between uses has been addressed through a combination of the location and arrangement of buildings or through architectural or landscaping treatments. Based on the design proposed with the Rail CDP/FDP and the Pre-rail CDP/FDP, staff recommends that the requested modification of the transitional screening yard requirement and waiver of the barrier requirement within this project be approved.

**Interior Parking Lot Landscaping**

Sect. 13-201 requires that interior parking lot landscaping be provided such that five percent of the area of the parking lot is landscaped. The application includes a request to waive the interior parking lot landscaping requirements for the existing above ground parking garages, Parking Terraces B, C and E. Pursuant to the provisions of Par. 6 of Par. 13-201, in conjunction with the approval of a rezoning application, the Board may approve a waiver or modification of the interior parking lot landscaping requirement when such modification will not have a deleterious effect on the existing or planned development of adjacent properties.

Parking Terrace B is the existing parking garage at the end of the Bloomingdale’s wing of the mall building. The future development of the Building 3-B, the office building on Leesburg Pike, will buffer most of this structure from views from Leesburg Pike. The redevelopment of Tysons Corner Center will not change the circumstance for the properties located to the east or west of this arm of the application property. Parking Terrace E was constructed a part of the recent expansion of the mall at the end of the wing located closest to the Capital Beltway. Parking Terrace C is located between the eastern wing of the mall building and the Towers Crescent development and faces the parking deck associated with that development. The upper level of Parking Terrace C is visible only from the upper levels of the adjacent and planned office buildings in Towers Crescent.

Staff supports the requested waiver of the interior parking lot landscaping requirements for existing Parking Terraces B, C and E, because this represent the existing conditions, retrofitting the tops of decks is very difficult and since the site otherwise exceeds the amount of open space required. It should be noted that the tops of the new parking decks will include turf and other landscaping. The applicant has also proffered to construct the Community Green, located on top of the underground parking deck in Phase 3 and portions of the Sky Terrace in Phase 4 as “intensive green roofs.”

**Peripheral Parking Lot Landscaping**

Sect. 13-202 requires that peripheral parking lot landscaping be provided in a four-foot wide strip with one large deciduous tree every fifty feet where a property
abuts land not in the right-of-way of a street or in a ten-foot wide strip with at least
one tree for every forty feet where the property abuts right-of-way. The application
includes a request to modify this requirement along Chain Bridge Road, where the
parking garages for Phases 1 and 2 abut the roadway. The northern edge of Phase
1 has been redesigned so that the width of the planting strip between the parking
garage and the roadway is no less than eight feet. The modification is also required
for Phase 2 where the proposed bus depot is located. Pursuant to the provisions of
Par. 3 of Par. 13-202, in conjunction with the approval of a rezoning application, the
Board may approve a waiver or modification of the peripheral parking lot landscaping
requirement when such modification will not have a deleterious effect on the existing
or planned development of adjacent properties. In this instance, the frontage along
Chain Bridge Road has been designed to accommodate the bus depot and to
provide an appropriate edge to the site where the ramp to the Capital Beltway is
adjacent to Phase 1. Staff concurs with the requested modification.

Parking

On July 21, 2003, the Board of Supervisors approved a parking reduction for Tysons
Corner Center. This approval was amended September 12, 2005, to permit 10,300
parking spaces to be provided for the Tysons Corner Center, reflecting the recently
completed expansion of the mall building (see Appendix 4). The amended parking
reduction was approved based on the parking accumulation pattern for the expanded
mall building including the multi-plex movie theater and the existing 60,000 sq. ft. of
office space now part of the mall building. The parking reduction included
development conditions that allowed for the expansion of the Macy’s building and
some changes of uses within the mall without requiring that the parking reduction be
amended when “it is determined by the Director that those increases do not affect the
parking accumulation associated with the parking reduction.” The applicant has been
informed by DPWES staff that approval of a new parking reduction will be required
when each phase is developed if the currently approved parking reduction for the
mall is to be continued.

The draft proffers state that parking will be provided in accordance with the
requirements of the Zoning Ordinance, including any future reductions that may be
approved by the Board. The CDP/FDP includes a chart that details the existing
car parking and the parking to be provided with each phase in the “Building and Parking
Schedule” contained on Sheet 3. As noted previously, with the construction of each
phase some parking will be displaced, especially with Phase 2, when existing Parking
Terrace D will be razed. Furthermore, some of the parking located in the new
parking structures will include parking to support the mall. The parking schedule
identifies the parking to be built with each phase for each use within that phase and
identifies the number of spaces to be provided in each structure for mall parking. The
schedule demonstrates that the parking provided within each phase meets the
Zoning Ordinance requirement for the new uses proposed for each phase. Sheet 3
also includes a chart that illustrates the proportion of the number of parking spaces
on the site that will exceed Zoning Ordinance requirements, expressed as a
percentage of the required parking.
This proffer also states that the current parking reduction shall remain in effect with regard to the shopping center until such time as the County determines that it must be amended.

An additional consideration is the availability of parking for each building in close proximity to that building, as well as segregating the parking for each use to ensure that parking for one use does not supplant its availability for other uses. For example, mall parking should not result in a resident or an office tenant not being able to park in the parking structure adjacent to that building. This is addressed by the draft proffers that state that the parking for each use will be separate to ensure that each use will have sufficient parking and that retail parking will be excluded from spaces allocated to office and residential users. The proffer also states that signage will be provided to direct retail patrons to parking for that use. The parking schedule states that there is sufficient parking within each phase to accommodate the residential and office uses in that phase.

Staff requested that the applicant commit to reducing further the parking provided on site to less than the Zoning Ordinance requirement given the proximity of the future rail station and in support of the proffered TDM program. However, the applicant has declined to do so for business reasons, citing difficulties obtaining financing and leasing the property in the future. The applicant has also noted that the cost of providing structured parking is an incentive to seek a parking reduction.

Loading Spaces

The application includes a request to reduce the overall number of loading spaces on site from 62 spaces to 37 spaces. The mall will be provided with the required 17 spaces; however, the total number of loading spaces for the new development proposed to be reduced from 45 to 20 spaces. Two loading spaces are proposed to be provided with each building, i.e. six spaces are provided within Phase 1, four spaces within Phase 2, four spaces within Phase 3 and six spaces within Phase 3. Staff recommends that this request be approved.

Overlay District Requirements

Portions of the property are located in parts of two different overlay districts, the Highway Corridor Overlay District and the Sign Control Overlay District.

*Highway Corridor Overlay District:* This district addresses specific automobile oriented uses, car washes, drive-in banks, drive-through pharmacies, fast food restaurants, quick-service food stores, service stations and service stations/minis-marts. Of these uses, the list of proffered uses includes only fast food restaurants and quick-service food stores. These uses are not proposed to be free-standing; they will be incorporated into the existing and the proposed buildings in Tysons Corner Center. Given this and the character of the development, staff has concluded the proposed conform with the requirements of Sect. 9-505.
**Sign Control Overlay District (SCOD):** The SCOD applies to free-standing signs for commercial and industrial uses and specifically limits office parks and shopping centers to free-standing signs with a maximum of 40 sq. ft. of sign area. The CDP/FDP includes locations for proposed free-standing signs for this mixed use project. The applicant has submitted a Comprehensive Sign Plan that requests approval of 34 foot tall free-standing entrance signs that are similar in sign area to the existing non-conforming free-standing signs, which are 568 square feet in area and approximately 18 feet tall. The Comprehensive Sign Plan can only be acted upon after the site has been rezoned to the PDC District; the CSP is scheduled for public hearing in January of 2007. Until such time as the CSP is approved, all signs on the property must comply with the conditions associated with SPA 89-P-034.

**Use Limitations for the PDC District**

Sect. 6-206 includes several use limitations that are applicable to the PDC District as follows:

Par. 1: This paragraph refers to the standards contained in Part 1 of Article 16 (Sect. 16-100). The subsequent text addressing those standards notes that these standards are, in staff’s judgment, satisfied.

Par. 2: This paragraph notes that the performance standards contained in Article 14 are applicable to the uses within a PDC District. The proffers address the requirements for lighting contained in Part 9 of Article 14. Other performance standards including, air pollution, fire and hazardous materials, radiation hazards, electromagnetic radiation and interference, liquid and solid waste disposal, noise and earthborn vibrations associated with blasting reference the standards contained in other sections of the County Code that are part of construction and other business activities on a property.

Par. 3: This paragraph notes that that standards set forth in Article 8, Special Permits, and Article 9, Special Exceptions, are to be used as a guide in the evaluating all group or category uses noted on a development plan. The group and category uses permitted per the draft proffers will not be located in free-standing buildings but will be located within the office buildings, residential buildings and the existing mall building on the site. As evidenced by the analyses contained in this staff report, staff concludes that the proposed group and category uses conform with the standards for special permit uses and special exception uses.

Par. 4: This paragraph states that all uses shall be in substantial conformance with the approved final development plans as provided for in Sect. 16-403, which requires that site plans be in substantial conformance with the final development plan.

Par. 5: This paragraph addresses secondary uses by requiring: a) that secondary uses are permitted only in a PDC District that includes one or more principle uses; b) limits the amount of gross floor area devoted to dwellings as a secondary uses to fifty percent of the principle uses in the development unless modified by the Board; and,
c) limits the gross floor area of all other secondary uses to less than 25 percent of the gross floor area of the principal uses in the development.

The Rail CDP/FDP, the Pre-rail CDP/FDP and the proffers include the following principle uses: offices, eating establishments, retail sales establishments, hotel, the existing theater in the mall building, garment cleaning establishments, personal service establishments, business supply and service establishments, financial institutions, public uses and repair service establishments. While a gross floor area is not listed on either CDP/FDP for some of the uses listed above, the GFA to be devoted to office, hotel and retails is listed on each CDP/FDP. The Rail CDP/FDP includes approximately 1,389,438 sq. ft. office; 266,513 sq. ft. hotel and in excess of 2.4 million sq. ft. of retail sales, resulting in a total of approximately 4 million sq. ft. of principle uses. The Pre-rail CDP/FDP includes approximately 490,076 sq. ft. office, 266,513 sq. ft hotel and in excess of 2.4 million sq. ft. of retail sales, for a total of approximately 3.16 million square feet of principle uses. The amount of gross floor area devoted to residential use is 1,685,275 sq. ft. (approximately 41 percent of the principal uses) and 480,825 sq. ft. (approximately 15 percent of the principal uses) respectively. In conclusion, both CDP/FDPs include one or more principal uses; the amount of GFA devoted to residences does not exceed fifty percent of the principle uses on site; and, the secondary uses would not exceed 25 percent of the total GFA; as required by Par. 5.

Par. 6: This paragraph requires that the proposed secondary uses be designed to protect the character of adjacent properties and be conducted entirely within a building. As discussed elsewhere in this report, staff concluded that the proposed design more than adequately addresses the relationship between the proposed development and the surrounding properties and such uses are to be located within buildings devoted to principal uses and will not be located in separate free-standing buildings.

Par. 7: This paragraph addressed service stations, and service station/mini-marts and vehicle light service establishment and is not applicable in this instance.

Par. 8: This paragraph addresses the sign regulations which are discussed above in the section entitled Signage.

Par. 9: This paragraph addresses including elderly housing or independent living facilities in a project. The draft proffers state that this use could be added through the approval of a special exception.

Par. 10: Pursuant to Sub-paragraph A, fast food restaurants are permitted when the use is located in a building with at least one other principle use and when they are designed to cater primarily to occupants and/or employees of the building complex, accessible via a clearing designated pedestrian system and are not more than 15 percent of the structure. The possible locations for fast food restaurants in either the existing mall building or within the lower floors of the proposed office or residential buildings demonstrate that any fast food restaurants will meet these standards.
The remaining paragraphs address uses, kennels and veterinary hospitals (Par. 11), drive through pharmacies (Par. 12), vehicle transportation service establishments (Par. 13), and new vehicle storage (Par. 14), that are not proposed to be part of the development.

**Standards for all Planned Developments** (Sect. 16-100)

Sect. 16-101 contains six general standards that must be met by a planned development. Sect. 16-102 contains three design standards to which all Conceptual and Final Development Plans are subject.

**Sect. 16-101, General Standards**

The first general standard requires that the planned development conform with the Comprehensive Plan (Par. 1). As discussed in the Land Use Analysis section above, staff has determined that this standard has been satisfied.

The second General Standard addresses whether or not the planned development is of such a design that it achieves the purpose and intent of a planned development more than would be development under a conventional district (Par. 2). The purpose and intent of the Planned Development Commercial District as contained in Sect. 16-201 is to encourage innovative and creative design of commercial development and to insure high standards of layout design and construction of high density commercial development. Further, the district regulations are designed to accommodate preferred high density land uses that could produce detrimental effects on neighboring properties if not strictly controlled as to location and design. For the reasons discussed elsewhere in the staff report, staff has determined that this standard has been satisfied.

The third general standard addresses the efficient use of the available land and protection of scenic assets and natural features such as trees, streams and topographic features (Par. 3). As noted in the discussion regarding the environmental criterion, there are no natural features remaining on the site. However, the well integrated and well designed plazas, streetscape and landscaping will re-introduce scenic assets to Tysons Corner Center. Staff has concluded that this standard has been satisfied.

The fourth general standard states that the planned development should be designed to prevent substantial injury to the use and value of existing surrounding development and shall not hinder, deter or impede development of surrounding undeveloped properties (Par. 4). This issue is addressed primarily in the discussions regarding the Neighborhood Context Criterion. Staff has determined that this standard has been satisfied.

The fifth general standard addresses the adequacy of public facilities in the vicinity (Par. 5). As noted in the Public Facilities Analysis, the site is located in an area where public facilities and public utilities are or can be available to the property. As noted in the analysis of the sanitary sewer needs, improvements down stream will be
required to accommodate the proposed development; the proffers acknowledge this requirement. The proffers include contributions to schools in the vicinity in accordance with the guideline that has been adopted by the Board, and a commitment to any increased contributions based on the adoption of a new guideline by the Board of Supervisors. Contributions to address the impacts of the proposed development on Park Authority facilities are included in the draft proffers. The details of these contributions are addressed under the Public Facilities Analysis. Staff has determined that this standard has been met.

The sixth general standard addresses internal linkages between internal facilities and to external facilities at a scale appropriate to the development (Par. 6). The roadway and pedestrian networks have been described extensively in this staff report. Staff has concluded that this standard has been satisfied.

Sect. 16-102, Design Standards

The first design standard specifies that, the peripheral yards should generally conform with the setbacks for the most similar conventional district. The most similar conventional districts are the C-4 District for the office use and the R-30 District for residential use. The following yard requirements are specified for these two districts.

<table>
<thead>
<tr>
<th>Yard Requirements In The C-4 And R-30 Districts</th>
<th>C-4</th>
<th>R-30</th>
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<tbody>
<tr>
<td>Front</td>
<td>$25^\circ \ ABP^1 \geq 40$ feet</td>
<td>$25^\circ \ ABP^1 \geq 20$ feet</td>
</tr>
<tr>
<td>Side</td>
<td>No Requirement</td>
<td>$25^\circ \ ABP^1 \geq 10$ feet</td>
</tr>
<tr>
<td>Rear</td>
<td>$20^\circ \ ABP^1 \geq 25$ feet</td>
<td>$25^\circ \ ABP^1 \geq 25$ feet</td>
</tr>
</tbody>
</table>

1. ABP – Angle of Bulk Plane is the angle at ground level of a line drawn from the property line to the top of the building. The building must be located within this envelope while not exceeding the maximum height requirement specified in the applicable zoning district.

Therefore, the following yards would be required on the buildings located along the peripheral boundary for each of the phases. The chart also includes the actual setback proposed in this instance.

<table>
<thead>
<tr>
<th>REQUIRED SETBACKS$^1$</th>
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<tbody>
<tr>
<td><strong>Building #</strong></td>
<td><strong>Height</strong></td>
<td><strong>Use</strong></td>
</tr>
<tr>
<td>Building 1A Chain Br. Rd.</td>
<td>351 feet</td>
<td>Residential R-30 Front</td>
</tr>
<tr>
<td>Building 1B I-495</td>
<td>320 feet</td>
<td>Office R-30 Front</td>
</tr>
<tr>
<td>Building 2A Chain Br. Rd</td>
<td>351 feet</td>
<td>Residential R-30 Front</td>
</tr>
<tr>
<td>Building 2A Ser. Sta.</td>
<td>351 feet</td>
<td>Residential R-30 Side</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td><strong>Required Setback In Feet</strong></td>
<td><strong>Setback Provided</strong></td>
</tr>
<tr>
<td>Building 1A Chain Br. Rd.</td>
<td>164 feet</td>
<td>50 feet</td>
</tr>
<tr>
<td>Building 1B I-495</td>
<td>149 feet</td>
<td>40 feet</td>
</tr>
<tr>
<td>Building 2A Chain Br. Rd</td>
<td>164 feet</td>
<td>0 feet$^2$</td>
</tr>
<tr>
<td>Building 2A Ser. Sta.</td>
<td>164 feet</td>
<td>18 feet</td>
</tr>
</tbody>
</table>
## REQUIRED SETBACKS’

<table>
<thead>
<tr>
<th>Building #</th>
<th>Height</th>
<th>Use</th>
<th>Applicable Conventional District &amp; Yard</th>
<th>Required Setback In Feet</th>
<th>Setback Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building 2B</td>
<td>320 feet</td>
<td>Office</td>
<td>C-4 Front</td>
<td>149 feet</td>
<td>0 feet</td>
</tr>
<tr>
<td>Building 3A</td>
<td>205 feet</td>
<td>Residential</td>
<td>R-30 Front</td>
<td>92 feet</td>
<td>82 feet</td>
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<tr>
<td>Building 3B</td>
<td>65 feet</td>
<td>Office</td>
<td>C-4 Front</td>
<td>40 feet</td>
<td>20 feet</td>
</tr>
<tr>
<td>Building 4A</td>
<td>195 feet</td>
<td>Residential</td>
<td>R-30 Front</td>
<td>91 feet</td>
<td>8 feet</td>
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<tr>
<td>Building 4B</td>
<td>110 feet</td>
<td>Office</td>
<td>C-4 Front</td>
<td>51 feet</td>
<td>21 feet</td>
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<tr>
<td>Building 4C</td>
<td>160 feet</td>
<td>Office</td>
<td>C-4 Front</td>
<td>75 feet</td>
<td>9 feet</td>
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</tbody>
</table>

1. The required setbacks assume that the building face is vertical for the full height of the building along the lot line from which the setback is being measured.
2. Along Chain Bridge Road Building 2A abuts the area to be dedicated for the bus depot which is to be constructed on land to be dedicated by the applicant for that purpose.

As discussed in the Land Use Analysis section above, there are streetscape standards outlined under the Urban Design portion of the Tysons Corner Urban Center Plan text. An important element of an urban streetscape is the relationship of the building to the street. In this instance, the buildings reflect the recommendations of the Plan that the buildings be located relatively close to streets. As such, the appropriate determination in this instance is whether the proposed buildings are in the proper relationship to the street, whether they further the design guidance contained in the Comprehensive Plan and how the streetscape recommendations contained in the Plan text for the Tysons Corner Urban Center are met. As discussed in the Land Use Analysis section above, staff has concluded that the proposed buildings have an appropriate relationship to the street as evidenced by compliance with the streetscape guidelines contained in the Plan text.

Given that the proposed layout conforms with the streetscape recommendations for the Tysons Corner Urban Center, staff has concluded that Design Standard 1 has been satisfied.

The second design standard states that other applicable provisions of the Ordinance such as off-street parking, landscaping, signs, etc. are applicable to planned developments (Par. 2). This standard is addressed by the analysis regarding Zoning Ordinance provisions above, and has been satisfied.

Design Standard Number 3 specifies that the street systems conform with the applicable requirements and that a network of trails be provided to provide access to recreational amenities open space, public amenities, vehicular access routes and
mass transit facilities (Par. 3). Staff has concluded that this standard has been satisfied as addressed by discussions throughout this report.

CONCLUSIONS AND RECOMMENDATIONS

Staff Conclusions

As illustrated by this report, the planning and land use issues and their resolution by the applicant serve as a model for transforming the Tysons Corner Urban Center in response to the extension of rail transit to and through that part of Fairfax County. The following summarizes the major facets of the project—urban design elements, the relationship to the planned extension of rail transit to and through Tysons Corner, transportation impacts on the road network, and other issues—to illustrate how the application provides that model of the type of development that the County expects in response to the opportunity provided by the rail extension.

The proposed design addresses diverse urban design issues by:

- Providing an appropriate synergistic mix of uses in close proximity to the planned rail station that will, by their nature, reduce vehicular trips;
- Providing a well designed and visually interesting pedestrian system, including a direct connection between the currently planned elevated rail station to the mall and to the proposed additional development on the site;
- Creating a pedestrian friendly environment on a site that was previously designed to focus on the automobile, by creating a system of plazas, pathways, pedestrian oriented streetscapes, and animated building façades;
- Creating an elevated set of plazas and pedestrian walkways that separate the pedestrian from the major traffic movements;
- Locating buildings and plazas in appropriate relationship to one another and so that the plazas have appropriate solar access;
- Proffering to provide animated façade areas on the new buildings and to the mall itself;
- Providing a layout that includes high quality urban design; and,
- Proffering to provide the Planning Commission with architectural plans for review, comment and approval prior to approval of such plans by staff itself.

The conversion of the Tysons Corner Center to a first class mixed use project is tied to the extension of Metrorail through Tysons to Dulles Airport. However, as noted in the Background section, while the Rail Project is moving forward, a funding commitment has not been finalized. To address the limited contingency that the rail project may not proceed as currently contemplated and to ensure that the proposed mixed-use transit-oriented redevelopment of Tysons Corner Center will occur in concert with the implementation of this major transportation asset the draft proffers:

- state that a reduced Phase 1 could be built without the rail project being funded and imminently constructed; and state that if the rail project is implemented at a
later date than currently contemplated, the rail related development could be constructed;

• include commitments that phase the project to the funding, construction and operation of rail: Phase 1 of the Rail CDP/FDP is tied to the funding of rail; Phase 2 cannot be constructed until such time as rail is under construction; Phase 3 can be constructed upon the opening of rail; and, Phase 4 is triggered once rail through Tysons Corner has been in operation for at least two years;

• fund the difference to have the bridge that connects to the rail station widened to sixteen feet wide; and

• state that, if the option to have the portion of the rail extension through Tysons Corner constructed underground rather than above ground is chosen, the applicant will modify the pedestrian connection to accommodate that change.

The impacts of the additional vehicular traffic generated by the proposed mixed use development on the road network in Tysons Corner are also addressed fully. As a result, Tysons Corner Center will become more readily accessible by many modes of transportation as follows:

• The site contains and will continue to accommodate a major bus depot where eight bus routes intersect.

• Additional bus connections will be available at the new bus depot on Chain Bridge Road.

• The draft proffers include a commitment to fund a study of the various existing shuttle programs in Tysons Corner and the feasibility of creating a circulator system within Tysons Corner.

• New pedestrian facilities will better connect this site to the development north of Chain Bridge Road, across International Drive and to Towers Crescent.

• Bicycle paths through the site will provide planned trail links through the site interconnecting the portion of Tysons Corner south of Leesburg Pike with the portion located north of Chain Bridge Road.

• The applicant has proffered the strongest transportation demand management (TDM) program that the County has seen to date. The proffered TDM program includes trip reduction goals that must be met and provides for resources and methods to remedy any shortfalls in achieving the proffered reduction in the number of trips, as well as penalties to be paid by the developer for any shortfall. In addition, the drafts proffers state that, if the proffered trip reduction goals are not met, the third and fourth phases of development cannot be built until such time as the proffered goals are met. The TDM includes monitoring to determine whether the goals are being met, requires periodic coordination, review and approval of reports and plans by the County, and requires that any changes to the program to address shortfalls in meeting the trip reduction goals be approved by the County. The proffered TDM program also includes elements related to the existing mall. This set of commitments constitutes the most robust TDM program presented with a zoning application to date.

• The draft proffers include road improvement and signalization commitments within the site to allow vehicle to move onto, off of, and through Tysons Corner Center more easily. Proffered improvements to the roads immediately
adjacent to the property include widening the Westpark Drive bridge to four lanes with on-road bicycle lanes, widening Chain Bridge Road and International Drive, widening on both sides of Leesburg Pike between International Drive and the interchange with the Beltway, and signal modifications associated with those improvements.

- The draft proffers include funding the design of the interchange at International Drive and Chain Bridge Road shown on the Comprehensive Plan.
- The proffers include a commitment to review and, if approved by VDOT, re-time the signals along Leesburg Pike between Old Gallows Road and the DAAR.

Other planning issues where this application has set an example for the redevelopment of other portions of Tysons Corner and the County include:

- The draft proffers commit to a reduction of the stormwater flowing off the site by 30 percent by including the construction of on-site stormwater detention, where none is required.
- The draft proffers include a commitment to reduce the amount of phosphorous from the site by 14 percent, where the PFM would require an 11 percent reduction.
- The draft proffers include the implementation of various low-impact development techniques which will provide water quality benefits in addition to the commitment to reduce phosphorous discharges from the site noted above.
- The draft proffers state that if the amount required for on-site recreation facilities in the PDC District is raised above the current $955 per dwelling unit, the amount of recreation facilities will equal the greater amount. The applicant has proffered and additional $493 per unit for athletic facilities and fields in the vicinity, which is to be escalated. A one-time contribution of $500,000 for athletic fields to be made within 30 days of the approval of the zoning case being final. A commitment is made to increase the proffered contributions for off-site fields and other recreation facilities requested by the Park Authority.
- The draft proffers provide commitments to the schools and state that the proffered contribution for schools will also be escalated upon an adoption of new guidelines by the Board of Supervisors.
- The proposed residential buildings are, except from the requirement to provide ADUs. In lieu of the 0.5 percent of the value of the residential portion of the project that is recommended by the Residential Development Criteria, the draft proffers commit the applicant to provide eight percent of the dwelling units as units that are affordable to individuals and families that make 70 percent of the MSA median household income.

The CDP/FDP and the draft proffers are the result of a cooperative relationship between staff and the applicant to effect a major change to one of the core areas of Tysons Corner and to provide an example of the transit oriented future for Tysons Corner as envisioned in current recommendations of the Comprehensive Plan. Staff has concluded that the pending application will provide an example of how to implement that transit oriented vision.
Recommendations

Staff recommends approval of RZ 2004-PR-044 subject to the execution of the draft proffers contained in Appendix 1 and approval of the Conceptual Development Plan.

Staff recommends approval of the following requested waivers and modifications:

- Waiver of the service drive requirement along Leesburg Pike (Rt. 7) and Chain Bridge Road (Rt. 123)
- Modification of the minimum 8-foot planting width for trees per Sect. 12-0702(2) of the Public Facilities Manual (PFM)
- Waiver of the barrier requirement along the eastern boundary (adjacent to the Capital Beltway)
- Modification of the transitional screening yard requirements along the eastern boundary (adjacent to the Capital Beltway)
- Waiver of the transitional screening yard and barrier requirements internal to the project
- Modification of the peripheral parking lot landscaping requirement for the western parking structures located adjacent to Chain Bridge Road
- Waiver of the interior parking lot landscaping requirements for the existing parking structure identified as Parking Terrace B, C and E
- Waiver to allow the use of underground stormwater management facilities with residential development pursuant to Par. 6-0303.8 of the PFM subject to the conditions contained in Appendix 7
- Approval by the Board of Supervisors pursuant to Sect. 2-414 of the Zoning Ordinance to allow a commercial building within 75 feet of the right-of-way of an interstate highway (the Capital Beltway – I-495)
- Modification to allow the pedestrian pathways shown on the CDP/FDP (sidewalks, the 25 foot wide sidewalk within the bus depot and an internal loop trail) to meet the requirement for a trail along Chain Bridge Road west of Tysons Boulevard (with rail CDP/FDP only)
- Waiver of the trail requirement along Chain Bridge Road between the site entrance opposite Tysons Boulevard and the ramp for the Capital Beltway
- Modification of the trail along Leesburg Pike to allow combined sidewalk/trail that is consistent with the streetscape recommendations for the Tysons Corner Urban Center
- Modification of the recommended on-road bike trail on ShopTysons Boulevard to allow a ten foot wide off-road bike trail
- Modification of the number of loading spaces required on site
- Waiver of the trail shown on the Trails Plan within the right-of-way of the Capital Beltway

Staff further recommends that the Final Development Plan be approved by the Planning Commission.

It should be noted that the main/trunk sewer lines serving this property may be inadequate. Should the Board approve this application, that approval does not guarantee
that sewer capacity will be available to serve this site, at such time as the applicant elects to develop the property.

It should be noted that it is not the intent of staff to recommend that the Board, in adopting any conditions proffered by the owner, relieve the applicant/owner from compliance with the provisions of any applicable ordinances, regulations, or adopted standards.

It should be further noted that the content of this report reflects the analysis and recommendations of staff; it does not reflect the position of the Board of Supervisors.

APPENDICES

1. Draft Proffer Statement
2. Affidavit
3. Applicant’s Statements:
   a. Statement of Justification
   b. Project Summary
   c. Transportation Demand Management Program Notes
   d. Reduction of the first submission of the CDP/FDP
   e. Trip Generation Summary Charts
   f. Executive Summary Transportation Study
   g. Overview Sections from the Transportation Study Addendums – October 25, 2005, March 24, 2006, March 30, 2006
   h. Transportation Demand Management Strategic Plan
   i. Executive Summary – Sanitary Sewer Study
   j. Noise Study
4. Approval Letter Regarding the Parking Reduction
5. Plan Citations and Land Use Analysis
6. Environmental Analysis
7. Stormwater Management Analysis
8. Transportation Analysis
9. Park Authority Comments
10. Schools Analysis
11. Sanitary Sewer Analysis
12. Fire and Rescue Analysis
13. Water Service Analysis – City of Falls Church
14. Comments of Fairfax Water
15. Selected Excerpts from the Zoning Ordinance
16. Residential Development Criteria
17. Glossary of Terms
TYSONS CORNER CENTER PROFFERS
RZ 2004-PR-044

June 7, 2005
Revised: November 10, 2005
Revised: January 6, 2006
Revised: January 9, 2006
Revised: January 26, 2006
Revised: February 10, 2006
Revised: March 17, 2006
Revised: April 24, 2006
Revised: May 18, 2006
Revised: June 14, 2006
Revised: July 19, 2006
Revised: August 14, 2006
Revised: September 1, 2006
Revised: September 12, 2006

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Pursuant to Section 15.2-2303 (A), Code of Virginia (1950, as amended) and Sect. 18-204 of the Zoning Ordinance of Fairfax County (1978, as amended), the property owners and applicants for themselves and their successors and/or assigns (collectively referred to as the “Applicant”) in this Rezoning application (“RZ”) proffer that the development of the parcels under consideration and shown on the Fairfax County Tax Maps as Tax Map 29-4 ((1)) 35A and 35C and 39-2 ((1)) 2, 4 and 5 (the “Property”) shall be in accordance with the following conditions if, and only if, Rezoning application RZ 2004-PR-044 is granted. In the event that the Rezoning application is denied, these Proffers shall be immediately null and void and of no further force or effect. The proffered conditions are:

**GENERAL**

1. **Conceptual/Final Development Plan.** The Property shall be developed in substantial conformance with the Conceptual/Final Development Plan dated November 15, 2004, and revised through September 1, 2006, prepared by Patton, Harris, Rust & Associates and consisting of 63 sheets (the “Development With Rail CDP/FDP”), and/or the Conceptual/Final Development Plan dated March 31, 2006, and revised through September 1, 2006, prepared by Patton, Harris, Rust & Associates and consisting of 33 sheets (the “Development Prior to Rail CDP/FDP”), as further described below. Development of the Property under the Development With Rail CDP/FDP is sometimes referred to in these Proffers as the “Development With Rail,” and development of the Property under the Development Prior to Rail CDP/FDP is sometimes referred to in these Proffers as the “Development Prior to Rail.” The use of the term “CDP/FDP” in these Proffers shall mean the Development With Rail CDP/FDP or the Development Prior to Rail CDP/FDP or both, as applicable.

2. **Minor Modifications.** Minor modifications to the CDP/FDP may be permitted pursuant to Section 16-403(4) of the Zoning Ordinance when necessitated by sound engineering or when necessary as part of final site engineering. Building footprints may be decreased, and the number of units and square footage within each building may be adjusted, as long as the minimum open space tabulations provided in the CDP/FDP are not reduced, the minimum building setbacks from the property lines (as provided in accordance with the dimensions shown on the CDP/FDP) are maintained, and the range of residential units and building heights comply with the ranges indicated in the CDP/FDP and these Proffers.

3. **Future Applications.** Any portion of the Property may be the subject of a Proffered Condition Amendment, Rezoning, Special Exception, Special Permit, Variance or other zoning action without the joinder and/or consent of the owners of the other land areas, provided that such application complies with Section 18-204 paragraph 6 of the Zoning Ordinance. Previously approved proffered conditions or development conditions applicable to a particular portion of the Property which are not the subject of such an application shall remain in full force and effect.
PROPOSED DEVELOPMENT

4. **Development With Rail and Development Prior to Rail.** Development of the Property may occur as described in paragraphs A, B and C below.

   A. **Development With Rail.** Subject to the transition provision described in paragraph C, if a Full Funding Grant Agreement or a similar or equivalent funding mechanism (“FFGA”) to finance the Metrorail extension through Tysons Corner has been executed by the time the Applicant intends to begin construction of any part of the new development, such new development of the Property shall be pursued under the Development With Rail CDP/FDP except as otherwise indicated in paragraph C.

   B. **Development Prior to Rail.** If a FFGA to finance the Metrorail extension through Tysons Corner is not executed at the time that the Applicant intends to begin construction of any part of the new development, the Applicant may only pursue development under the Development Prior to Rail CDP/FDP. The Applicant may pursue development of the Property under the Development Prior to Rail CDP/FDP until such time as the FFGA is executed by the relevant parties, and the Applicant chooses to pursue construction of Phases 1, 2, 3 and 4 as described in Proffer #6.

   C. **Transitions in Applicable Development Plans.** If the Applicant has an approved site plan for the Development Prior to Rail CDP/FDP, but has not started construction at the time that a FFGA is executed, then the Applicant shall not be required to construct the Development With Rail, and may proceed with development under the Development Prior to Rail CDP/FDP. In addition, the Applicant reserves the right to begin construction under the Development Prior to Rail CDP/FDP and subsequently complete development of Phase 1 of the Development With Rail CDP/FDP if the FFGA is executed after the Applicant obtains an approved site plan for the Development Prior to Rail CDP/FDP. Alternatively, the Applicant may complete construction under the Development Prior to Rail CDP/FDP and subsequently proceed with Phases 2, 3 and/or 4 as further described in the Proffers.

5. **Development With Rail CDP/FDP.** The Property is approximately 78.65 acres in size and is currently developed with 2,517,057 square feet, which includes the existing Tysons Corner Center super-regional mall (the “Existing Shopping Center”) and an up to 75,000 square foot un-built expansion of the Existing Shopping Center. The additional development proposed with this Development With Rail will supplement the uses and square footage existing on the Property. As contemplated by the CDP/FDP, approximately 42,922 square feet of the Existing Shopping Center will be removed, leaving 2,474,135 square feet in the Existing Shopping Center, including the 75,000 square foot un-built expansion; a maximum of 3,538,900 square feet gross floor area of development may be added to the 2,474,135 square feet of development in four phases as indicated in the CDP/FDP and as follows:
Existing Shopping Center*  
2,474,135 SF

Development With Rail
- Office: 1,389,438 SF
- Multifamily Residential Units: 1,685,275 SF (minimum 950 units, maximum 1,345 units)
- Hotel: 266,513 SF (maximum 300 rooms)
- New Retail and Other Non-Residential/Retail/Commercial Non-Office Uses: 197,674 SF

*Including the 75,000 SF un-built expansion and removal of 42,922 SF of the Existing Shopping Center

6. Phasing of the Development With Rail. The Development With Rail (consisting of a total of 3,538,900 square feet of gross floor area in addition to the Existing Shopping Center) will take place in four phases, as indicated in the CDP/FDP and further described below:

A. Phase 1: Phase 1 consists of a maximum of 1,342,700 square feet of gross floor area. The Applicant may submit and process a site plan or building plans at any time; however, the Applicant shall not obtain approval of any plans or permits, including but not limited to, grading plans, site plans and/or building permits until such time as (1) a FFGA is executed as set forth Proffer #4 and (2) an agreement is executed between the Applicant and the Dulles Transit Partners, the Virginia Department of Rail and Public Transportation and/or their respective successors (jointly, the “Dulles Rail Project Entities”) in accordance with Proffer #51.

<table>
<thead>
<tr>
<th>Phase 1 summary:</th>
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</thead>
<tbody>
<tr>
<td>Residential Building 1-A (259-355 units)</td>
</tr>
<tr>
<td>Office Building 1-B</td>
</tr>
<tr>
<td>Hotel Building 1-C (up to 300 rooms)</td>
</tr>
<tr>
<td>Retail/Commercial Buildings 1-A, 1-C, 1-D</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

B. Phase 2: Phase 2 consists of a maximum of 1,096,900 square feet of gross floor area.

i. The Applicant may submit and process a site plan or building plans at any time; however, the Applicant shall not obtain approval of any plans or permits, including but not limited to, grading plans, site plans and/or building permits until such time as construction of the Metrorail extension through Tysons Corner has commenced.

ii. For the purposes of this proffer, commencement of construction of the Metrorail extension through Tysons Corner shall be deemed to have occurred upon the commencement of site work related to the construction of the track or stations for the Dulles Corridor Metrorail Project.
Phase 2 summary:

<table>
<thead>
<tr>
<th>Building and Use</th>
<th>Sq Ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building 2-A (278-408 units)</td>
<td>518,000</td>
</tr>
<tr>
<td>Office Building 2-B</td>
<td>520,400</td>
</tr>
<tr>
<td>South Entrance Transit Pavilion Building 2-E</td>
<td>10,000</td>
</tr>
<tr>
<td>Retail/Commercial Buildings 2-B, 2-C, 2-D</td>
<td>48,500</td>
</tr>
<tr>
<td>Total</td>
<td>1,096,900</td>
</tr>
</tbody>
</table>

C. Phases 3 and 4: Phase 3, as shown on the Development With Rail CDP/FDP, is comprised of 379,900 square feet of gross floor area, and Phase 4, as shown on the Development With Rail CDP/FDP is comprised of 669,400 square feet of gross floor area. An additional 50,000 square feet residential development may be allocated to either Phase 3 or Phase 4 or shared between both of those phases as long as the maximum number of residential units does not exceed 1,345.

Phase 3 summary:

<table>
<thead>
<tr>
<th>Building and Use</th>
<th>Sq Ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building 3-A (200-282 units)</td>
<td>298,000</td>
</tr>
<tr>
<td>Office Building 3-B</td>
<td>26,100</td>
</tr>
<tr>
<td>Retail/Commercial Buildings 3-A and 3-B</td>
<td>55,800</td>
</tr>
<tr>
<td>Total</td>
<td>379,900</td>
</tr>
</tbody>
</table>

Phase 4 summary:

<table>
<thead>
<tr>
<th>Building and Use</th>
<th>Sq Ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building 4-A (213-300 units)</td>
<td>518,000</td>
</tr>
<tr>
<td>Office Buildings 4-B and 4-C</td>
<td>281,300</td>
</tr>
<tr>
<td>Retail/Commercial Buildings 4-A, 4-B, 4-C and 4-D</td>
<td>68,100</td>
</tr>
<tr>
<td>Total</td>
<td>669,400</td>
</tr>
</tbody>
</table>

i. Order of Phases 3 and 4. At the Applicant’s discretion, Phases 3 and 4 of the Development With Rail may occur in either order, as long as the first of the two phases occurs after the conditions of Proffer 6.C.ii have been met, and the second of the two phases occurs after the conditions of Proffer 6.C.iii have been met.

ii. Third Phase Timing. The Applicant may submit and process a site plan or building plans at any time; however, the Applicant shall not obtain approval of any plans or permits for the third phase, including but not limited to grading plans, site plans and/or building permits until such time as (1) the Tysons Central 123 Metro Station is in operation, (2) an elevated pedestrian bridge connecting the Property to the Tysons Central 123 Metro Station is open for use, (3) a bus plaza located on the Property is in operation, and (4) the conditions of subparagraph iv below have also been met.
iii. **Fourth Phase Timing.** The Applicant may submit and process a site plan or building plans at any time; however, the Applicant shall not obtain approval of any plans or permits, including but not limited to grading plans, site plans, and/or building permits until such time as (1) the Tysons Central 123 Metro Station is in operation for not less than two years, (2) an elevated pedestrian bridge connecting the Property to the Tysons Central 123 Metro Station is open for use for not less than two years, (3) the bus plaza located on the Property is in operation for not less than two years, and (4) the conditions of subparagraph iv below have also been met.

iv. **TDM Threshold for Third and Fourth Phase Timing.** In addition to complying with subparagraphs ii and iii above for the third and fourth phases, the Applicant shall not obtain approval of any plans or permits, including but not limited to grading plans, site plans, and/or building permits if penalties related to the Transportation Demand Management Program are due or have been paid under Proffer #41.O, unless the sum of all AM and PM peak hour vehicle trips for all uses that have reached Stabilization at the time of the immediately preceding annual Trip Count was less than the combined totals for Maximum Trips After Reduction during both AM and PM peak hour trips for all such uses as contained in the applicable table in Proffer #41.A.ii. The terms Stabilization, Trip Counts and Maximum Trips after Reduction are defined in Proffer #41.

a. To illustrate the effect of this subparagraph iv, if development is occurring under the Development With Rail, notwithstanding that penalties may be due or have been paid under Proffer #41.O, the Applicant may proceed to the third phase if the aggregate number of AM and PM peak hour vehicle trips for all uses that have reached Stabilization in Phases 1 and 2 is less than 2,522. The Applicant may proceed to the fourth phase only if the aggregate number of AM and PM peak hour vehicle trips for all uses that have reached Stabilization for Phases 1, 2 and 3 is less than 2,817 in order to proceed to the fourth phase if the fourth phase is Phase 4, or 3,271 for Phases 1, 2 and 4 in order to proceed to the fourth phase if the fourth phase is Phase 3.

7. **Development Prior to Rail CDP/FDP.** In the Development Prior to Rail CDP/FDP, approximately 42,922 square feet of the Existing Shopping Center will be removed, leaving 2,442,057 square feet in the Existing Shopping Center, including an up to 75,000 square foot un-built expansion. The Applicant proposes to add an additional 1,262,738 square feet of gross floor area of development to the existing development under the Development Prior to Rail in the location where Phase 1 of the Development With Rail CDP/FDP is shown. The Applicant reserves the right to begin construction under the Development Prior to Rail and subsequently complete development of the Property under the Development With Rail CDP/FDP as set forth in Proffer #4.
If the Applicant begins development under the Development Prior to Rail, at such time as the FFGA is executed by all appropriate parties, the Applicant may proceed with development of Phases 1, 2, 3 and 4, as described in Proffers #4 and #6. In that event, at such time as the Applicant constructs Phase 2 under the Development With Rail, the Applicant shall complete the improvements indicated in Proffers 38.C.ix and #43.A.iii, if such improvements have not been completed.

The total square footage of the Development Prior to Rail is broken down as follows:

<table>
<thead>
<tr>
<th>Proposed Development</th>
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</thead>
<tbody>
<tr>
<td>Residential Building 1-A (259-355 units)</td>
<td>480,875 SF</td>
</tr>
<tr>
<td>Office Building 1-B</td>
<td>490,076 SF</td>
</tr>
<tr>
<td>Hotel Building 1-C</td>
<td>266,513 SF</td>
</tr>
<tr>
<td>Retail/Commercial Buildings 1-A, 1-C and 1-D</td>
<td>25,274 SF</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,262,738 SF</strong></td>
</tr>
</tbody>
</table>

8. Owners’ Associations

A. Umbrella Owners’ Association. Prior to the issuance of the first RUP or first Non-RUP under either the Development With Rail or the Development Prior to Rail, the Applicant shall establish an Umbrella Owners’ Association (the “UOA”). Tysons Corner Holdings LLC and Tysons Corner Property Holdings LLC, or any successor entities that are the owners of the Existing Shopping Center, shall be members of the UOA.

B. Homeowner and Condominium Owners’ Associations. For each residential building in which units are held for sale, the Applicant shall cause either a homeowners’ association and/or a condominium owners’ association (“HOA/COA”) to be formed for that building. Each of these associations shall be members of the UOA.

C. Disclosures. UOA and HOA/COA documents (including budgets provided in any offering or sale materials) shall specify the proffer and maintenance conditions and obligations set forth in these Proffers. Purchasers shall be advised in writing of these proffer conditions and obligations prior to entering into a contract of sale.

D. UOA TDM Obligations. All residents, tenants, owners, employers and employees living, working, operating a business or owning property within the Property shall be advised of the TDM Plan described in Proffer #41. All UOA and HOA/COA members shall be informed of any funding obligations for the TDM program prior to entering into a contract of sale, and all such obligations shall be included in UOA and HOA/COA documents.

9. The Existing Shopping Center and the Proffers. These Proffers and the CDP/FDP include a number of road and other improvements that shall be implemented in conjunction with the development of the new buildings and facilities. A 75,000 square foot un-built expansion
may be added to the Existing Shopping Center building in the location identified on the CDP/FDP as Macy’s, and/or other exterior or interior renovations or other improvements to the Existing Shopping Center, but not the addition of any new square footage to the structure, beyond the 75,000 square feet referenced above, may be carried out without requiring the construction or implementation of the phased road and other improvements that are specifically proffered herein.

Many of these proffers include references to contributions or improvements that are required following the issuance of a specific Residential Use Permit (“RUP”) or Non-Residential Use Permit (“Non-RUP”). For the purpose of these proffers, when RUPs or Non-RUPs are referenced, the RUPs or Non-RUPs are not those associated with the Existing Shopping Center but are those associated with the proposed new office, residential, Retail/Commercial and/or hotel uses.

10. Mix of Uses. The Property shall consist of a mix of residential, office, retail, service and hotel uses and may include the following uses, subject to the limitation that the maximum square footage of the residential, office, new Retail/Commercial and hotel uses shall not exceed the square footages indicated in the CDP/FDP and the limitations of Proffer #6 and #7. In addition, the following uses are permitted on the Property.

- Eating establishments
- Theatres
- Bank teller machines
- Amusement arcades
- Fast food restaurants (without drive-through)
- Quick-service food stores
- Vehicle rental establishments permitted with no more than twenty-five (25) total vehicles on the Property at any one time and with no individual vehicle rental establishment to exceed more than 10 cars on the site at any one time; the location of the storage spaces for the rental vehicles shall be shown on the applicable site plan.
- Billiard and pool halls
- Bowling alleys
- Commercial swimming pools, tennis courts and similar courts
- Health clubs
- Financial Institution
- Indoor archery ranges, fencing and other similar indoor recreational uses
• Miniature golf courses
• Skating facilities
• Community clubs, centers, meeting halls, swimming pools, archery ranges
• Swimming clubs, and tennis clubs/courts
• Dwellings as indicated on the CDP/FDP
• Institutional uses
• Child care centers and nursery schools with approval of a Special Exception unless shown on the proffered CDP/FDP or in accordance with Proffer #16.
• Churches, chapels, temples, synagogues and other such places of worship with a child care center, nursery school or private school of general or special education with approval of a Special Exception
• Colleges and universities
• Cultural centers, museums and similar facilities
• Independent living facilities with the approval of a Special Exception
• Private clubs and public benefit associations
• Private schools of general education with approval of a Special Exception
• Private schools of special education with approval of a Special Exception
• Personal service establishments
• Business supply and service establishments
• Garment cleaning establishments (restricted to an establishment that provides drop-off/pick-up service only with no on-site processing/cleaning)
• Public uses
• Repair service establishments
• Retail sales establishments

11. **Community Space.** The Applicant shall provide, at no cost to the County, a centrally-located space of not less than 1,700 square feet in the Existing Shopping Center or elsewhere on the Property for use by Fairfax County to serve the Fairfax County Police, the Fairfax County Fire Department and/or other users as coordinated by the County and the Applicant. The
Applicant shall provide utilities, cleaning services and general maintenance for this space at no cost to the County. The Applicant shall also provide basic office furniture, including desks, chairs and tables.

12. **Incubators.** The Applicant shall provide opportunities for small and minority-owned businesses to obtain retail cart or kiosk space within the Existing Shopping Center and within other interior or exterior areas of the Property and will consider these businesses, if successful, as candidates for tenancy as in-line retail space becomes available in either the Existing Shopping Center or elsewhere on the Property. Upon request, the management of the Existing Shopping Center shall facilitate coordination between small and minority-owned businesses and third party organizations that may be able to provide assistance to these incubators.

13. **Metrorail Tax District Buyout for Certain Residential Uses.** At least sixty days prior to recording residential condominium documents for any portion of the Property located within the Phase I Dulles Rail Transportation Improvement District (the "Phase I District"), the Applicant shall provide a written notice to the Director of the Real Estate Division of the Fairfax County Department of Tax Administration advising that the Applicant intends to record condominium documents for that portion of the Property. Prior to recording the condominium documents, the Applicant shall pay to Fairfax County a sum equal to the then-present value of Phase I District taxes that will be lost as a result of recording the condominium documents, in accordance with a formula approved by the Fairfax County Board of Supervisors.

14. **Hours of Operation of the Existing Shopping Center Corridor and Elevated Pedestrian Bridges.** To permit convenient access to and through the Property to the Tysons Central 123 Metro Station, the interior mall corridors (other than service corridors) of the Existing Shopping Center and the interior pedestrian circulation routes as indicated on the CDP/FDP (including the bridges proposed to the neighboring Towers Crescent Property per Proffer #29) shall be open not less than between the hours of one hour before and one hour after the hours of operation of the Tysons Central Metro 123 Station. This proffer shall take effect at the time the Tysons Central 123 Metro Station becomes operational for general public use. This proffer shall not preclude the Applicant from (A) altering the alignment of the interior corridors of the Existing Shopping Center as long as mall corridors as a whole provide substantially equivalent connectivity, (B) from temporarily limiting portions of the corridors, as necessary, for cleaning, tenant construction and/or other Existing Shopping Center operations as long as mall corridors provide substantially equivalent connectivity and appropriate signage is provided, or (C) exercising such other reasonable controls over such corridors and bridges to prevent the general public from acquiring rights of access that are inconsistent with the status of the Property as private property, as long as mall corridors as a whole provide substantially equivalent connectivity.

15. **Grocery and Convenience Store.**

   A. **Grocery Store.** The Applicant shall provide a grocery store of at least 5,000 square feet and no more than 15,000 square feet on the Property no later than at the time of issuance of the 106th RUP for Phase 4 or the Non-RUPs for 140,650 square feet of office space for Phase 4 of the Development With Rail, unless by such time a grocery store of a similar or larger size has been opened for business within Land Units O or P as identified in the Tysons Corner Urban Center.
Comprehensive Plan, and except as further described below. This grocery store shall provide daily necessities and prepared foods to serve primarily the residents and tenants of the Property. As a neighborhood serving grocery store, it shall neither be a quick-service (convenience) food store nor a large-format destination supermarket. At the time of submission of site plans for Phase 2, the Applicant shall identify a location on the Property where the grocery store described above may be located (“Grocery Store Location”).

i. Notwithstanding the foregoing, if the Applicant has not begun construction of the third phase (either Phase 3 or 4) within five years after issuance of the final RUP or Non-RUP for Phase 2, the Applicant shall provide a grocery store as described in paragraph A on the Property.

ii. Notwithstanding the foregoing, if the Applicant has not begun construction of the fourth phase (either Phase 3 or 4) within five years issuance of the final RUP or Non-RUP for the third phase, the Applicant shall provide a grocery store as described in paragraph A on the Property.

B. Quick Service Food Store. The Applicant shall provide a quick service food store on the Property prior to issuance of the 129th RUP for Phase 1 or the Non-RUPs for 278,750 square feet of office space for Phase 1, whichever occurs first. The existing CVS convenience store located within the Existing Shopping Center shall not satisfy this requirement. At such time as the grocery store as required by paragraph A has opened, the quick service food store shall not be required.

16. Child Care Center. Prior to issuance of the 204th RUP for Phase 2 or the Non-RUP for 272,100 square feet of Phase 2 office space, whichever occurs first, the Applicant shall provide at least one child care center on the Property.

A. The child care center shall accommodate a maximum daily enrollment of no fewer than 100 children and no more than 150 children, which may be modified with approval of a Special Exception without requiring a Proffer Condition Amendment.

B. The child care center shall be marketed primarily to the employees, tenants and residents on the Property. The Applicant reserves the right to modify this requirement with approval of a Special Exception without requiring a Proffer Condition Amendment.

C. The child care center shall meet the child care standards in the Zoning Ordinance current at the time of submission of the building plans, including those standards governing outdoor recreation areas.
17. **Architecture.** Buildings shall be designed with high quality architecture and building materials. The exterior building materials used in the development of the new residential, office and hotel buildings shall consist of glass, steel, brick masonry, architectural pre-cast, stone masonry, architectural concrete and/or other materials of similar quality that are typically used on the exterior of Class A office buildings and residential and hotel buildings of a similar quality. No Exterior Insulation and Finish Systems (EIFS) shall be utilized on any of the new proposed residential, office or hotel buildings. At or prior to the time of submission of building plans to Fairfax County, the Applicant shall provide information on the building architecture and materials and the animated façade areas as specified in Proffer #19 to the Planning Commission for review and approval after consultation with the Providence District Supervisor; no such building plans shall be approved by the County until such approval is granted by the Planning Commission. In the course of its architectural review, the Planning Commission shall consider, among other things, whether the building heights, building articulation and other architectural design characteristics of the proposed buildings are in furtherance of the objectives of the County’s Comprehensive Plan in enhancing the Tysons Corner skyline.

18. **Maximum Building Heights.** The maximum heights of the proposed buildings shall not exceed the building heights indicated on the CDP/FDP. As indicated on the CDP/FDP, the Applicant is committed to maximum building heights and to a range of number of stories. This height limit does not include penthouses, elevators or mechanical equipment rooms covering less than 25% of the roof pursuant to Section 2-506 of the Zoning Ordinance. Penthouses shall be similar in material and color to the building, so the penthouse structure is consistent with the rest of the architecture of the building or is otherwise architecturally integrated with the building. No such penthouse structure shall exceed 25 feet in height, unless it can be demonstrated by the Applicant that such additional height is needed for the elevator the Applicant selects for that building; in which case, the maximum height of the penthouse structure shall not exceed 30 feet. The Applicant shall screen mechanical equipment located on the rooftops of the proposed buildings from ground level view, using parapet walls and other screening walls, materials or devices.

19. **Animated Façade Areas.** The Applicant shall provide animated façade areas throughout the Property as identified on the CDP/FDP and which shall be indicated on the architectural/building plans submitted per Proffer #17.

A. **External Streetscape Presence.** The Applicant shall require new tenants located in the areas identified in the CDP/FDP as “Animated Façade Areas” to create an external streetscape presence through the use of transparent exterior storefront facades (as outlined below in paragraph C) and entries, landscaping, seating areas, canopy and awning shade elements and other techniques that create a building façade that provides interest to pedestrians and vehicles. When negotiating new leases with existing tenants located in the Animated Façade Areas, the Applicant shall require existing tenants to also create such external streetscape presence using the foregoing techniques.
B. **Entry Elements.** The Animated Façade Areas shall include functioning entry doors into the applicable Retail/Commercial space. Such entry elements shall not be separated by a distance of more than 75-feet on-center, unless a greater separation is needed to accommodate larger tenant spaces or as permitted by the Zoning Administrator. Should the layout of a larger tenant not be able to accommodate multiple entries with a maximum spacing of 75 feet, such tenant shall be required to design the façade with glazed elements that are no more than 25-feet apart, and of a size no smaller in area than 48 square feet.

C. **Glazing Requirements and Transparency Levels.** Along the Animated Façade Areas, a minimum transparency level of 45% of the overall area of the façade (as measured across the entire length of the façade and to a height of 15-feet from the lowest finished floor elevation) shall be provided through glazed windows and doors that allow views into the tenant space. Up to 20% of the above described transparent windows or glazing can be met with display windows or glazing that have reduced visibility through sandblasting, glass blocks or other similar methods, that allow for light to enter the interior space without providing direct visibility from outdoors, with the remaining glazing remaining fully transparent.

20. **Buildings 1-A and 1-B Route 123 Retaining Wall and Parking Structure Façade.** As indicated in the CDP/FDP, the Applicant shall treat portions of the parking terrace façade associated with Buildings 1-A and 1-B along Route 123 to provide a high-quality, attractive façade of no greater than 34’ in height above grade at any point as shown on the CDP/FDP. The façade of the wall shall be composed of high-quality architectural block, stone, stone-like material, colored pre-cast concrete or a comparable material. At the time of submission of site plans to Fairfax County, the Applicant shall provide information on the building materials and elevations of this wall to the Planning Commission for review and approval after consultation with the Providence District Supervisor.

A. The Applicant shall provide lighting of the wall to provide a visually interesting façade along Route 123.

B. Along Route 123 in front of Buildings 1-A and 1-B, and as indicated on the CDP/FDP, the Applicant shall provide street trees to help screen the parking structure façade. The Applicant may provide London Plane trees; however, final determination of the tree species and specific planting locations (at least 4’ back from the top of curb) shall be coordinated with Urban Forest Management.

C. Landscaping, including vines and/or lower lying vegetation and planters, shall be provided intermittently within the face of the wall to create horizontal bands of plant materials that will break-up the mass of the wall and integrate the wall into the landscaping. Irrigation and drainage shall be provided on this wall feature to water the vegetation. At the time of site plan submission, the Applicant shall provide details of the wall landscaping (i.e. irrigation, soil information, size of the planting areas, depth of the planting areas, and other such information as Urban Forest Management may request) plans for review by Urban Forest Management. The Applicant shall maintain the landscaping on the wall to ensure the vegetation and the
wall look attractive and provide a plan for such maintenance for the review and approval of Urban Forest Management.

D. Irrespective of the landscaping provisions in paragraph C., at the time of site plan submission, the Applicant may pursue an architectural wall without the landscaping described in paragraph C if the Applicant in coordination with Urban Forest Management determines that vegetation on the wall may not survive or appear attractive. Per this Proffer, the Applicant shall submit information on the building materials and elevations of this alternative architectural wall to the Planning Commission for review and approval.

21. Telecommunications Equipment. Telecommunications equipment serving the Property may be placed on the proposed building(s) rooftop(s); however, any such facilities must (a) comply with the Zoning Ordinance; and (b) be screened, designed and/or setback sufficiently from the perimeter of the roof and penthouse such that they shall not be visible from the surrounding streets at street level. Screening measures may be used such as (i) including the facilities as part of the architecture of the building(s), (ii) utilizing consistent colors, (iii) employing telecommunication screening material, and (iv) flush-mounted antennas.

LIGHTING

22. Lighting. All on-site, outdoor and parking garage lighting shall meet or be less than that permitted under the Outdoor Lighting Standards of Section 14-900 of the Zoning Ordinance. All parking lot and building mounted security lighting shall utilize full cut-off fixtures. Wall-washer type lighting shall use fixtures with shielding such that the lamp surface is not directly visible. Lighting fixtures on the sky terrace on the future improved Parking Terrace A in Phase 4 shall utilize full cut-off fixtures and appropriate heights to mitigate the lighting impact on nearby residential units.

23. Parking Structure Lighting. The Applicant shall utilize full cut-off, low-intensity or recessed lighting directionally shielded to mitigate the impact on the adjacent residences for any lighting along the perimeter of a parking structure not constructed of solid walls. Such lighting shall meet the requirements of Article 14 of the Zoning Ordinance.

24. Construction Lighting. During construction, the Applicant shall attempt to reduce glare from OSHA, VOSHA, VUSBA and local ordinance required superstructure lighting to the extent possible without violating aforementioned laws, regulations or policies. Such measures as cut-off shields, lower intensity or lower number of light bulbs, dimming or extinguishing lighting after operating hours of the Existing Shopping Center will be presented to appropriate inspectors for their consideration.

NOISE ATTENUATION

25. Noise Attenuation. To meet the noise limitations described in paragraphs A through E below, the Applicant shall provide appropriate noise attenuation measures as identified on the CDP/FDP as a “Sound Attenuation Wall” and as determined necessary based on the noise studies required below and as approved by DPZ.
At the time of submission of each site plan, the Applicant shall submit a noise study addressing the buildings shown on that site plan (“Noise Study”) to the Department of Planning and Zoning (“DPZ”) and the Department of Public Works and Environmental Services (“DPWES”) for review and approval. The Noise Study shall indicate the traffic and transit-related noise anticipated from I-495 (including the southbound entrance ramp adjacent to the Property), Route 123 (including transit related noise due to the Tysons Central 123 Metro Station and the associated bus plaza adjacent to the Property), Route 7, International Drive and the Westpark Bridge. The Noise Study shall include projected noise levels in the residential units, hotel rooms, office space and outdoor recreation areas shown on the submitted site plan and will be based on final site topography and conditions shown on the site plan rather than existing topography/conditions. The methodology of the Noise Study, including any noise measurement locations that may be required, shall be subject to the approval of DPZ and DPWES. The following information shall be included in this noise study: the affected buildings, the affected outdoor recreation areas, and the affected residential units, hotel rooms and/or office spaces (occupied spaces) and the noise attenuation measures to ensure that the affected outdoor areas meet the standards outlined below.

A copy of the applicable approved Noise Study shall be included with the submission of the building plans for the construction of each building on the site. The building plan shall identify the affected occupied spaces and the noise attenuation measures, including materials, to be provided to ensure that each such affected occupied space meets the standards outlined below. Supporting information that documents that the proposed noise attenuation measures will be sufficient to attain the interior noise standards shall also be provided. The Applicant shall not obtain building permits until such time as the County has approved the noise attenuation measures for each building.

A. **Outdoor Recreation Areas.** The Applicant shall provide noise attenuation measures shown on the CDP/FDP as necessary to ensure that traffic-related noise in the outdoor recreation areas that are so identified in the CDP/FDP do not exceed 65 dBA Ldn. Adjustments to the noise attenuation measures indicated on the CDP/FDP may be permitted subject to the approval of DPZ to ensure that the noise attenuation measures provide the necessary noise attenuation.

B. **Noise Levels within Residential Units, Hotel Rooms and the Office Buildings.** The Applicant shall provide noise attenuation measures in order to reduce interior noise in all residential units and hotel rooms to approximately 45 dBA Ldn or less. The Applicant shall provide noise attenuation measures to reduce interior noise in the office buildings to approximately 50 dBA Ldn or less.

C. **Identification of Affected Buildings and Units.** The buildings in which noise attenuation measures are required for some or all of the residential units, hotel rooms or office space contained therein shall be identified on the site plans. The specific units or areas requiring such attenuation and the proposed measures to attenuate the noise shall be indicated on the appropriate building plans, as determined by DPWES. This information shall also be disclosed in the UOA documents.
D. **Residential Balconies.** No balconies shall be provided in any areas of the residential buildings projected to exceed 75 dBA Ldn. The Applicant shall disclose in sales contracts/rental agreements that some of the residential balconies may be located in areas where noise levels may exceed 65 dBA Ldn.

E. **Areas in Excess of 75 dBA Ldn.** If the noise study reveals that there are residential units located within an area that exceeds 75 dBA Ldn projected to 2026, then the residential units in that location shall not be built, and the Applicant shall (i) pursue a proffered condition amendment to change the location of the residential units or (ii) replace the residential units with non-residential or office uses as long as the non-residential or office square footage as indicated in Proffer #6 for the Development With Rail and Proffer #7 for the Development Prior to Rail is not exceeded.

**PARKING**

26. **Parking.**

A. **Parking Management.** The Applicant shall separate the parking associated with office, residential and Retail/Commercial uses (including the Existing Shopping Center) to ensure that each of these uses will have sufficient parking per the tabulations indicated in the CDP/FDP or any approved parking reduction. Parking provided for the office and residential uses shall be located in close proximity to the respective use. Spaces allocated for the residential uses shall not be accessible by patrons of the Existing Shopping Center or the new Retail/Commercial uses. Patrons of the Existing Shopping Center may utilize the parking spaces set aside for office use during hours other than normal business hours, as determined feasible by the Applicant and the office tenants. The Applicant shall designate parking for each use through on-site signage to direct drivers to the appropriate parking locations. The Applicant shall provide signage to direct visitors from the parking terraces to the Existing Shopping Center.

   i. Clearly marked pedestrian routes or paths from the parking spaces available to Retail/Commercial patrons in the proposed parking structures to the Existing Shopping Center shall be provided. These routes shall be open and accessible the same hours as the Existing Shopping Center. These routes shall not require patrons to walk through residential buildings.

B. **Parking and Phasing.** At the time that construction of any or all of the four phases is completed, the parking provided in that phase or on the Property (taken as a whole) shall not exceed the Zoning Ordinance parking requirements, except as provided in this paragraph B and except as indicated on the CDP/FDP. Notwithstanding the foregoing, the Applicant may provide more parking than required by the Zoning Ordinance (i) in any phase to the minimum extent necessary to avoid construction of partial floors of parking structures, and (ii) in Phases 1, 2 and 3 to the extent necessary to provide sufficient parking for future phases, subject to the qualification
that the number of spaces provided does not exceed 110% of the number of spaces required by the Zoning Ordinance. As indicated in the CDP/FDP, parking in excess of Zoning Ordinance requirements will be provided during construction of Phase 2 in order to accommodate the demolition of Parking Terrace D.

C. Existing Approved Parking Reduction for the Existing Shopping Center. The Applicant shall pursue a parking reduction for the Existing Shopping Center if Fairfax County determines that an amendment to the governing reduction (as approved by the Board of Supervisors on September 12, 2005 (6399-PKS-010-1)) is required. If such a study is required and the County fails to approve a new parking reduction for the Existing Shopping Center, the Applicant shall provide the parking required by the Ordinance for the Existing Shopping Center.

D. Future Parking Reductions. Given (i) the proximity to the future Tysons Central 123 Metro Station, (ii) the bus facilities already located or to be located on the Property, (iii) the character of the Development With Rail as a mixed-use transit-oriented development, and (iv) the intended effects of the Transportation Demand Management Plan provided in accordance with Proffer #41, the Applicant shall evaluate and pursue parking reduction(s) for the uses associated with the Development With Rail other than the Existing Shopping Center at appropriate times as may be permitted by Article 11, Parking, of the Fairfax County Zoning Ordinance.

SIGNAGE

27. Signage.

A. Advertising/Store Signage. The Applicant shall provide signage as permitted by Article 12 of the Zoning Ordinance and SPA 89-P-034 until and unless SPA 89-P-034 is replaced with an approved Comprehensive Sign Plan or similar approval.

B. Wayfinding Signage. The Applicant shall provide wayfinding signage as permitted by Article 12 of the Zoning Ordinance and SPA 89-P-034 until and unless SPA 89-P-034 is replaced with an approved Comprehensive Sign Plan or similar approval. The Applicant shall provide DPZ Staff and the Planning Commission with a wayfinding sign plan for administrative review and comment during review of each site plan. Such wayfinding sign plan shall depict the signs proposed within the area subject to the site plan and any modifications to signs outside the site plan area. The Applicant shall implement the wayfinding sign plan for each phase by installing all wayfinding signs for that phase prior to the issuance of the first RUP or Non-RUP for that phase. The wayfinding signage plan shall include provision of signage to direct those traveling on the Property to the parking locations associated with each of the uses on the Property.

C. Temporary Signs. No temporary signs (including “Popsicle” style paper or cardboard signs) which are prohibited by Article 12 of the Zoning Ordinance, and no signs prohibited by Chapter 7 of Title 33.1 or Chapter 8 of Title 46.2 of the Code of Virginia, shall be placed on or off-site to assist in the initial sale of residential units.
on the Property. Furthermore, agents and employees involved in the marketing and sale of the residential units on the Property shall be directed to adhere to this policy.

**OFF-SITE ELEVATED PEDESTRIAN CONNECTIONS**

28. **Elevated Connection Across International Drive.** Should the Applicant or others choose to provide an elevated pedestrian bridge across International Drive that would connect the Property and Land Unit O, as such is identified in the Comprehensive Plan, such a bridge may be provided as permitted by the Zoning Administrator. In addition, should an above-grade pedestrian connection across I-495 on the site frontage be funded for construction, the Applicant shall work with County to provide all necessary easements to permit construction of this facility and to provide pedestrian access to the on-site pedestrian network at no expense to the County or the Commonwealth of Virginia.

29. **Towers Crescent Pedestrian Connections.** The CDP/FDP depicts two pedestrian bridges labeled as “Towers Crescent Proffered Bridge” and “Alternative Bridge Alignment” to connect the Property and the property at Tax Map #39-2 ((20)) 1A1, 1E and 1F (the “Towers Crescent Property”); however, it is the Applicant’s intent to participate in the construction of only one bridge except as discussed in paragraph C below. The Applicant prefers to construct the Alternative Bridge Alignment, since this bridge more directly connects the Existing Shopping Center to the plaza on the Towers Crescent Property as indicated on the CDP/FDP. The Applicant shall be required to construct or contribute to the construction of the Towers Crescent Proffered Bridge as described in paragraph A below, unless an alternative bridge is provided as described in paragraph B below.

A. **Towers Crescent Proffered Bridge.** The CDP/FDP depicts a “Towers Crescent Proffered Bridge,” which would provide a pedestrian connection between the Towers Crescent Property and the westerly end of Parking Terrace C on the Property. This bridge connection is also indicated on the Generalized Development Plan associated with the Towers Crescent Property development (RZ 1998-PR-058). Proffer #24 of the proffers associated with RZ 1998-PR-058 (the “Towers Crescent Proffers”) describes the commitment of Tycon Tower I Investment Limited Partnership, Towers Crescent LLC and Towers Crescent Land LLC (and their successors or assigns) (collectively, the “Towers Crescent Owners”) to construct a pedestrian bridge connection between the Property and the Towers Crescent Property. The provision of this bridge connection is required by this Proffer if the proposed bridge receives necessary approvals from Fairfax County, and if the easements and funding as further described in this proffer are provided by the Applicant and the Towers Crescent Owners.

   i. The Applicant shall (a) provide easements as necessary for the construction of the Towers Crescent Proffered Bridge from the centerline of Fashion Boulevard to Parking Terrace C at such time as the Towers Crescent Owners submit a site plan for this pedestrian bridge, and (b) provide funds to the Towers Crescent Owners necessary for the construction of the pedestrian bridge from the centerline of Fashion Boulevard to Parking Terrace C in accordance with the Towers Crescent
Proffers, provided that the Towers Crescent Owners submit the design and final construction cost information for the pedestrian bridge to the Applicant for its reasonable review and approval. The Applicant shall provide funds for construction of the Towers Crescent Proffered Bridge as construction progress payments, such that funds shall be advanced to fund the construction of the bridge as it is completed.

ii. To permit convenient pedestrian access across the bridge and to and through the Property, the Towers Crescent Proffered Bridge shall remain open not less than the same hours as the mall corridor hours are open in the Existing Shopping Center. At such time as the hours of operation are extended in the mall corridors per Proffer #14, the hours of operation of the bridge shall be extended accordingly.

iii. If the Towers Crescent Owners have not begun construction of the Towers Crescent Proffered Bridge as of the time of the Applicant’s submission of a site plan for Phase 2, the Applicant shall thereafter construct the bridge at such time as the Towers Crescent Owners provide (i) the necessary easements (at no cost to the Applicant), (ii) funding for the design of the bridge and (iii) all of the costs of construction of the bridge other than those costs that are required to be paid by the Applicant under this Proffer. The Applicant shall diligently pursue the three aforementioned items from the Towers Crescent Owners. If the Towers Crescent Owners fail to provide the easements and design and construction funding described in this proffer, the Applicant shall provide the County with documentation of such easements and funding.

iv. If such funds and/or easements have not been provided by the Towers Crescent Owners prior to approval of a site plan for Phase 2, the Applicant shall not be required to design and/or construct this bridge connection. In such event, however, the Applicant shall be obligated to (A) escrow funds in an amount approved by Fairfax County DPWES equal to the cost of constructing the Towers Crescent Proffered Bridge from the centerline of Fashion Boulevard to Parking Terrace C (including a safe pedestrian connection into the Existing Shopping Center) as indicated in the CDP/FDP, and (B) provide the necessary construction and access easements to permit the construction of the bridge connection to any party ready, willing and able to complete the construction of the bridge connection (such as, but not limited to, Fairfax County). If six years after the Applicant provides the escrow to the County plans have not been submitted to the County to permit construction of the Towers Crescent Proffered Bridge, the escrow shall be returned to the Applicant.

B. Substitute Elevated Bridge Location. If, prior to the construction of the Towers Crescent Proffered Bridge as outlined in paragraph A above, the Applicant and the Towers Crescent Owners reach a written agreement that provides for a
substitute elevated pedestrian bridge connection between the Towers Crescent Property and the Property (such as, but not limited to, the Alternative Bridge Alignment indicated on the CDP/FDP), such that the alternate location shall be constructed instead of the Towers Crescent Proffered Bridge, provided that (1) the design, location and the schedule for the construction of the alternate elevated bridge are approved by the Zoning Administrator (including the pedestrian pathways across Parking Terrace C), and (2) such alternate elevated bridge is constructed in accordance with designs and plans and on a schedule as approved by the Zoning Administrator.

C. Additional Elevated Bridge Location. The Applicant reserves the right to construct another bridge in addition to the Towers Crescent Proffered Bridge (such as, but not limited to, the Alternative Bridge Alignment) so long as (1) the design and location of the alternate elevated bridge are approved by the Zoning Administrator (including the pedestrian pathways across Parking Terrace C), and (2) such alternate elevated bridge is constructed in accordance with designs and plans as approved by the Zoning Administrator.

LANDSCAPING

30. Landscape Plan. The CDP/FDP includes a conceptual landscape plan for the Property, consisting of an overall plan and details regarding streetscapes, plazas, the wall described in Proffer #20 and other features. As part of the site plan submission for each phase, the Applicant shall submit to Urban Forest Management of DPWES for review and approval a detailed Landscape Plan, which shall include, among other things, irrigation information, design details for tree wells and other similar planting areas above structures and along streets; the composition of the planting materials and/or structural soils used where plantings are to be located within or on top of structures and along streets and other methods to be used to ensure the viability of the proposed plantings; information demonstrating that the requirements of this Proffer have been met; and other information that may be requested by Urban Forest Management. Such Landscape Plan shall be consistent with the quality and quantity of plantings and materials shown on the CDP/FDP and Proffers 30-32. Adjustments to the type and location of vegetation and the design of the plazas, pocket parks and streetscaping shall be permitted subject to approval of the Zoning Administrator.

31. Streetscaping. Streetscaping shall be provided throughout the site as indicated in the CDP/FDP. The Applicant shall phase the planting of streetscaping as indicated in the CDP/FDP.

A. For trees within 15 feet of the proposed buildings, the Applicant may shift the location of said trees to address final tenant program and urban design with Zoning Administrator approval. In some instances, said trees may be relocated or shifted to avoid conflicts and facilitate urban design elements such as outdoor cafes, entry doors and facilities/structures related to the buildings. Those trees located in the row closest to the curb shall not be shifted as described in this paragraph; however, the Applicant may make other adjustments as necessary due to engineering reasons if approved by DPZ.
B. After the approval of this rezoning, if the applicable streetscaping guidelines in the Comprehensive Plan are revised, the streetscaping may be adjusted to incorporate adjustments to the streetscaping guidelines in the Comprehensive Plan. Such modification may be permitted subject to approval of the Zoning Administrator.

C. Brick pavers or tree grates shall be used for tree wells.

32. **Structural Soil.** For trees not planted within an 8-foot wide minimum planting area, or that do not meet the minimum planting area required by the Public Facilities Manual (“PFM”), the Applicant shall provide a minimum of 130 square feet and 90 square feet of surface area of structural soil for those trees identified as Category 4 and 3 shade trees, respectively, in the PFM. The structural soil shall have a minimum width of 8-feet and a minimum depth of 36-inches and shall be connected to the extent feasible, as determined by Urban Forest Management. Geotextile fabric shall be provided between the structural soil and a layer of organic material located on top of the structural soil. At the time of site plan submission, the Applicant shall provide written documentation, including information about the composition of the structural soil, to Urban Forest Management indicating that a qualified and appropriately licensed company provided the structural soil. The Applicant shall provide 72-hour notice to Urban Forest Management and the Providence Supervisor’s Office prior to installation of the soil to allow verification of the composition of the structural soil and verification that the structural soil is installed correctly. The Applicant shall provide written confirmation from a certified arborist and/or landscape architect demonstrating and verifying installation of structural soil.

**SANITARY SEWER AND STORMWATER MANAGEMENT**

33. **Sanitary Sewer Coordination.** In connection with the development of the new residential, office and hotel buildings on the Property under the Development With Rail or the Development Prior to Rail, the Applicant shall upgrade portions of the sanitary sewer system that serve the site in accordance with the recommendations in the Preliminary Sanitary Sewer Capacity Analysis prepared by Patton, Harris, Rust & Associates and dated May 16, 2006 and as may be determined necessary by DPWES. Upon request of DPWES, the Applicant shall provide capacity analyses at the time of site plan review.

34. **Stormwater Management Master Plan.** At the time of review of the first site plan, the Applicant shall prepare and obtain approval from DPWES of a Stormwater Management Master Plan (the “Stormwater Plan”) for the entire Property. This plan shall address water quality and quantity management and phasing of construction of the proposed stormwater mitigation measures in accordance with the CDP/FDP. This plan shall use computational methods acceptable to the County to demonstrate satisfaction of this proffer for the entire Property. The stormwater management described below is proposed for the Development With Rail and the Development Prior to Rail. The stormwater management requirements indicated below for the Development Prior to Rail are the same as for Phase 1 of the Development With Rail. At the time of site plan review for each subsequent site plan, if any, the Applicant shall update the Stormwater Plan as necessary as determined by DPWES. These updates shall include new computations supporting any modifications to the stormwater detention or stormwater quality treatment proposed since the County approval of the previous Stormwater Plan.
A. **Water Quantity Goals.** As of the date of these Proffers, there is no on-site detention of water on the Property. Using underground detention methods similar to those shown in the CDP/FDP, the Stormwater Plan shall demonstrate at full build-out of the Development With Rail a thirty percent (30%) reduction in the existing (at the time of rezoning) peak rate of stormwater discharge for the Property for the 10-year design storm, with phased reductions provided at each phase as indicated on the CDP/FDP. The Stormwater Plan shall demonstrate at full build-out of the Development Prior to Rail, a seven and one-half percent (7.5%) reduction in the existing (at the time of rezoning) peak rate of stormwater discharge for the Property for the 10-year design storm.

B. **Best Management Practices ("BMP").** Sand filters, Filterra devices, and/or other such other low impact development ("LID") methods as may be approved for water quality treatment credit by the County shall provide water quality treatment for the site. Using methods similar to those shown on the CDP/FDP, the Stormwater Plan shall demonstrate at full build-out of the Development With Rail a net fourteen percent (14%) reduction from the existing (at the time of rezoning) stormwater phosphorous loading for the discharge leaving the Property. The Stormwater Plan shall demonstrate at full build-out of the Development Prior to Rail a two and one-half percent (2.5%) reduction from the existing (at the time of rezoning) stormwater phosphorous loading for the discharge leaving the Property.

C. **Low Impact Development ("LID").** In addition to the Best Management Practices in Paragraph B. above, the Applicant shall incorporate the following LID strategies to mitigate environmental impacts of existing and proposed development on-site. The LID facilities shown on the CDP/FDP are for the purpose of illustrating the application of the proposed LID techniques. In the event that either the Applicant or County staff deems it necessary to substitute another LID strategy for one of those listed below, the Applicant shall identify an alternate strategy acceptable to both parties, and if necessary as determined by Fairfax County, will seek administrative approval from the Zoning Administrator pursuant to the provisions of Sect. 16-403 of the Zoning Ordinance.

   i. **Porous Pavement.** The Applicant shall install porous pavement in areas of pavement south of Parking Terrace C and near ShopTysons Boulevard, as shown in the CDP/FDP.

   ii. **Plaza Landscaping.** The Applicant shall install landscaping on each of the plaza areas as designated on the CDP/FDP. The intent of this landscaping is to: (1) reduce the heat island effect on the plaza areas and (2) provide a natural aesthetically-pleasing sense of place consistent with the programming for these spaces. Details of these areas shall be included in the Landscape Plan to be provided pursuant to Proffer #30.
iii. **Stabilized Turf.** The Applicant shall install stabilized turf in the fire lane areas as indicated in the CDP/FDP.

iv. **Intensive Green Roof.** Under the Development With Rail, the Applicant shall install and maintain two intensive green roof areas over the parking structures as shown on the CDP/FDP, one of which shall be in Phase 3 (Community Green) and one of which shall be in Phase 4 (landscaped portions of the Sky Terrace). These two roofs shall include landscape plantings in a natural soil matrix over an under-drain system. The intent of these intensive green roofs is (1) to incorporate into otherwise impervious areas of the site a soil matrix and plantings intended to provide stormwater pollutant removal; (2) to reduce the heat island effect on site; (3) to naturalize and add aesthetically pleasing elements to be used by citizens; and (4) to function in conjunction with the programmed uses in these areas. Details concerning these areas shall be included on the Landscape Plan that will be provided pursuant to Proffer #30.

v. **Cisterns.** The Applicant shall install cisterns as shown on the CDP/FDP. The cisterns shall detain water for reuse on-site for irrigation and other appropriate uses.

vi. **Infiltration.** The Applicant shall install an infiltration facility on the site in the area generally north of the existing International Drive entrance to the Property and as indicated on the CDP/FDP.

D. **Applicant Maintenance Responsibility.**

i. **Regular Maintenance.** The Applicant shall assume responsibility for the perpetual maintenance of all of the stormwater management structures associated with this proffer and shall execute an agreement with the County in a form satisfactory to the County to this effect at the time of its first site plan approval (the “SWM Agreement”) and subsequent site plans, as required. The Applicant shall be responsible for maintenance of the BMP and LID devices and underground detention devices. The Applicant shall be required to contract with one or more maintenance and management companies to perform regular routine maintenance of the stormwater management devices, and the Applicant shall provide a maintenance report annually to the Fairfax County Maintenance and Stormwater Management Division of DPWES. The UOA documents shall include the UOA’s maintenance responsibility for the stormwater management structures.

ii. **County Agreement.** The SWM Agreement for the underground detention facilities as indicated on the CDP/FDP shall address the following issues to the satisfaction of DPWES: (1) future replacement when warranted; (2) liability and insurance in an amount reasonably acceptable to Fairfax
County; and (3) allowance for County inspection to ensure that the facilities are maintained by the Applicant in good working order.

**TRANSPORTATION**

35. **High Occupancy Toll (“HOT”) Lanes Coordination.** The Applicant shall meet with representatives of any public or private entities that propose to design, construct and operate HOT lanes or similar transportation improvements to be located in the right-of-way of the Capital Beltway, and representatives or members of VDOT, FCDOT, DPZ, and the Board of Supervisors to discuss and evaluate the estimated impacts, benefits, connectivity, association and relation of the Property to such improvements, and if agreeable to the Applicant, allow a connection of the HOT lanes on or to the Property. The Applicant shall coordinate design and construction activities and schedules for the reconstruction of the Westpark Bridge as described in Proffer #37 with any public or private entities that propose to design, construct and operate HOT lanes or similar transportation improvements to the Capital Beltway, so as to ensure that the design and reconstruction of the Westpark Bridge will not conflict and is compatible with the location or schedule for construction of the HOT lanes improvements.

36. **Road Improvements – Acquisition of Right-of-Way and Easements**

   A. At the time of submission of a site plan, the Applicant shall attempt to acquire, and then if successful, shall dedicate such off-site right-of-way and easements as are necessary to complete the improvements described on the CDP/FDP and referenced in the Proffers for each phase of the Development With Rail or the Development Prior to Rail. The Applicant shall use its good faith efforts to obtain such rights-of-way and easements at fair market value.

   B. If, subsequent to the filing of each site plan, the Applicant is unable to bring about the dedication by others and the necessary rights-of-way and easements, or to acquire by purchase the rights-of-way or easements at fair market value, as determined by an MAI (Member of the Appraisal Institute) appraisal, then the Applicant shall request the Board of Supervisors condemn the necessary land and/or easements.

   C. It is understood that the Applicant’s request to the Board of Supervisors for condemnation will not be considered until it is forwarded in writing to the Division of Land Acquisition or other appropriate County official, accompanied by (1) plans, plats and profiles showing the necessary right-of-way or grading easements to be acquired, including all associated easements and details of the proposed transportation improvements to be located on said right-of-way property (2) an independent appraisal of the value of the right-of-way property to be acquired and of all damages to the residue of the affected property; (3) a sixty (60) year title search certificate of the right-of-way property to be acquired; and (4) a letter of credit in an amount equal to the appraised value of the property to be acquired and of all damages to the residue which can be drawn upon by the County. It is also understood that in the event the property owner of the land to be acquired is awarded with more than the appraised value
of the property because of the damages to the residue in a condemnation suit, the amount of the award in excess of the letter of credit amount shall be paid to the County by the Applicant within forty-five (45) days of said award. In addition, the Applicant agrees that all reasonable and documented sums expended by the County in acquiring the right-of-way and necessary easements shall be paid to the County by the Applicant within sixty (60) days of written demand. Notwithstanding the foregoing, with respect to any condemnation of property along the frontage of Route 123 that is pursued in furtherance of the improvements to be completed under Proffer 38.C.ii and 61, only the provisions of clauses (1) through (3) of this subparagraph shall apply.

D. Except as specifically provided to the contrary, in the event the necessary rights-of-way and/or easements cannot be acquired voluntarily, and the County chooses not to exercise its right of eminent domain, the Applicant is then released from performing any obligations under the Proffers that cannot be performed without such acquisition. The Applicant, however, shall complete the proffered improvements for which acquisition of right-of-way or easements is not necessary. The Applicant shall escrow funds for the unbuilt portion in an amount determined by DPWES as indicated in the proffers if condemnation does not occur. In the event the County elects to defer its exercise of eminent domain, then Applicant’s proffer requiring such acquisition shall likewise be deferred to the extent that such acquisition is necessary to perform the proffer.

37. Westpark Bridge.

A. Westpark Bridge Pedestrian and Vehicular Improvements. The Applicant shall widen the existing Westpark Bridge and its approaches to VDOT standards for acceptance into the VDOT maintenance system. Such widening shall result in a total of four lanes undivided with a six-foot sidewalk on the east side of the road and a six-foot on-road bike lane on each side of the road while maintaining the existing 7.8-foot sidewalk on the west side of the road, as indicated in the CDP/FDP. Prior to the submission of a site plan that includes the bridge, the Applicant shall coordinate the design and construction of this bridge with FCDOT to ensure compatibility with the Dulles Rail Project design.

i. ShopTysons Boulevard/Westpark Bridge Traffic Signal. The Applicant shall design and adjust the traffic signal at the ShopTysons Boulevard/Westpark Bridge intersection or install a new signal to accommodate the widened bridge and intersection modifications as determined by VDOT. With the installation of the new signal or modifications to the existing signal, the Applicant shall install pedestrian-activated chirping countdown signal heads or a reasonable substitute (if a substitute is requested by VDOT or FCDOT), to facilitate the movement of pedestrians through the intersection and the movement of pedestrians and bicyclists along the trail.
ii. **Westpark Bridge/Westpark Drive Traffic Signal.** The owners of Tax Map 29-4 ((10)) 4B have proffered to provide a traffic signal at the intersection of Westpark Drive and Galleria Drive. If the terms of that proffer are met during construction of the proffered Westpark Drive bridge improvements, the Applicant shall coordinate with the owners of Tax Map 29-4 ((10)) 4B to permit installation of that traffic signal by the owners of Tax Map 29-4 ((10)) 4B.

B. **Phasing of Bridge Design and Construction.** The Applicant shall design the new bridge and submit the appropriate plans and information to VDOT and DPWES no later than the time of submission of the first site plan for the Development With Rail or Development Prior to Rail. The Applicant shall construct and open the bridge for traffic and operate the ShopTysons Boulevard/Westpark Drive traffic signal prior to issuance of RUPs for 225 units or Non-RUPs for 400,000 square feet of the office space, whichever occurs first. Upon demonstration by the Applicant that, despite diligent efforts, due to the coordination required with other transportation improvements in the vicinity, the improvement has been or should be delayed, the Zoning Administrator may agree to a later date for completion of the improvement including the traffic signal. Following completion of the bridge construction, the Applicant shall provide FCDOT with a certified schedule of costs actually paid or incurred in the design and construction of the bridge for use in determining the applicable credit toward the contribution to the Tysons Corner Transportation Fund per Proffer #39.

i. **HOT Lanes.** If the entities proposing to construct the HOT lanes project complete or become obligated to complete the Westpark Bridge widening project as part of any proposed HOT lanes improvements to the Capital Beltway, the Applicant shall pay $8,200,000 to the Tysons Transportation Fund, with $820,000 to be contributed prior to the first site plan approval for the Development With Rail or the Development Prior to Rail and the remaining $7,380,000 to be contributed prior to issuance of the first RUP or Non-RUP, whichever should occur first. The amount of this contribution to be made shall be adjusted yearly, based on changes in the Construction Cost Index published by the Engineering News-Record (“CCI”), from the base year of 2007 to the actual date of payment.

a. If the Applicant makes the foregoing payment, and it is later determined that the entities constructing the HOT lanes project are not obligated to construct the bridge widening (or if the Applicant makes the foregoing payment and at the time of the County’s issuance of the building permit for the residential building 1-A, the entities proposing to construct the HOT lanes project have not started construction of the Westpark Bridge widening project, if directed to do so by the County, the Applicant shall construct this widening, provided the County refunds the $8,200,000, with escalator if any to the Applicant. In the event that the Applicant
takes over the completion of the widening of the Westpark Bridge under either of the foregoing circumstances, the Applicant will not be obligated to complete that project by the deadline set forth in paragraph B above, but by such later date that is mutually agreed upon by the Applicant and the County.

C. **Right-of-Way/Easements.** To complete this improvement, right-of-way and approval for temporary and permanent easements may be required from off-site property owners. The Applicant shall work diligently and in good faith to obtain any necessary right-of-way and/or easements at fair market value.

i. Should the Applicant not receive the requisite right-of-way, easements or other approvals from all necessary parties by the time its first site plan is otherwise ready for approval by DPWES, the Applicant shall request the County utilize the condemnation provisions as outlined in Proffer #36 to obtain the right-of-way and/or easements necessary to permit completion of this improvement.

a. If the County elects not to pursue condemnation, rather than making the improvements to the Westpark Bridge, the Applicant shall instead (1) provide to Fairfax County its completed design plans for this bridge, (2) receive a credit for the cost of this design incurred by the Applicant towards its Tysons Transportation Fund commitment contained within Proffer #39 (Tysons Transportation Fund) based on review of actual invoices for legitimate expenses, and (3) in lieu of constructing this bridge, contribute all required, remaining funds to the Tysons Transportation Fund, per Proffer #39 within 60 days of County notification that the County is not pursuing condemnation.

38. **Road Improvements.**

A. **Overview and Phasing.** The Applicant shall construct road improvements with the phasing of the development as reflected on the CDP/FDP and in these proffers. Except as specifically provided below, each set of phased improvements shall be constructed and open for traffic, or shall be operating, as the case may be, not later than the date of the issuance of that number of RUPs or Non-RUPs set forth below. Upon demonstration by the Applicant that, despite diligent efforts to complete the proffered improvement, the improvement(s) has been or should be delayed, the Zoning Administrator may agree to a later date for completion of the improvement(s).

Development Prior to Rail/Phase 1: 260,000 square feet of office space or 130 residential units, whichever occurs first

Phase 2: 260,200 square feet of office space or 139 residential units, whichever occurs first
Phase 3: 13,050 square feet of office space or 100 residential units, whichever occurs first

Phase 4: 140,650 square feet of office space or 107 residential units, whichever occurs first

The CDP/FDP and the Tysons Corner Center Intersection Improvement References graphic attached to these proffers as Exhibit A provides numeric references to the intersections specified below.

B. On-Site Traffic Signals. At the time of implementation of the below proffers that require installation of traffic signals on the Property or modification of existing signals, the Applicant shall provide VDOT with the requisite traffic signal plans for review and comment/approval. If the County, upon request of the Applicant or on its own initiative, determines that such signal installations as proffered below will be detrimental to traffic operation, the Zoning Administrator may (1) agree to a later date for completion of the traffic signal installation or (2) permit the Applicant to proceed without the signal installations.

C. Development Prior to Rail/Phase 1 (Unless otherwise noted, for the purpose of this Proffer, Phase 1 shall also refer to the Development Prior to Rail)

i. Take the following actions with respect to Route 123 Frontage Improvements. (See Sheets 47, 49 and 50 of the Development With Rail CDP/FDP or Sheets 21, 22 and 23 of the Development Prior to Rail CDP/FDP).

a. Prior to site plan approval for Phase 1, or upon written request by Fairfax County, whichever occurs first, the Applicant shall dedicate and convey in fee simple to the Board of Supervisors right-of-way along Route 123 for roadway frontage improvements and future improvements to the I-495 southbound ramp, as indicated on the CDP/FDP.

b. The Applicant shall construct improvements along the Route 123 Property frontage to provide the following:

- Four northbound through lanes of travel transitioning to three through lanes and two ramp lanes accessing I-495;
- A separate northbound right turn lane into the Property entrance;
- With Phase 1 of the Development With Rail, but not the Development Prior to Rail, the Applicant shall also provide three bus bays in the Bus Plaza for use in conjunction with the future Tysons Central 123 Metro Station (subject to the
agreement further described in Proffer #51) as indicated on Sheet 47 of the Development With Rail CDP/FDP.

c. All of the improvements described in subparagraph b. shall be limited to the south side of the existing Route 123 median and shall be designed to accommodate, but shall not include, improvements on Tysons Boulevard to accommodate dual left turns from Route 123 to Tysons Boulevard.

d. The Applicant shall provide VDOT with verification of adequate sight distance with any future elevated pedestrian bridge that is intended to connect the Property to the Tysons Central 123 Metro Station.

ii. Reconstruct the Route 123/Tysons Boulevard/Property driveway intersection (Intersection #2) on-site to add three lanes of stacking storage at the Route 123 egress and construct improvements to the existing Route 123 entrance to the Property as indicated on Sheet 47 of the Development with Rail CDP/FDP and Sheet 9 of the Development Prior to Rail CDP/FDP. To accommodate this new entrance configuration, and to better accommodate traffic volumes, the Applicant shall replace the existing traffic signal at the Route 123/Tysons Boulevard/Property driveway intersection (Intersection #2) with a new traffic signal with the signal poles and signal heads located as appropriate for the adjusted intersection. This improvement to the Route 123/Tysons Boulevard/Property driveway intersection (Intersection #2) is an interim improvement until such time as the ultimate improvements are provided with Phase 2 per Proffer #38.D.iv. If the Applicant should construct Phases 1 and 2 concurrently, this improvement would be superseded by the improvement discussed in Proffer #38.D.iv.

iii. Install a traffic signal, including pedestrian-activated chirping countdown signal heads (or reasonable alternative if requested by VDOT or FCDOT), at the Fashion Boulevard/Ring Road/Nordstrom intersection, southwest of Parking Terrace “C” (Intersection #9). This improvement is to be coordinated with the Towers Crescent Owners, as necessary regarding easements and/or letters of permission.

iv. Install a traffic signal, including pedestrian-activated chirping countdown signal heads (or reasonable alternative if requested by VDOT or FCDOT), at the Ring Road/Fashion Boulevard intersection located southeast of Parking Terrace “C” (Intersection #8).

v. Install a traffic signal on ShopTysons Boulevard east of the northeast corner of Lord & Taylor (Intersection #6).
vi. Add a southbound right-turn overlap phase to the signal at the Route 7/Property driveway intersection (Intersection #12) and add pedestrian-activated chirping countdown signal heads (or reasonable alternative if requested by VDOT or FCDOT) and painted crosswalks, subject to VDOT approval. If VDOT does not permit signal modifications in this location, the Applicant shall demonstrate to FCDOT that the Applicant diligently pursued such modifications. If the signal modifications are not permitted, the Applicant shall provide an escrow amount for this improvement, in an amount approved by the County, for future signal modifications or other improvements in the vicinity of the site.

vii. Design and construct pedestrian-activated chirping countdown signal heads (or reasonable alternative if requested by VDOT or FCDOT) and crosswalks at the intersection of International Drive and the Crate and Barrel entrance (Intersection #4) and at the intersection of International Drive/Fletcher Street (Intersection #10) to VDOT standards.

viii. As indicated on Sheets 52 and 53 of the Development with Rail CDP/FDP and Sheet 25 of the Development Prior to Rail CDP/FDP, construct an additional westbound lane along the Property’s Route 7 frontage connecting the existing right-turn lane from Route 7 into the Mall Property at Fashion Boulevard (Intersection #12) to the proposed westbound lane west of the entrance. This additional westbound lane will provide four through travel lanes, with the additional westbound lane tying into the existing right turn lane at International Drive in the vicinity of Intersection #11. The existing 4’ sidewalk will be replaced with a 5’ interim sidewalk until the sidewalk improvement per Proffer #43.A.vi is constructed as part of the development of Phase 3.

ix. Take the following actions with respect to Route 123 Offsite Frontage Improvements (only with the Development With Rail except as discussed in Proffer #7).

a. The Applicant shall design the roadway improvements to Route 123 along the frontage of Tax Map #29-4 ((1)) 16 and 17 to permit construction of an additional northbound through lane as indicated on Sheet 48 of the CDP/FDP as follows.

   • Widen northbound International Drive to accommodate a right turn lane from northbound International Drive onto northbound Route 123 (Intersection #1).

   • Adjust the Route 123 median to provide a 7’ wide pedestrian sanctuary for pedestrians crossing Route 123 at International Drive. To accomplish this pedestrian improvement, the Route 123 left turn lanes and right turn lane lanes shall be narrowed to 11’ in width, subject to approval of VDOT. If VDOT does
not approve lanes of 11’ in width, the Applicant shall coordinate with FCDOT to provide an alternative alignment. In addition, the Applicant shall stripe pedestrian crosswalks in conformance with this design.

- Adjust as necessary the traffic signal at the Route 123/International Drive intersection (Intersection #1) to accommodate the changes in the configuration of the intersection, including but not limited to shifts in the traffic signal poles and relocation of utility connections to the traffic signal. The Applicant shall install pedestrian-activated chirping countdown signal heads (or reasonable alternative if requested by VDOT or FCDOT) at the Route 123/International Drive intersection.

- Re-stripe the southbound International Drive right turn lane for shared through/right turn movements at the Route 123/International Drive intersection (Intersection #1). Irrespective of the reimbursement provisions in Proffer #38.C.ix.b, the Applicant shall not seek County reimbursement for the costs associated with the re-striping indicated in this paragraph.

b. The Applicant shall construct these improvements if Fairfax County agrees in writing to reimburse the Applicant for the cost of those improvements, including land acquisition at fair market value, except as noted above. The Applicant shall not enter into any agreement to acquire land for these purposes without Fairfax County’s prior written approval of the terms of acquisition. Except as may otherwise be agreed to between the County and the Applicant, reimbursement will be provided by the County in the form of monthly construction progress payments upon submission by the Applicant and approval by the County of all necessary documentation demonstrating the expenditures for the defined improvements that have been paid or incurred by the Applicant. The Applicant shall be entitled to obtain reimbursement for all of its third-party costs, such as engineering and design costs, except for any costs paid or incurred in connection with the acquisition of land or easements necessary for these improvements. The Applicant shall not be entitled to reimbursement for the Applicant’s own overhead costs or profit.

c. The Applicant shall exercise diligent efforts to try to acquire all necessary off-site right-of-way and easements necessary for construction of these improvements in accordance with the procedures described in Proffer #36. The Applicant shall provide DPWES with documentation of such diligent efforts to
d. If it is mutually determined by the Applicant and the County that the improvements cannot be constructed, the Applicant shall provide the County with the frontage improvement plans for use with future road widening.

x. Make At Grade Pedestrian Improvements (Only with the Development Prior to Rail) consisting of improvements to the at-grade pedestrian crossing at the Route 123/Tysons Boulevard/Property driveway (intersection #2) to include a painted crosswalk and pedestrian-activated chirping countdown signal heads (or reasonable alternative if requested by VDOT or FCDOT).

xi. Only with the Development Prior to Rail, relocate the Ring Road at the southeast corner of Parking Terrace D to permit improvements to the Route 123/Property entrance as indicated on Sheet 22 of the Development Prior to Rail CDP/FDP.

D. Phase 2.

i. Install a traffic signal, including pedestrian-activated chirping countdown signal heads (or reasonable alternative if requested by VDOT or FCDOT), at the Fashion Boulevard/Ring Road/Bloomingdale’s intersection (Intersection #13).

ii. Add northbound and southbound overlap phases and adjust signal timing at the Route 7/International Drive intersection (Intersection #11). If VDOT does not permit the installation of signal modifications at this location, the Applicant shall demonstrate to FCDOT that the Applicant diligently pursued such modifications. If the signal modifications are not permitted, the Applicant shall escrow funds with the County for future signal modifications or other improvements in the vicinity of the site. The amount of this escrow shall be determined by FCDOT and shall equal the cost of the signal modification.

iii. If required by the County, the Applicant shall design the Route 123/International Drive (Intersection #1) interchange, including both preliminary and detailed design plans for a proposed grade separated single point urban interchange in accordance with the timing described in Proffer 38.A.

a. The Applicant shall meet with the FCDOT and VDOT to identify design requirements and formatting (so as to be able to turn over designs to FCDOT in a form usable to FCDOT) and shall generate a preliminary design plan for the interchange to include typical sections, plan design concept, preliminary grades, traffic
information, preliminary hydraulic design, costs, and a concept for traffic maintenance.

b. Following a field inspection by VDOT, the Applicant shall update the preliminary design plans to provide detailed hydraulic, bridge design and traffic control information, as well as to identify initial right-of-way and easement needs for the project. The design of the Route 123/International Drive interchange will not include improvements to other nearby interchanges, including but not limited to the Route 7/Route 123 interchange, but shall include lane transitions as necessary. The Applicant will not be obligated to conduct any VDOT public hearings or related procedures. Design efforts will not include final bridge plans or utility relocation plans.

c. Prior to site plan approval for Phase 2, the Applicant shall request the County to determine whether the County will exercise its option to not require the Applicant to design this interchange. If the County notifies the Applicant prior to site plan approval for Phase 2 that it has elected to not require the Applicant to design this interchange, then the Applicant shall pay $1,200,000 to the Tysons Transportation Fund, with $120,000 due prior to site plan approval of Phase 2 and the remaining $1,080,000 due prior to issuance of the first RUP or Non-RUP in Phase 2, whichever should occur first. The amount of this contribution to be made shall be adjusted yearly, based on changes in the CCI, from the base year of 2007 to the actual date of payment.

iv. Construct improvements to the existing Route 123 entrance to the Property (Intersection #2) and realign the ring road as indicated on Sheets 24 and 26 of the CDP/FDP.

v. Complete frontage improvements along Route 123 to include a fourth bus bay in the Bus Plaza, as indicated on Sheet 49 of CDP/FDP.

vi. Subject to VDOT approval, at the Route 7 intersection with Fashion Boulevard (Intersection #12), construct an additional southbound lane on Fashion Boulevard to eastbound Route 7 to provide two exclusive left turn lanes, a shared left/through lane and an exclusive right-turn lane on Fashion Boulevard, as shown on Sheet 24 of the CDP/FDP. The Applicant shall make signal timing adjustments, as necessary.

vii. Subject to VDOT approval, construct improvements along Route 7 eastbound between International Drive/Gallow's Road and Old Gallows Road to provide one additional eastbound shared/right through lane to provide a total of four through eastbound travel lanes, as indicated on Sheets #52 and 53 of the CDP/FDP.
a. The Applicant shall exercise diligent efforts to try to acquire all necessary off-site right-of-way and easements necessary for construction of these improvements in accordance with the procedures described in Proffer #36.

b. Construction of these Route 7 offsite frontage improvements shall be completed prior to issuance of the first RUP/Non-RUP for Phase 2 of the Development With Rail. Upon demonstration by the Applicant that, despite diligent efforts, the improvement has been or should be delayed, the Zoning Administrator may agree to a later date for completion of the improvement.

c. If it is mutually determined by the Applicant and the County that the improvements cannot be constructed, the Applicant shall provide the County with the frontage improvement plans and contribute the amount estimated by FCDOT for the construction of this frontage improvement, subject to review and approval by FCDOT, to the Tysons Transportation Fund to permit future construction of this improvement or other improvements in the vicinity.

E. Phase 3.

i. Widen Fashion Boulevard to provide eastbound and westbound left-turn lanes at the Fashion Boulevard intersection with the internal Ring Road at Nordstrom (Intersection #9). With this improvement, the Applicant shall complete modifications as necessary to the traffic signal constructed at this intersection in Phase 1, including adjustments necessary to address construction of the above-grade pedestrian crossing in the immediate vicinity as shown on the CDP/FDP.

ii. Widen Fashion Boulevard to provide a second eastbound left-turn lane at the intersection with ShopTysons Boulevard (Intersection #8).

iii. Widen Fashion Boulevard to provide a northbound left-turn lane at the intersection with the internal Ring Road at Bloomingdale’s (Intersection #13).

iv. Widen the eastbound and westbound outside travel lanes of Fashion Boulevard to 15-feet (including gutter) from Route 7 (Intersection #12) to ShopTysons Boulevard (Intersection #8) to accommodate bikes and vehicles as shown on Sheets 32, 34 and 35 of the CDP/FDP.

v. The Applicant shall construct frontage improvements along the Property’s Route 7 frontage east of the Fashion Boulevard/Leesburg Pike intersection (Intersection #12) to provide an additional right-turn lane into the Property from westbound Route 7, as indicated on Sheet #53 of the CDP/FDP.
a. This roadway improvement may require off-site construction easements and public access easements from the adjacent properties to the east (identified on the Fairfax County Tax Map as 39-2 ((4)) 30 and 30A). Despite diligent and timely efforts on its part, should the Applicant not receive the requisite approvals and easements from all necessary parties by the time its Phase 3 site plan is otherwise ready for approval by DPWES, the Applicant shall request the County utilize the condemnation provisions as outlined in Proffer #36 to obtain the right-of-way and/or easements necessary to permit completion of this improvement. If the Applicant fails to obtain the off-site construction and/or public access easements, the Applicant shall demonstrate to FCDOT that the Applicant diligently pursued such modifications.

If the County elects not to pursue condemnation, rather than constructing the above described improvements to Route 7, the Applicant shall instead provide the County with the construction plans and escrow funds with the County, subject to FCDOT approval, in an amount sufficient to complete the construction or to be used for road or transit improvements elsewhere in Tysons Corner at the County’s discretion.

vi. Add a westbound right-turn overlap phase and adjust signal timings at the Route 7 intersection with Fashion Boulevard (Intersection #12). If VDOT does not permit the signal modifications in this location, the Applicant shall demonstrate to FCDOT that the Applicant diligently pursued such modifications. If the signal modifications are not permitted, the Applicant shall escrow funds with the County for future signal modifications or other improvements in the vicinity of the site. The amount of this escrow shall be determined by FCDOT and shall equal the cost of the signal modification.

F. Phase 4.

i. Prior to site plan approval for Phase 4 or upon demand by Fairfax County, whichever should occur first, the Applicant shall dedicate and convey in fee simple to the Board of Supervisors right-of-way along International Drive, as indicated on the CDP/FDP.

ii. Widen the International Drive median from 4-feet wide to 7-feet wide north of Fletcher Street to provide a pedestrian refuge for use by pedestrians crossing International Drive at the intersection (Intersection #10), as indicated on the CDP/FDP.

iii. Widen International Drive along the site frontage to provide three 11-foot northbound travel lanes, subject to VDOT approval. If VDOT fails to
approve these 11-foot lanes, the Applicant shall work with FCDOT to provide an alternative alignment.

iv. Contribute $70,000 to FCDOT to be used for future spot improvements in the Route 7 corridor of Tysons Corner. The contribution amount shall escalate on a yearly basis from the base year of 2007 and change effective each January 1 thereafter, based on changes in the CCI.

G. Phase 3 and 4 Improvements if Phase 4 Occurs Before Phase 3. If the Applicant elects to construct Phase 4 prior to Phase 3, the road improvements associated with Phases 3 and 4 per Proffer #38.E and 38.F shall be completed as indicated below.

i. Phase 4. The Applicant shall provide the road improvements associated with Phase 4, as indicated in Proffer #38.F, and the improvement in Proffer #38.E.v.

ii. Phase 3. If constructed as the last phase, at the time of construction of Phase 3, the Applicant shall provide the remaining road improvements as set forth in Proffer #38.E. but not included in paragraph 38.G.i. above.

H. Adjust Traffic Signal Timing. For the purpose of this proffer, data collection for the following corridor evaluations shall be conducted within four weeks of the first Trip Count date after Stabilization as defined in Proffer #41 (not including a week containing a federal holiday or when public schools are not in session). The Applicant shall submit the corridor evaluation to the County and VDOT within four months after the collection of data.

i. Following the Stabilization of either the Development Prior to Rail or Phase 1, the Applicant shall conduct, and submit to VDOT, a corridor evaluation of existing signal timings along Route 7 from Old Gallows Road to the Dulles Toll Road (11 intersections) during the AM and PM peak hours.

ii. Following the Stabilization of Phase 2, the Applicant shall conduct, and submit to VDOT, a corridor evaluation of existing signal timings along Route 123 from Anderson Road to Old Courthouse Road (seven intersections) during the AM and PM peak hours.

iii. Following the Stabilization of Phase 3, the Applicant shall conduct, and submit to VDOT, a corridor evaluation of existing signal timings along Route 123 from Anderson Road to Old Courthouse Road (seven intersections) during the PM peak hour, along International Drive from Fletcher Street to Crate & Barrel (two intersections) during the PM peak hour, and along Route 7 from Old Gallows Road to the Dulles Toll Road (11 intersections) during the AM and PM peak hours.
iv. Following the Stabilization of Phase 4, the Applicant shall conduct, and submit to VDOT, a corridor evaluation of existing signal timings along Route 123 from Anderson Road to Old Courthouse Road (seven intersections) during the AM peak hour and along Route 7 from Old Gallows Road to the Dulles Toll Road (11 intersections) during the AM and PM peak hours.

v. The purpose of each corridor evaluation, as indicated in subparagraphs i-iv above, is to determine appropriate signal timing modifications along each corridor. Such signal timing plans shall be subject to VDOT review and approval at each phase. Following each corridor analysis, the Applicant shall make such signal timing modifications as approved by VDOT based on the findings of the evaluation as soon as reasonably feasible.

39. Tysons Transportation Fund. The Applicant shall provide a contribution of $3.62 per new non-residential square foot and $804 for each new residential unit associated with the subject site plan to Fairfax County for the Tysons Transportation Fund. Prior to site plan approval, the Applicant shall contribute 10% of the aforementioned amount to the Tysons Transportation Fund, with the remainder of the contribution to be made prior to issuance of a RUP or Non-RUP for the subject building. The amount due at each phase shall be adjusted to ensure that credits for all creditable expenditures are granted as further described below. The square foot and per unit amount of the contribution to be made shall be adjusted, as approved by the Board of Supervisors, based on changes in the CCI from the base year of 2007 to the actual date of payment.

The Applicant shall receive credits against the contributions that would otherwise be due to the Tysons Transportation Fund for the following actual or estimated costs: (a) costs incurred or to be incurred (or payments made or to be made) with respect to the design and construction of improvements to the Westpark Bridge as described in Proffer #37, and (b) costs incurred or to be incurred (or payments made or to be made) in the design of the Route 123/International Drive interchange as described in Proffer #38.D.iii. To the extent that any creditable amount exceeds the amounts that are due to the Tysons Transportation Fund with any site plan, such excess shall be carried over and applied to amounts that may be due with any future site plan.

A. Westpark Bridge Design and Construction.

i. If the Applicant has performed the work specified in Proffers 37.A and 37.B, the amount of the Tysons Transportation Fund credit shall be determined by FCDOT based on documentation acceptable to FCDOT that describes in detail all design and construction costs actually paid or incurred by the Applicant.

ii. If the Applicant has not yet performed the work specified in Proffers 37.A and 37.B, but has confirmed in writing its legal and binding obligation to perform such work by the date prescribed by Proffers 37.A and 37.B, the amount of the credit shall be determined by FCDOT based on detailed estimates of the costs to design and construct the bridge project as
submitted by the Applicant, and shall be subject to final reconciliation and adjustment subsequent to completion and acceptance of the bridge project and submission of documentation acceptable to FCDOT that describes in detail all design and construction costs actually paid or incurred by the Applicant.

iii. If entities other than the Applicant have performed or will perform the work specified in Proffers 37.A and 37.B, the Applicant shall contribute the amount specified in Proffers 37.B.i. to the Tysons Transportation Fund, and the credit shall equal the amount paid.

B. Route 123/International Drive Interchange Design.

i. If the Applicant has performed the design work in accordance with Proffer 38.D.iii.a, then the amount of the credit shall be determined by FCDOT based on documentation acceptable to FCDOT that describes in detail all design costs actually paid or incurred by the Applicant.

ii. If the Applicant does not perform or has been released from performing the design work in accordance with Proffer 38.D.iii.a, but makes or has confirmed its binding commitment to make the payment described in Proffer 38.D.iii.c, then the credit will be the amount specified in Proffer 38.D.iii.c.

iii. If the Applicant has not yet performed the design work in accordance with Proffer 38.D.iii.a., but has confirmed in writing its legal and binding obligation to perform such work by the date prescribed by Proffer 38.D.iii.a, then the amount of the credit shall be determined by FCDOT based on detailed estimates of the costs to design the interchange in accordance with Proffer 38.D.iii.a. as submitted by the Applicant, and shall be subject to final reconciliation and adjustment subsequent to completion and acceptance of the interchange design and submission of documentation acceptable to FCDOT that describes in detail all design costs actually paid or incurred by the Applicant.

40. Congestion Management. The Applicant shall prepare and implement a construction congestion management plan during construction of each phase, as appropriate. The congestion management plan shall identify anticipated construction entrances, construction staging areas, construction vehicle routes and procedures for coordination with FCDOT and/or VDOT concerning construction material deliveries, lane closures, and/or other construction related activities that may adversely affect the surrounding road network. Such plans shall be prepared by a qualified professional and submitted for review and comment to the Providence District Supervisor and the Providence District Planning Commissioner, FCDOT and DPWES upon submission of the initial site plan for each phase. The Transportation Coordinator (as defined in Proffer #41) shall coordinate with the development/construction manager, VDOT, FCDOT and the Dulles Rail Project Entities throughout construction, to monitor the off-site transit and roadway improvements and ensure the congestion management plan adequately ensures safe
circulation at all times and efficient circulation on the Property and on the public roadways adjoining the Property. In addition, the TC shall coordinate any adjustments to the TDM Plan (as defined in Proffer #41) as necessary to address the congestion management plan.

TRANSPORTATION DEMAND MANAGEMENT

41. Transportation Demand Management. This Proffer sets forth the programmatic elements of a transportation demand management plan (the “TDM Plan”). Initially, the TDM Plan shall be implemented and maintained by Tysons Corner Holdings LLC and Tysons Corner Property Holdings LLC, or the entities that are their successors as the owners or developers of the Existing Shopping Center (jointly, the “Owner/Developer”). After the completion and Stabilization (as hereinafter defined) of the fourth phase and satisfaction of the proffered goals described below for a period of two years, the TDM Plan shall be maintained by the UOA. For the purposes of this proffer, under no circumstances shall the UOA be deemed to be the Owner/Developer, and the provisions of this Proffer applicable to the Owner/Developer shall not apply to the UOA, except as specifically noted. As used in this Proffer, the term “Development” shall be deemed to refer to both the Development With Rail and the Development Prior to Rail.

The purposes of the TDM Plan are to (a) limit the number of vehicle trips generated by certain of the new uses constructed as part of the Development, and (b) encourage the use of transit (Metrorail and bus), other high occupant vehicle commuting modes, walking, biking and teleworking by employees, customers and residents who work or live in the buildings located in the Development and the Existing Shopping Center. The TDM Plan will be based on the “Transit-Oriented Development Transportation Demand Management Study and Strategic Plan” prepared by Strategic Transportation Initiatives, Inc., dated September 1, 2006 (the “TDM Strategic Plan”), the terms of which are hereby incorporated by reference.

A. Vehicle Trip Objectives.

i. General. Implementation of the TDM Plan shall help to limit the number of vehicle trips generated by the Development through the use of mass transit, ride-sharing and other strategies. The Development shall be designed to create significant interactions among various uses on the Property such that fewer automobile trips will occur within the site and on the external road network through the creation of synergistic relationships within the Property. In addition, easy access to Metrorail and bus facilities and the capability for teleworking will provide commuting options other than the automobile to residents, employees and visitors to the Property.

ii. Maximum Trips After Reduction Limits. The objective of the TDM Plan shall be to limit the number of vehicle trips generated by the new on-site residential, office and hotel uses in the Development during weekday peak hours (as determined using methods based on ITE, 7th edition, Trip Generation rates and/or equations) (the “ITE Trip Generation Rate”). The number of vehicle trips generated by the proposed residential, office and hotel uses shall be separately measured so that appropriate remedial actions may be undertaken as required to address any excess of trips
associated with a specific type of use. The types of remedial actions that will be undertaken are described in the TDM Strategic Plan. The number of vehicle trips generated by the new on-site residential, office and hotel uses in the Development during weekday peak hours shall not exceed the maximum trip limits for each of the defined uses ("Maximum Trips After Reduction") set forth in the following tables.

After rail is operational at the Tysons Central 123 Metro Station, the effect of the Maximum Trips After Reduction limits will be to reduce vehicle trips generated by the on-site uses during the weekday Peak Hours (as defined below) as follows.

**Percentage Trip Reduction at Build-out of Each Phase After Rail is Operational**

<table>
<thead>
<tr>
<th>Use</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>27%</td>
<td>31%</td>
</tr>
<tr>
<td>Residential</td>
<td>51%</td>
<td>68%</td>
</tr>
<tr>
<td>Hotel</td>
<td>24%</td>
<td>50%</td>
</tr>
</tbody>
</table>

The Maximum Trips After Reduction indicated in the following tables is based on the percentage reduction of total trips that would otherwise be generated by the Development according to methods in the ITE Trip Generation Rate. In the event that the buildings actually constructed by the Applicant in any phase have less than the maximum number of dwelling units or hotel rooms and/or less than the maximum square footage of office gross floor area, then the Maximum Trips After Reduction set forth in the below charts shall still govern.

**Maximum Trips After Reduction for the Development Under the Development With Rail**

**Phase 1 Before Rail is Operational**

<table>
<thead>
<tr>
<th>Component</th>
<th>AM PEAK HOUR</th>
<th></th>
<th></th>
<th>PM PEAK HOUR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>735</td>
<td>595</td>
<td>19%</td>
<td>697</td>
<td>509</td>
<td>27%</td>
</tr>
<tr>
<td>Residential</td>
<td>146</td>
<td>82</td>
<td>44%</td>
<td>175</td>
<td>84</td>
<td>52%</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>110</td>
<td>34%</td>
<td>182</td>
<td>98</td>
<td>46%</td>
</tr>
<tr>
<td>Total</td>
<td>1047</td>
<td>787</td>
<td>25%</td>
<td>1054</td>
<td>691</td>
<td>34%</td>
</tr>
</tbody>
</table>
### Phase 1 After Rail is Operational

<table>
<thead>
<tr>
<th>Component</th>
<th>AM PEAK HOUR</th>
<th></th>
<th></th>
<th>PM PEAK HOUR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>735</td>
<td>537</td>
<td>27%</td>
<td>697</td>
<td>481</td>
<td>31%</td>
</tr>
<tr>
<td>Residential</td>
<td>146</td>
<td>72</td>
<td>51%</td>
<td>175</td>
<td>56</td>
<td>68%</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>126</td>
<td>24%</td>
<td>182</td>
<td>91</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>1047</td>
<td>735</td>
<td>30%</td>
<td>1054</td>
<td>628</td>
<td>40%</td>
</tr>
</tbody>
</table>

### Phases 1 and 2 After Rail is Operational

<table>
<thead>
<tr>
<th>Component</th>
<th>AM PEAK HOUR</th>
<th></th>
<th></th>
<th>PM PEAK HOUR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>1473</td>
<td>1075</td>
<td>27%</td>
<td>1397</td>
<td>964</td>
<td>31%</td>
</tr>
<tr>
<td>Residential</td>
<td>305</td>
<td>149</td>
<td>51%</td>
<td>365</td>
<td>117</td>
<td>68%</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>126</td>
<td>24%</td>
<td>182</td>
<td>91</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>1944</td>
<td>1350</td>
<td>31%</td>
<td>1944</td>
<td>1172</td>
<td>40%</td>
</tr>
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</table>

### Phases 1 through 3 After Rail is Operational

<table>
<thead>
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<th>Component</th>
<th>AM PEAK HOUR</th>
<th></th>
<th></th>
<th>PM PEAK HOUR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>1591</td>
<td>1161</td>
<td>27%</td>
<td>1539</td>
<td>1062</td>
<td>31%</td>
</tr>
<tr>
<td>Residential</td>
<td>432</td>
<td>212</td>
<td>51%</td>
<td>516</td>
<td>165</td>
<td>68%</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>126</td>
<td>24%</td>
<td>182</td>
<td>91</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>2189</td>
<td>1499</td>
<td>32%</td>
<td>2237</td>
<td>1318</td>
<td>41%</td>
</tr>
</tbody>
</table>

### Phases 1 through 4 After Rail is Operational

<table>
<thead>
<tr>
<th>Component</th>
<th>AM PEAK HOUR</th>
<th></th>
<th></th>
<th>PM PEAK HOUR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>2058</td>
<td>1502</td>
<td>27%</td>
<td>1968</td>
<td>1358</td>
<td>31%</td>
</tr>
<tr>
<td>Residential</td>
<td>562</td>
<td>275</td>
<td>51%</td>
<td>671</td>
<td>215</td>
<td>68%</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>126</td>
<td>24%</td>
<td>182</td>
<td>91</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>2786</td>
<td>1903</td>
<td>32%</td>
<td>2821</td>
<td>1664</td>
<td>41%</td>
</tr>
</tbody>
</table>
### Phases 1, 2, and 4 After Rail is Operational

<table>
<thead>
<tr>
<th>Component</th>
<th>AM PEAK HOUR</th>
<th>PM PEAK HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction</td>
<td>Maximum Trips After Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>1940</td>
<td>1416</td>
</tr>
<tr>
<td>Residential</td>
<td>433</td>
<td>212</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>126</td>
</tr>
<tr>
<td>Total</td>
<td>2539</td>
<td>1754</td>
</tr>
</tbody>
</table>

*Trip Generation Before Reduction is based on the ITE Trip Generation Rates before the TDM and synergy reductions.

### Maximum Trips After Reduction for the Development if the Applicant Starts Development Under the Development Prior to Rail (Phase 1A for the purpose of this chart)

Because the Development Prior to Rail is an alternate development option that would be in place of Phase 1 under the Development With Rail, it is referred to as Phase 1A in the following tables.

#### Phase 1A (Before Rail is Operational)

<table>
<thead>
<tr>
<th>Component</th>
<th>AM PEAK HOUR</th>
<th>PM PEAK HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction</td>
<td>Maximum Trips After Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>669</td>
<td>542</td>
</tr>
<tr>
<td>Residential</td>
<td>146</td>
<td>80</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>110</td>
</tr>
<tr>
<td>Total</td>
<td>981</td>
<td>732</td>
</tr>
</tbody>
</table>

#### Phase 1A (After Rail is Operational)

<table>
<thead>
<tr>
<th>Component</th>
<th>AM PEAK HOUR</th>
<th>PM PEAK HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction</td>
<td>Maximum Trips After Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>669</td>
<td>488</td>
</tr>
<tr>
<td>Residential</td>
<td>146</td>
<td>72</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>126</td>
</tr>
<tr>
<td>Total</td>
<td>981</td>
<td>686</td>
</tr>
</tbody>
</table>

*Trip Generation Before Reduction is based on the ITE Trip Generation Rates before the TDM and synergy reductions.
The trips indicated below provide the Maximum Trips After Reduction if development of the Development Prior to Rail (Phase 1A) is complete and the Applicant subsequently commences construction of later phases under the Development With Rail as further described in Proffer #6.

**Phase 1A and 2 After Rail is Operational**

<table>
<thead>
<tr>
<th>Component</th>
<th>AM PEAK HOUR</th>
<th></th>
<th></th>
<th>PM PEAK HOUR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>1407</td>
<td>1027</td>
<td>27%</td>
<td>1328</td>
<td>916</td>
<td>31%</td>
</tr>
<tr>
<td>Residential</td>
<td>305</td>
<td>149</td>
<td>51%</td>
<td>365</td>
<td>117</td>
<td>68%</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>126</td>
<td>24%</td>
<td>182</td>
<td>91</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>1878</td>
<td>1302</td>
<td>31%</td>
<td>1875</td>
<td>1124</td>
<td>40%</td>
</tr>
</tbody>
</table>

**Phase 1A through 3 After Rail is Operational**

<table>
<thead>
<tr>
<th>Component</th>
<th>AM PEAK HOUR</th>
<th></th>
<th></th>
<th>PM PEAK HOUR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>1525</td>
<td>1113</td>
<td>27%</td>
<td>1470</td>
<td>1014</td>
<td>31%</td>
</tr>
<tr>
<td>Residential</td>
<td>432</td>
<td>212</td>
<td>51%</td>
<td>516</td>
<td>165</td>
<td>68%</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>126</td>
<td>24%</td>
<td>182</td>
<td>91</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>2123</td>
<td>1451</td>
<td>32%</td>
<td>2168</td>
<td>1270</td>
<td>41%</td>
</tr>
</tbody>
</table>

**Phase 1A through 4 After Rail is Operational**

<table>
<thead>
<tr>
<th>Component</th>
<th>AM PEAK HOUR</th>
<th></th>
<th></th>
<th>PM PEAK HOUR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
<td>Percent Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>1992</td>
<td>1454</td>
<td>27%</td>
<td>1899</td>
<td>1310</td>
<td>31%</td>
</tr>
<tr>
<td>Residential</td>
<td>562</td>
<td>275</td>
<td>51%</td>
<td>671</td>
<td>215</td>
<td>68%</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>126</td>
<td>24%</td>
<td>182</td>
<td>91</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>2720</td>
<td>1855</td>
<td>32%</td>
<td>2752</td>
<td>1616</td>
<td>41%</td>
</tr>
</tbody>
</table>
### Phase 1A, 2 and 4 After Rail is Operational

<table>
<thead>
<tr>
<th>Component</th>
<th>AM PEAK HOUR</th>
<th>PM PEAK HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trip Generation Before Reduction*</td>
<td>Maximum Trips After Reduction</td>
</tr>
<tr>
<td>Office</td>
<td>1874</td>
<td>1368</td>
</tr>
<tr>
<td>Residential</td>
<td>433</td>
<td>212</td>
</tr>
<tr>
<td>Hotel</td>
<td>166</td>
<td>126</td>
</tr>
<tr>
<td>Total</td>
<td>2473</td>
<td>1706</td>
</tr>
</tbody>
</table>

*Trip Generation Before Reduction is based on the ITE Trip Generation Rates before the TDM and synergy reductions

### Definitions

i. **Transportation Coordinator.** The Owner/Developer and subsequently the UOA shall appoint a qualified transportation management professional to be the Transportation Coordinator (“TC”) for the project. The TC’s duties shall be to develop, implement and monitor the various components of the TDM Plan and revise the TDM Plan as appropriate. The TC shall oversee all elements of the TDM Plan and act as the liaison between the Owner/Developer and subsequently the UOA and FCDOT. The TC may be employed either directly by the Owner/Developer or by a property management company under a management contract with the Owner/Developer.

ii. **Stabilization.** The “Stabilization” of any phase of the Development, or of any building in a phase of the Development, shall be deemed to occur on the date when (a) initial RUPs have been issued for 100% of the units in a residential building in that phase, regardless of the physical occupancy in that phase, (b) initial Non-RUPs shall have been issued for 100% of the gross leaseable area in an office building in that phase, regardless of the physical occupancy, and (c) initial Non-RUPs shall have been issued for the hotel in that phase, regardless of the physical occupancy.

iii. **Peak Hour.** The relevant weekday AM or PM “peak hour” shall be that 60-minute period during which the highest volume of mainline through volumes occurs between 6:00 and 9:00 AM and 4:00 to 7:00 PM, respectively, as determined by mechanical and/or manual traffic counts conducted by a qualified traffic engineering firm conducted at select locations within a cordon defined by Route 7, International Drive, Route 123 and I-495 and as approved by FCDOT. To determine the peak hour, such counts shall be collected beginning on a Monday at 2400 hours and continuing to the following Thursday at 2400 hours during a week between April 1 and May 31 (but not including a week containing a federal holiday or when public schools are not in session). The methodology for determining the peak hour may be modified, in
agreement between the Owner/Developer (or the UOA after the end of the Owner/Developer Control Period) and FCDOT without requiring a PCA, in order to respond to technological and/or other improvements in trip counting.

iv. **Index**. The term “Index” shall mean the Consumer Price Index for all urban consumers (CPI-U) 1982-1984=100 (not seasonally adjusted). All fixed amounts specified in this Proffer as being due to the TDM Account, the TDM Remedy Fund and the TDM Incentive Fund shall be adjusted annually to reflect changes in the Index over a 2007 base year, unless another base year is specified. All amounts payable to the TDM Penalty Fund, and the then-stated amount of the Letter of Credit, shall be adjusted annually starting in 2022 to reflect changes in the Index over a 2021 base year.

v. **Owner/Developer Control Period**. The term “Owner/Developer Control Period” shall be defined as the period starting upon the approval of the Rezoning and ending on the date when two consecutive annual Trip Counts conducted after Stabilization of the last of Phases 3 or 4 to be constructed show that vehicle trips meet the trip reduction objectives, and are equal to or less than the applicable Maximum Trips After Reduction.

vi. **TDM Remedy Fund**. The purpose of the “TDM Remedy Fund,” as further described below, shall be to supplement the TDM Account in support of additional TDM strategies that may be determined to be necessary following any of the Trip Counts and for which sufficient funding is not immediately available through the then-existing TDM Account, including the TDM Budget Contingency (as hereinafter defined).

vii. **TDM Penalty Fund; Letter of Credit**. The TDM Penalty Fund is an account into which the Owner/Developer will deposit penalty payments as may be required to be paid pursuant to this Proffer (the “TDM Penalty Fund”). The County may withdraw funds from the TDM Penalty Fund for transportation improvements in the vicinity of the Property. To secure the Owner/Developer’s obligations to make payments into the TDM Penalty Fund, the Owner/Developer will provide the County with letter of credit as further described below.

Prior to the issuance of the first RUP or Non-RUP, whichever comes first, for Phase 1, the Owner/Developer (or its successor owner or developer, but not the UOA) shall (a) establish the TDM Penalty Fund and (b) deliver to the County a clean, irrevocable letter of credit in the stated amount of $2,000,000 issued by a banking institution approved by the County to secure the Owner/Developer’s obligations to make payments into the TDM Penalty Fund as described in paragraph O (the “Letter of Credit”). The stated amount of the Letter of Credit shall be increased to $3,000,000 prior to issuance of the first RUP or Non-RUP, whichever comes first, for
Phase 2, $3,500,000 prior to issuance of the first RUP or Non-RUP, whichever comes first, for Phase 3 and $4,000,000 prior to issuance of the first RUP or Non-RUP, whichever comes first for Phase 4. Alternatively, the Owner/Developer may provide substitute or additional Letters of Credit that achieve the same result.

The Letter of Credit will name the County as the beneficiary and will permit partial draws or a full draw.

The foregoing stated amount(s) of the Letter of Credit (1) shall be reduced by the sum of any and all previous draws under the Letter of Credit and payments by the Owner/Developer into the TDM Penalty Fund, and (2) starting in 2022, shall be increased annually to reflect changes in the Index over a 2021 base year.

If the results of any Trip Counts during the Owner/Developer Control Period show that, notwithstanding adjustments to the TDM Budget and TDM Plan over the time periods specified in paragraph M., the Maximum Trips After Reduction specified in Proffer #41.A.ii are being exceeded, then the penalty provisions of paragraph O shall apply. Thereafter, the Owner/Developer will make the payments required under paragraph O into the TDM Penalty Fund, and the County shall be authorized to withdraw the amounts on deposit in the TDM Penalty Fund. Penalty funds paid to the County shall be applied to transportation improvements in the vicinity of the Property at the County’s sole discretion.

At such time as the Owner/Developer is required to pay a penalty per paragraph O, if the Owner/Developer fails to make the required penalty payment to Fairfax County, within 30 days after written demand, the County shall have the ability to withdraw the penalty amount directly from the Letter of Credit.

C. Components of the TDM Plan. In order to meet the Maximum Trips After Reduction objectives, a TDM Plan shall be adopted and implemented by the Owner/Developer, subject to FCDOT approval. The minimum components of the TDM Plan are specified in paragraph C and may be subsequently adjusted by mutual agreement between the Owner/Developer (and subsequently the UOA) and FCDOT. All adjustments to the components of the TDM Plan contained in this paragraph C shall be approved by FCDOT and will not require a PCA. The TDM Plan shall include provisions in respect of the Development and the Existing Shopping Center as set forth in para. 41.C.i below and in Proffer #42. The minimum TDM Plan components are further described in the TDM Strategic Plan. In addition, the TDM Strategic Plan includes information about possible supplemental TDM Plan components. In addition to the timing, phasing and implementation information in this Proffer, more detail is provided in the TDM Strategic Plan.
i. **TDM Components Applicable to the Existing Shopping Center and the Development.** At a minimum, the TDM Plan shall contain the following elements as applicable to the Existing Shopping Center and the Development, including residential building occupants, office building tenants and employees and hotel employees and guests:

a. **TDM Network --** Establishment of a network of designated on-site TDM contacts among the Owner/Developer, the UOA, office building tenants, property managers and FCDOT through which to coordinate the implementation of the TDM Plan.

b. **Meetings with Stakeholders --** The TC shall attend meetings with other community groups and organizations that have a mutual interest in furthering the success of TDM programming and the effectiveness of mass transit and other non-SOV commuting (such as with TYTRAN and Dulles Corridor Rail Association).

c. **Website --** Develop and maintain a TDM project website that includes targeted information on a building-by-building basis, and that includes multi-modal transportation information, real-time travel and transit data, the possibility of online transit pass sales or value loading and connections to supporting links.

d. **Personal outreach --** In person outreach by the TC or the TC’s representatives to all new commercial tenants to explain the TDM program and transit options.

e. **Dissemination of information --** Dissemination of information in the TC’s on-site office as well as in prominent locations throughout the Property, including in the Existing Shopping Center. This dissemination of information shall include information relevant to patrons and customers of the Existing Shopping Center in addition to the Retail/Commercial, residential, office and hotel uses about transit benefits programs, maps and schedules offered by WMATA, Fairfax Connector and other transit providers, through the electronic information kiosks that are described below, and/or displays at its mall customer/concierge service booths.

f. **Transit benefits --** Encouragement of employers to offer employee benefit options including parking cash out, pre-tax/payroll subsidies for transit and vanpool fares, flex-time and alternative work schedule programs and live-near-work incentives.

g. **Telework programs and telework facility --** The Owner/Developer shall provide space for a telework facility for use by residents on the Property. The facility shall be located in the Development or
in the Existing Shopping Center. The telework facility shall consist of a minimum of 600 square feet of gross floor area and shall have computers, copier facilities, a fax machine and access to lap-top hook up stations with secure wireless internet access, private space for phone calls and access to a washroom.

h. Car sharing -- Car sharing program(s) subject to agreement with third-party vendor(s) (such as ZipCar/FlexCar).

i. Taxi stand -- A taxi stand shall be provided at the hotel in Phase 1.

j. Ridematching, carpoools, vanpools and guaranteed ride home -- Vanpool and carpool formation programs, including ride matching services, and coordination with established guaranteed ride home programs.

k. Commuter Club -- The TC shall establish a Commuter Club, which will provide discounts and special incentives to members, who may be comprised of residents, office and hotel workers and employees of retail tenants in the Existing Shopping Center.

l. Parking management plan -- A parking management plan, which shall include the “un-bundling” of parking spaces from residential unit sales/leases, dedication of parking spaces for carpoools/vanpools in the office parking areas and offering Commuter Club incentives/benefits to residential carpoolers.

m. Informational Kiosks -- The Owner/Developer shall provide space and a power supply within the Existing Shopping Center for electronic information kiosks that provide transit information if such kiosks should become available from WMATA, Fairfax County or other entities.

n. Vans and shuttles -- The Owner/Developer shall provide van and shuttle drop-off points or areas as shown on the CDP/FDP and shall allow and encourage employer, hotel and other shuttle services that are operating in the Tysons Corner area to stop at such points or areas to pick-up or drop off employees and patrons.

o. Rush hour pricing – The Owner/Developer shall provide incentives to residents, employees and visitors to remain on the Property during the PM peak by offering movie ticket and restaurant discounts during the afternoon/evening rush hour peak. These discounts shall be subsidized through the TDM budget and/or TDM Incentive Fund.
ii. **Additional TDM Components Applicable to Residential Buildings.** In addition to the TDM program components described in paragraph 41.C.i above, at a minimum, the TDM Plan shall also have the following components as applicable to residents:

a. **In-Unit Internet Access** -- All residential units shall be pre-wired to provide wireless Internet access (or other technology that may become available from time to time) to permit residents to access the Internet from home.

b. **Sales/leasing marketing program** -- A targeted marketing program for residential sales/leases that encourages and attracts TDM-oriented people such as one and no-car individuals and families to live in the Development as well as a targeted marketing program for office tenants to encourage on and off site office workers to live in the on-site residential buildings. The Owner/Developer shall actively support the TC and Existing Shopping Center management in the efforts to encourage office tenants to live in the residential units on the Property through discussions between executives and officers of the office tenants and executives and officers of the Owner/Developer.

c. **TDM incentives** – One time distribution of fare media or other incentives to all initial residents of driving age as well as on select occasions as an incentive.

d. **Transportation advising** -- “Personalized transportation advising” integrated into new unit walk-throughs, including appropriate training of sales/leasing agents.

iii. **Additional TDM Components Applicable to Office Buildings.** In addition to the TDM program components described in paragraph 41.C.i above, at a minimum, the TDM Plan shall also have the following components as applicable to the office building tenants and employees:

a. **Matching On-Site Office Employees to On-Site Residential Units** – Residential units shall be marketed to the on and off-site Tysons Corner Urban Center office employers and workers, including providing information in prospective tenant packages and possible discounts or financial incentives to those employees who live and work on the Property. The Owner/Developer shall actively support the TC and Existing Shopping Center management in the efforts to encourage office tenants to live in the residential units on the Property through discussions between executives and officers of the office tenants and executives and officers of the Owner/Developer.
b. Relocation program -- Coordination of a relocation program to bring new businesses to the Property, with the goal of the office tenants utilizing alternative commuting options.

c. Leasing Packages -- Integration of transportation information and education materials into office leasing packages.

D. **Shuttle Bus/Bus Circulator System.** In order to provide initial support for the development of a comprehensive Tysons Corner shuttle or circulator system, prior to approval of the first site plan, the Owner/Developer shall, at FCDOT’s option, (1) contribute $100,000 to Fairfax County to pay for the expenses of a feasibility study relating to the creation of a consolidated shuttle or circulator system in the Tysons Corner area, or (2) retain a qualified consultant at the Owner/Developer’s expense not to exceed $100,000 to perform such a study. If FCDOT chooses the second option, the scope of the study will be prepared by the Owner/Developer and will be subject to review and approval by FCDOT, and the selected consultant shall be approved by FCDOT. The purpose of the study will be to summarize and evaluate the various private shuttle services currently provided in the Tysons Corner area and make recommendations to the County about the possible ownership, organizational structure, routes, sources of revenue and start-up and on-going capital and operating budget requirements for a shuttle or bus circulator system that would be intended to consolidate and replace existing shuttle services.

i. In addition, upon receipt of a written request from Fairfax County indicating the County’s intent to create a Tysons Corner shuttle or bus circulator system, the Owner/Developer shall make a one-time payment of $250,000 to the County to pay start-up expenses relating to the operation of such a consolidated system if the County decides to and proceeds to organize such a service, and the Owner/Developer shall contribute $100,000 to the County during each of the initial ten years that the service is in operation in Tysons Corner.

ii. In addition, the TC shall coordinate with the employers, hotels and automobile dealerships that run existing shuttles in Tysons Corner to provide access for those shuttles to the Property.

iii. In the event that after the completion of the feasibility study, a consolidated shuttle or bus circulator system is not created, the Owner/Developer may elect to operate a consolidated shuttle/circulator service itself.

iv. In the event that after the completion of the feasibility study, the events described in paras. i and iii above do not occur, then starting on the tenth anniversary of the approval date for the Rezoning, the Owner/Developer shall pay $250,000 to the County for the purpose of operating or enhancing existing bus service to and in the vicinity of the Property and
shall pay $100,000 per year on the following ten annual anniversary dates
to further that service.

E. **Transportation Coordinator.** Within ninety (90) days after the approval of the
Rezoning, the Owner/Developer shall appoint a TC for the project. The
Owner/Developer shall provide written notice to FCDOT of the appointment of
the TC within ten (10) days of such appointment and shall furnish FCDOT with
evidence of such TC’s qualifications and thereafter shall do the same within ten
(10) days of any change in such appointment. Following the initial appointment
of the TC, the Owner/Developer or the UOA, as applicable, shall continuously
employ, or cause to be employed as specified above, a TC for the Development
and the Existing Shopping Center.

F. **TC Office.** The Owner/Developer and subsequently, the UOA, shall provide a
centrally-located office for the TC and space for TDM products, services and
program offerings available to new residents, businesses, customers and visitors
to the Property. The office may be located within the Existing Shopping Center
or elsewhere on the Property.

G. **TDM Plan and Budget.** Within thirty (30) days after the TC has been appointed
by the Owner/Developer, the Owner/Developer, through the TC, shall prepare and
submit an initial TDM Plan to FCDOT for review and comment, including (i) the
start-up components of the TDM Plan that will be put in place both before and
after the commencement of operations at the Tysons Central 123 Metro Station
and (ii) an initial budget sufficient to implement the TDM Plan for the remainder
of the year and for the next calendar year (the “TDM Budget”). The TDM Budget
shall include a contingency equal to a minimum of ten percent (10%) of the
amount of the annual TDM Budget (the “TDM Budget Contingency”). If
FCDOT has not responded with any comments to the Owner/Developer within
sixty (60) days of receipt of the TDM Plan and TDM Budget, the TDM Plan and
TDM Budget shall be deemed approved. The Owner/Developer shall provide
written documentation demonstrating the establishment of the TDM Budget to
FCDOT no later than thirty (30) days after FCDOT’s response to the proposed
TDM Budget and Plan or following the sixty (60) day period described above.

Thereafter, the TC shall re-establish the TDM Budget for each calendar year,
which shall cover the costs of implementation of the TDM Plan for such year
(including the TDM Budget Contingency). The TC shall furnish a copy of the
TDM Budget and TDM Plan for each year to the FCDOT for review and
comment not less than sixty (60) days before the beginning of each year. A line
item for the TDM Account shall be included in the UOA budget upon the
establishment of the UOA. The association documents that establish and control
the UOA shall provide that the TDM Account shall not be eliminated as a line
item in the UOA budget and that funds in the TDM Account shall not be utilized
for purposes other than to fund TDM strategies. The TDM Account shall be
funded solely by the Owner/Developer until such time as assessments of residents
and commercial owners are implemented as provided in the UOA documents.
H. **TDM Account.**

i. **Initial Funding.** Within thirty (30) days after the establishment of the initial TDM Budget, the Owner/Developer shall establish and fund an account (the “TDM Account”) in the initial amount of the annual budget for the TDM program for the then current year. The purpose of the TDM Account shall be to fund the TDM Budget, including the TDM Budget Contingency. The TDM Account shall be established as an interest bearing account with a banking or other financial institution qualified to do business in Virginia. All interest earned on the account principal shall remain in the TDM Account, and shall be used for TDM Plan purposes. The Owner/Developer shall provide written documentation demonstrating the establishment of the TDM Account to FCDOT within ten (10) days of its establishment. Funds in the TDM Account shall be utilized by the TC each year to implement the TDM Plan in accordance with the TDM Budget.

ii. **Excess Funds in TDM Account.** Any funds remaining in the TDM Account at the end of any given year shall be transferred to the TDM Remedy Fund, as further discussed in paragraph I, until such time as the TDM Remedy Fund has achieved a balance of $400,000 (this amount shall be adjusted annually based on changes in the Index from the base year of 2007). At such time as the TDM Remedy Fund achieves such a balance, any funds remaining in the TDM Account at the end of any given year shall be transferred to the TDM Account for use in transit incentives. In the event that the TDM Remedy Fund is drawn upon, then the TDM Remedy Fund shall be replenished during the next TDM Budget cycle (repeated for multiple budget cycles if necessary), as indicated above, until the TDM Remedy Fund achieves a balance of $400,000 (as such amount is or has been adjusted in accordance with the method described above).

iii. **Annual Funding.** The TDM Account shall be replenished annually following the establishment of each year’s TDM Budget and any transfer of funds to the TDM Remedy Fund. The TDM Account shall maintain a starting balance at the beginning of each year of not less than $200,000, or in such greater amount as may be required under the TDM Budget for such year.

iv. **Transfer to UOA.** The TDM Account shall be managed by the Owner/Developer (and not the UOA) until the Owner/Developer Control Period has expired. Thereafter, management of the TDM Account will become the responsibility of the UOA.

I. **TDM Remedy Fund.** At the same time that the Owner/Developer creates and funds the TDM Account, the Owner/Developer shall establish a separate interest bearing account referred to as the “TDM Remedy Fund.” All interest earned on the principal in this account shall be added to the principal in the TDM Remedy
Fund and shall be used for TDM Remedy Fund purposes. Prior to issuance of the first RUP or Non-RUP, the Owner/Developer shall contribute to the TDM Remedy Fund to the extent necessary for the TDM Remedy Fund to have a $400,000 balance (as such amount has been adjusted at that time based on changes in the Index from a base year of 2007). Funds from the TDM Remedy Fund shall be drawn on only for purposes of immediate need of TDM funding, and may be drawn upon prior to any TDM Budget adjustments that may be required under paragraph M. At the end of the Owner/Developer Control Period, the Owner/Developer shall contribute to the TDM Remedy Fund to the extent necessary for the TDM Remedy Fund to have a balance of $400,000, as such amount may have been adjusted annually based on changes in the Index from a base year of 2007. Following such payment into the TDM Remedy Fund, the Owner/Developer shall transfer the TDM Remedy Fund to the UOA. Thereafter, the UOA shall continue to replenish the TDM Remedy Fund per the requirements of paragraph 36.H.ii.

J. TDM Incentive Fund. Prior to issuance of the first RUP or Non-RUP for the first building constructed as part of the Development, the Owner/Developer shall make a one time contribution of $400,000 to a segregated sub-account in the TDM Account to fund a transit incentive program. Such program shall be prepared by the Owner/Developer, through the TC and in coordination with FCDOT and shall include consideration for fare media distribution and value loading, financing incentives, and alternative incentives (such as grocery delivery) tailored to residents and mall customers. The TDM Incentive Fund shall be established as an interest bearing account with a banking or other financial institution qualified to do business in Virginia. All interest earned on the account principal shall remain in the TDM Incentive Fund and shall be used for TDM incentive purposes.

K. Annual Surveys and Reports. Commencing in 2007, the Owner/Developer, or the UOA after the end of the Owner/Developer Control Period, shall cause the TC to prepare and submit to the County the annual surveys and reports on the TDM Plan described below.

i. Annual Survey. An annual survey (the “Annual Survey”) shall be completed in September of each year. The Annual Survey shall gather information on the effectiveness of the TDM Plan and shall be used by the TC to determine whether changes to the TDM Plan are needed to, among other things, achieve (or to continue to achieve) the objective that vehicle trips do not exceed the Maximum Trips After Reduction. If the Annual Survey reveals that changes to the TDM Plan are needed, the Owner/Developer (and subsequently the UOA, as applicable) through the TC shall coordinate such changes with FCDOT and implement and adjust the TDM Budget accordingly. The TC shall coordinate the preparation of Annual Survey materials and the methodology for validating survey results with FCDOT prior to doing each year’s Annual Survey, and shall collect and analyze the results. Such analysis shall include at a minimum:
a. A description of the TDM measures in effect for the survey period and a description of how such measures have been implemented;

b. The number of people surveyed and the number of people who responded in each building;

c. The results of any surveys taken during the survey period;

d. The number of residents, employees and/or others participating in the TDM programs, displayed by category of participants and by mode of use;

e. An evaluation of the effectiveness of the TDM Plan and its program elements, including its effectiveness in achieving vehicle trip reduction objectives for each of the residential, office and hotel buildings, and, if necessary, proposed modifications to the plan and program elements; and

f. A description of the uses constructed and occupied on the Property at the time the survey was conducted and levels of occupancy.

ii. Annual Report. The TC shall submit a written annual report on the TDM Plan to the FCDOT no later than sixty (60) days after the completion of the Annual Survey described in Proffer #41.K.i. (the “Annual Report”). The Annual Report shall include (a) a description of the TDM strategic efforts for the year, including, as applicable, sample marketing materials, (b) a financial statement that includes the TDM Budget for the year and a detailed summary of actual TDM Plan income and expense for such year, (c) a summary of the levels of occupancy in the buildings that have been completed in the Development, (d) an analysis of the results of the Annual Survey (e) a compilation and analysis of the results of any Trip Counts that were conducted during the year, (f) discussion of any changes proposed to the TDM Plan and (g) the amount of money then on deposit in the TDM Penalty, Incentive and Remedy Funds.

iii. Adjustments to Calendar and Due Dates. At the mutual agreement of the FCDOT and the Owner/Developer (and subsequently the UOA), the due dates for the delivery of the Annual Report may be altered if changes have occurred, or appear to have occurred, in trip characteristics resulting from events such as an additional phase reaching Stabilization.

iv. Meetings with FCDOT. The Owner/Developer or UOA (as applicable) shall meet with FCDOT annually to discuss the results of the Trip Counts, the Annual Survey, the Annual Report and the TDM Plan.
L. **Trip Counts.**

i. **Trip Count Measurement Dates.** For purposes of this Proffer, Trip Counts shall be measured on three consecutive days over a maximum two week period (but not including a week containing a federal holiday or when public schools are not in session); these dates are referred to as “Trip Count Measurement Dates.” Trip Counts shall be conducted between April 1 and May 31 after Stabilization (as previously defined in para. 41.B.ii) has occurred for the first phase of development and shall continue annually thereafter except as provided in paragraph 41.L. In accordance with Proffer #41.L.v and during the times below, the Owner/Developer shall conduct interim trip counts at the request of FCDOT. At least thirty (30) days prior to conducting the Trip Counts, the Owner/Developer shall meet with FCDOT to review and reach agreement on the dates that will be the Trip Count Measurement Dates, the methodology for the Trip Counts, and the analyses to be done after the Trip Counts are complete.

ii. **Trip Counts, Generally.** Starting when the Stabilization of the first phase of the Development has occurred, the Owner/Developer shall measure separately the actual vehicle trips that are generated from the office, residential and hotel uses for all phases that have reached Stabilization in the Development (the “Trip Counts”) on the Trip Count Measurement Dates to evaluate whether the vehicle trips are equal to or less than the applicable Maximum Trips After Reduction. Trip Counts provided to FCDOT shall include information about the occupancy levels for all surveyed uses at the time of the Trip Count Measurement Dates.

iii. **Methods.** Trip Counts shall include counts of vehicles entering and exiting the areas of the parking garages designated for residential, office and hotel parking, as well as those additional manual and mechanical counts as may be needed, as determined by FCDOT. Trip Counts shall be conducted at the garages so that the only trips generated by the separate office, residential and hotel uses are compared to the Maximum Trips After Reduction specified for each such use (that is, cut-through trips, Metro trips, retail trips, etc. are excluded).

iv. **Calculations.** For each residential, office and hotel use, the total number of peak hour vehicle trips shall be computed by summing the number of trips entering and exiting the parking garages for the individual uses (residential, office and hotel) on each of the three days that Trip Counts are taken during the AM and PM peak hours and dividing that sum by three. Values will be provided for each garage included in the Development, and a sum of vehicle trips generated by the residential, office and hotel uses separately will be calculated.
v. Frequency of Trip Counts. Following the Stabilization of the first phase of the Development, the Owner/Developer shall conduct Trip Counts annually until such time as two consecutive annual Trip Counts indicate that the trips generated in the AM and PM Peak Hours by all phases that have reached Stabilization are equal to or less than the applicable Maximum Trips After Reduction. At such time, the Owner/Developer shall conduct Trip Counts every two years, provided that at such time as the next phase reaches Stabilization, the Owner/Developer shall again conduct annual Trip Counts until such time as the provisions of this paragraph permit Trip Counts every two years. If the Owner/Developer is conducting Trip Counts every two years as permitted above, and if two consecutive biennial Trip Counts indicate that the trips generated in the AM and PM Peak Hours by all phases that have reached Stabilization are equal to or less than the applicable Maximum Trips After Reduction, then the Owner/Developer shall conduct additional Trip Counts at not greater than five (5) year intervals to determine whether the Maximum Trips After Reduction are continuing to be met, until such time as annual Trip Counts would otherwise be required due to the Stabilization of a subsequent phase. Notwithstanding the provisions of this paragraph, FCDOT may request counts be undertaken at any time to validate traffic data, but not more frequently than two times per calendar year. If such requests are made by FCDOT, the Owner/Developer shall conduct the requested counts.

vi. Evaluation of Trip Counts. The results of the Trip Counts shall be compared to the Maximum Trips After Reduction specified for each use to determine whether actual trips are equal to, less than or greater than the specified Maximum Trips After Reduction. In the event the trips generated by each of the uses in the phases that have reached Stabilization are equal to or less than the Maximum Trips After Reduction specified for each use, then the Owner/Developer and subsequently the UOA (as applicable) shall continue to administer the TDM Plan in the ordinary course, in accordance with the provisions of these Proffers. If the trips generated by each of the uses in the phases that have reached Stabilization are greater than the Maximum Trips After Reduction, the Owner/Developer and subsequently the UOA (as applicable) shall follow the provisions of paragraph M below.

M. Adjustments to TDM Plan and Budget. In the event that any of the Trip Counts are greater than the applicable Maximum Trips After Reduction, then the TC shall convene a meeting with FCDOT within thirty (30) days after the completion of the Trip Counts to review the results of that report and the TDM strategies then in place for the Development. Thereafter, the TC shall develop modifications to the TDM Plan and the TDM Budget to address the surplus of trips, including any surplus caused by or related to a particular use or uses. The Owner/Developer shall submit any revisions to the TDM Plan and TDM Budget to FCDOT within thirty (30) days following this meeting. If FCDOT has not provided comments to
the Owner/Developer within sixty (60) days after receipt of the revised TDM Plan and revised TDM Budget, the Owner/Developer’s revisions to the TDM Plan and TDM Budget shall be deemed approved. Following approval of the revised TDM Plan and TDM Budget, the Owner/Developer shall (1) draw down on the TDM Remedy Fund, if it is determined to be necessary to do so, (2) increase the TDM Account with TDM Remedy Fund monies if necessary in order to cover any additional costs to implement the revised TDM Budget, (3) implement the provisions of the revised TDM Plan as developed in consultation with FCDOT, and (4) continue to conduct Trip Counts annually. In the event that Maximum Trips After Reduction are still being exceeded after two annual revision cycles, then the penalties set forth in paragraph O shall apply.

N. Subsequent Reporting After the Owner/Developer Control Period.

i. Owner/Developer Control Period. The Owner/Developer shall remain obligated under this Proffer until the end of the Owner/Developer Control Period. At the end of the Owner/Developer Control Period, the Owner/Developer shall be released from any further obligation under this Proffer, and the UOA shall bear the sole responsibility for continuing compliance with these Proffers. At the end of the Owner/Developer Control Period, the Letter of Credit shall be returned to the Owner/Developer for cancellation.

a. Continuation of TDM Plan. In the event the trips generated are equal to or less than the applicable Maximum Trips After Reduction, then the UOA shall continue to administer the TDM Plan in the ordinary course, in accordance with the provisions of this Proffer, including the fact that through the TC, the UOA shall continue to submit the Annual Reports, including the results of the Annual Survey and any Trip Counts, to FCDOT, as prescribed in paragraph K.

b. Additional Trip Counts. If an Annual Report demonstrates that a change in commuting patterns has occurred that is significant enough to reasonably call into question whether the Maximum Trips After Reduction limits are continuing to be met, as determined by FCDOT, then FCDOT may require the UOA to conduct additional Trip Counts (pursuant to the methodology set forth in paragraph L) within 180 days to determine whether in fact such objectives are being met or are likely to be exceeded. If any such Trip Counts demonstrate that the Maximum Trips After Reduction are being exceeded, then the UOA shall meet with FCDOT to review the TDM strategies in place and to develop modifications to the TDM Plan to address the surplus of trips. Within sixty (60) days following such meeting, the UOA shall submit a revised TDM Plan and TDM Budget to FCDOT for its review and approval. If FCDOT provides no response within sixty
(60) days after receipt of the revised TDM Plan and TDM Budget, the UOA’s revised TDM Plan and TDM Budget shall be deemed approved.

O. **TDM Penalty Fund.** If the results of any Trip Counts during the Owner/Developer Control Period show that the actual vehicle trips continue to exceed the Maximum Trips After Reduction after two annual testing cycles, then the Owner/Developer shall pay to the TDM Penalty Fund the amounts specified below, and FCDOT may thereafter withdraw such funds from the TDM Penalty Fund. If the Owner/Developer fails to pay what is due to the TDM Penalty Fund, FCDOT may draw against the Letter of Credit in the amount that was due to be paid. FCDOT may apply funds withdrawn from the TDM Penalty Fund, or drawn under the Letter of Credit for transportation improvements in the vicinity of the Property.

As indicated in Proffer #6.C.iv, the Applicant shall not obtain approval of any plans or permits, including but not limited to grading plans, site plans, and/or building permits if penalties related to the Transportation Demand Management Program are due or have been paid under this Proffer, unless the sum of all AM and PM peak hour vehicle trips for all uses that have reached Stabilization at the time of the immediately preceding annual Trip Count was less than the combined totals for Maximum Trips After Reduction during both AM and PM peak hour trips for all such uses as contained in the applicable table in Proffer #41.A.ii.

The maximum aggregate amount of all penalties to be paid under this paragraph O is $4,000,000, and shall be $2,000,000 following Stabilization of first phase (that is, either Phase 1 of the Development With Rail or the Development Prior to Rail), $3,000,000 following Stabilization of Phase 2, $3,500,000 following Stabilization of Phase 3 and $4,000,000 following Stabilization of Phase 4, in each case (1) less the sum of any and all previous draws under the Letter of Credit and payments by the Owner/Developer to the TDM Penalty Fund, and (2) starting in 2022, increased annually to reflect changes in the Index over a 2021 base year.

To supplement the penalty information below, attached as Exhibit B to these Proffers are schedules that describe in detail these penalties. Illustrative examples demonstrating possible scenarios of the application of the TDM Penalty Fund provisions are depicted in Exhibit C.

i. If the volume of AM and/or PM peak hour vehicle trips generated by the (i) combined residential uses for all phases that have reached Stabilization, (ii) combined office uses for all phases that have reached Stabilization or (iii) hotel use after Stabilization exceeds the applicable Maximum Trips After Reduction limit for such use, the Owner/Developer shall make penalty payments as indicated below.

   a. **Failure up to 2%.** If there is a failure in the reduction of trips for each of the uses listed in subparagraph i above in either or both of
the AM and PM Peak Hours by up to 2%, the Owner/Developer shall pay to the TDM Penalty Fund $4,000 per vehicle trip for each trip by which such Maximum Trips After Reduction limit has been exceeded in the Peak Hour in which the limit has been exceeded, but in the event that the limits are exceeded in both the AM and PM Peak Hours, in whichever Peak Hour would result in a higher penalty amount.

b. Failure Greater than 2% but less than or equal to 5%. If there is a failure in the reduction of trips for each of the uses listed in subparagraph i above in either or both of the AM and PM Peak Hours by more than 2% but less than or equal to 5%, the Owner/Developer shall pay to the TDM Penalty Fund $6,000 per vehicle trip for each trip by which such Maximum Trips After Reduction limit has been exceeded in the Peak Hour in which the limit is exceeded, but in the event that the limits are exceeded in both the AM and PM Peak Hours, in whichever Peak Hour would result in a higher penalty amount.

c. Failure Greater than 5%. If there is a failure in the reduction of trips for each of the uses listed in subparagraph i above in either or both of the AM and PM Peak Hours by an amount greater than 5%, the Owner/Developer shall pay to the TDM Penalty Fund $12,000 per vehicle trip for the number of trips that would equate to a 5% failure in whichever Peak Hour would result in the higher penalty amount.

P. Enforcement. If the TC fails to timely submit any Annual Report or Trip Count evaluation report to FCDOT as required by this Proffer, Fairfax County may thereafter issue the TC a written notice providing the TC has sixty (60) days within which to cure such violation. If after such sixty (60) day period the TC still has not submitted the Annual Report or Trip Count evaluation report, then the Owner/Developer and/or UOA as applicable shall be subject to a penalty of $200 per day payable to Fairfax County to be used for transit or transportation related improvements in the vicinity of the Property until such time as the report is submitted to FCDOT.

42. Transportation Demand Management Program Specific to the Existing Shopping Center. As provided in Proffer #41.C.i, certain components of the TDM Plan are applicable to and will benefit the Existing Shopping Center. Also, the Owner/Developer shall provide an additional TDM program that is tailored to specifically serve the Existing Shopping Center (the “Mall TDM Program”). The Mall TDM Program shall also be administered by the TC for the Owner/Developer, which shall retain financial and legal responsibility of this program even though the UOA will assume responsibility for the TDM Plan at the end of the Owner/Developer Control Period as described in Proffer #41.N.
A. **Goals of the Mall TDM Program.** Because tenants of the Existing Shopping Center and their employees work hours that are atypical of the standard work day, these tenants and their employees do not necessarily travel to and from the Property during the Peak Hours. Given this, the Mall TDM Program shall encourage Existing Shopping Center tenants and their employees to utilize transit, carpools, walking, biking and other non-SOV modes of transportation to travel to and from the Property rather than focusing on the specific trip reductions during the AM or PM Peak Hours. The goal of the Mall TDM Program is for ___% of the Existing Shopping Center store tenants and their employees to use non-SOV modes of transportation to commute to and from the Existing Shopping Center on a regular basis. *THIS PERCENTAGE TO BE PROVIDED FOLLOWING THE MALL SURVEY CONDUCTED IN SEPTEMBER 2006.*

B. **Components of the Mall TDM Program.** The Mall TDM Program shall include, at a minimum, the components applicable to the Existing Shopping Center that are described in Proffer #41.C.i, and the additional components provided below. These additional components may be subsequently amended by mutual agreement between the Owner/Developer and FCDOT. All amendments to the components of the Mall TDM Program contained in this Proffer shall be approved by FCDOT and will not require a PCA. The Mall TDM Program components are further described in the TDM Strategic Plan.

i. **Employee/Tenant Meetings --** The TC shall hold regular TDM meetings with the Existing Shopping Center store tenants and their employees to review the available transit options, adequacy of bus schedules (including hours of service), changes in transit service and other relevant transit-related topics. The TC shall invite Fairfax County and/or WMATA representatives to these meetings from time to time to speak to the group(s) about these and related subjects. Based on these meetings, the TC shall work with Fairfax County or WMATA to consider changes to the relevant services, such as changes to bus schedules, if such changes would provide better service to Existing Shopping Center tenants and their employees.

ii. **Transit Incentives --** Utilizing the Mall TDM Incentive Fund (described in paragraph C below), the TC shall provide financial incentives to Existing Shopping Center store tenants and their employees that utilize transit. These incentives shall include contests with fare card rewards, mall gift certificates and the like (for example—an award could be offered to the transit riding employee of the month/year or the tenant with the highest percentage of employees utilizing non-SOV transport to commute to and from the Existing Shopping Center).

iii. **Regional TDM Incentive Programs --** The TC shall make information available to Existing Shopping Center store tenants and their employees about programs that promote alternative commuting options. This shall include information on vanpools, carpools, guaranteed ride home and
other programs offered by organizations in the Washington, D.C. Metropolitan Area.

iv. Ridesharing -- The TC shall assist Existing Shopping Center store tenants and their employees in forming carpools or vanpools and the provision of convenient parking spaces to carpools or vanpools.

C. Mall TDM Incentive Fund. The Owner/Developer shall establish a Mall TDM Incentive Fund for use exclusively by the Owner/Developer with Existing Shopping Center store tenants and their employees. The Owner/Developer shall contribute $25,000 per year to this fund for the provision of transit incentives, such as gift certificate awards, fare card contests and/or give-aways, transit fairs specific to the Existing Shopping Center store tenants and their employees and for similar inducements or incentive activities. This amount shall be adjusted annually based on changes in the Index from the base year of 2007. The Applicant shall start providing this funding at the time that the first TDM Budget is approved and funded per Proffer #41. At such time as a tenant elects to financially contribute to the Mall TDM Program, such contributions shall be utilized in addition to the Owner/Developer’s annual contributions (that is, the Owner/Developer’s annual contributions shall not be reduced or offset in any way).

D. Annual Surveys and Analysis. The TC shall monitor the success of the Mall TDM Program in reaching the goal set forth in paragraph A above through tenant and employee surveys completed in September of each year (“Mall Surveys”). The TC shall review and analyze the Mall Surveys, and submit an analysis of survey results (“Mall Survey Analysis”) to FCDOT as a supplement to the Annual Report required by Proffer #41.K.ii. The Mall Survey Analysis shall include the following information:

i. A description of the Mall TDM Program measures in effect for the survey period and a description of how such measures have been implemented;

ii. The number of tenants and/or employees surveyed and the number who responded;

iii. The results of the Mall Surveys taken during the survey period;

iv. The number of people participating in the Mall TDM Program, displayed by category of participants and by mode of use; and

v. An evaluation of the effectiveness of the Mall TDM Program in achieving the goal set forth in paragraph A, including the effectiveness of the components in place and, if necessary, proposed modifications.

E. Adjustment to the Mall TDM Program Goal. At such time as the Metrorail has been in operation at the Tysons Central 123 Metro Station for a period of five years, the TC and Existing Shopping Center management shall review the non-
SOV transportation goal stated above to determine if the goal should be adjusted to more accurately reflect the transit mode split for the employees in the Existing Shopping Center. The TC shall address this issue in the Mall Survey Analysis submitted with the next Annual Report. The Mall TDM Program goal shall be reviewed with FCDOT at the next annual TDM meeting. At the time of review, the Owner/Developer and FCDOT (in coordination with the Providence District Supervisor) shall determine by mutual agreement if the mode split goal should be adjusted.

F. Mall TDM Program Participation Outreach. The TC and Existing Shopping Center management shall endeavor in good faith to encourage participation by Existing Shopping Center store tenants in the Mall TDM Program, including the encouragement of a financial participation by such tenants through their direct offering of transit benefit programs and transit incentives to their employees. Actions taken by the TC and Existing Shopping Center management in furtherance of this objective shall include dissemination of information to, and solicitation of participation from, the tenant’s Existing Shopping Center in-store management and executives or officers at its headquarters offices, at appropriate intervals.

G. Increasing Existing Shopping Center Store Tenant Commitments. In conjunction with the TC, the Owner/Developer and the management company for the Existing Shopping Center shall develop a long-range plan and schedule covering a period of years for endeavoring to incorporate covenants in leases that would require Existing Shopping Center store tenants to participate in the Mall TDM Program. This plan and schedule shall be submitted to the County at such time as the TDM Plan is submitted per Proffer #41.G, and shall include the following information. The TC may revise this plan with mutual agreement by FCDOT and the Owner/Developer.

a. A schedule for the dissemination of information and outreach efforts to be made or provided to tenants and their respective corporate ownership about the quality of life, financial and employee retention benefits of participation in and encouragement of the Mall TDM Program. The target of this information exchange and outreach shall be the national level executives or officers of the Existing Shopping Center store tenants.

b. The Owner/Developer shall actively support the TC and Existing Shopping Center management in the efforts to encourage tenants and executives to support the Mall TDM Program. Such support shall include executives and officers of the Owner/Developer communicating with executives and officers with national tenants as necessary.

The TC shall provide a detailed report to the county with respect to the activities described in this paragraph G as a supplement to the Annual Report that is to be

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filed with the county in accordance with Proffer #41. This report shall include detailed accounts of the outreach efforts and the feedback and response from the tenants. The report shall also include information on how the TC and the Owner/Developer will address any lack of interest in, opposition to, or other issues posed by Existing Shopping Center store tenants with the Mall TDM Program.

**PEDESTRIAN/BICYCLE IMPROVEMENTS**

43. **On-Site Trails.** The Applicant shall complete the trails described in paragraph A below and as indicated in the CDP/FDP, on a phase-by-phase basis, and in each phase, so the trails will be available for use on or before the date of issuance of that number of RUPs or Non-RUPs as meet the following thresholds:

- Development Prior to Rail or Phase 1 of the Development With Rail: 260,000 square feet of office space or 130 residential units, whichever occurs first
- Phase 2: 260,200 square feet of office space or 139 residential units, whichever occurs first
- Phase 3: 13,050 square feet of office space or 100 residential units, whichever occurs first
- Phase 4: 140,650 square feet of office space or 107 residential units, whichever occurs first

A. Due to the urban nature of the site, the Applicant may request modifications to the Public Facilities Manual design criteria for trails, such as shoulders or lane markings; such modifications shall be subject to approval by DPWES. For each phase, the Applicant shall provide appropriate pedestrian/bicycle signage and lane markings. Upon demonstration by the Applicant that despite diligent efforts, the improvement(s) has been delayed, the Zoning Administrator, may agree to a later date for completion of the improvement(s).

i. Development Prior to Rail and/or Phase 1 – a 10-foot wide trail along the eastern side of ShopTysons Boulevard with crosswalks as indicated on Sheet 22 of the Development With Rail CDP/FDP or Sheet 18 of the Development Prior to Rail CDP/FDP.

   a. This trail requires approval of Fairfax Water (“FW”) to adjust the grades over the water main and approval of VDOT to grade and construct a retaining wall. If VDOT fails to grant such permission, the Applicant shall provide this improvement via the “Phase One: Alternative Plan For Bike Trail” as indicated in the above noted pages of the CDP/FDP or pursue another reasonable alternative as approved by the Zoning Administrator and DPWES.

ii. Development Prior to Rail and/or Phase 1 – As indicated on Sheet 23 of the Development With Rail CDP/FDP (or Sheet 19 of the Development Prior to Rail CDP/FDP), the Applicant shall provide a 6-foot wide multipurpose trail adjacent to the Mall Ring road between Terrace A and
International Drive to connect to existing sidewalks at Fletcher Street and the Crate & Barrel/Mall entrance (Intersection #4). This sidewalk will subsequently be replaced with a 12-foot shared pedestrian/bicycle path to be provided in Phase 4 and as further described in Proffer #43.A.vii below.

iii. Phase 1 – As indicated on Sheet 23 of the CDP/FDP, the Applicant shall provide a 10-foot wide trail along International Drive north of the Crate & Barrel/Mall entrance (Intersection #4) along the Property’s frontage. This improvement is to be provided with Phase 1 of the Development With Rail only; however, if, as outlined in Proffers #4 and #6, after completing the Development Prior to Rail, the Applicant is permitted to proceed to Phase 2, this improvement shall be completed as part of Phase 2 in accordance with Proffer #7.

iv. Phase 2 – As indicated on Sheet 26 of the CDP/FDP, the Applicant shall provide a 10-foot wide trail from International Drive to the bus plaza on Route 123.

v. Phase 3 – As indicated on Sheet 35 of the CDP/FDP, the Applicant shall provide a 6-foot wide sidewalk on the south side of Fashion Boulevard adjacent to Towers Crescent if the Towers Crescent Owners provide necessary grading, construction and pedestrian access easements at reasonable cost to the Applicant. Prior to site plan approval for Phase 3, which includes roadway improvements to Fashion Boulevard in the vicinity, the Applicant shall diligently pursue the necessary easements and provide DPWES with documentation of the efforts to coordinate with the Towers Crescent Owners. If the Towers Crescent Owners should grant the necessary easements, the Applicant shall provide this trail widening improvement prior to issuance of the first RUP or Non-RUPs for Phase 3, whichever occurs first.

Should the Applicant not receive the requisite approvals and easements from the Towers Crescent Owners at the time its Phase 3 site plan is otherwise ready for approval by DPWES, the Applicant shall request the County utilize the condemnation provisions as outlined in Proffer #36 to obtain the easements necessary to permit completion of this improvement. The Applicant shall provide DPWES with documentation of such diligent efforts to demonstrate the Applicant’s failed attempts to obtain the necessary easements. If the County elects not to pursue condemnation, rather than constructing the above described trail widening, the Applicant shall escrow funds per the County of Fairfax Unit Price Schedule to permit the replacement of the 4-foot sidewalk sections with 6-foot sidewalk sections as determined by Fairfax County.

vi. Phase 3 – As indicated on Sheets 34 and 35 of the CDP/FDP, the Applicant shall provide a 15-foot wide shared vehicle/bicycle lane and
streetscaping on Fashion Boulevard and a 12-foot wide shared pedestrian/bicycle path and streetscaping along the Property’s Leesburg Pike frontage as indicated on Sheet 37 of the CDP/FDP.

vii. Phase 4 – As indicated on Sheet 44 and 45 of the CDP/FDP, the Applicant shall provide a 12-foot wide shared pedestrian/bicycle path and streetscaping along the Property’s International Drive frontage.

B. Trail Adjustment. The trails may be adjusted to incorporate changes to the bike trail guidelines in the Fairfax County Comprehensive Plan for the Tysons Corner Urban Center or the County’s Trails Plan (including locating the trails along Leesburg Pike and/or International Drive on-road), without obtaining a Proffer Condition Amendment or an amendment to the CDP/FDP if approved by the Zoning Administrator. If the County revises the Comprehensive Plan trail alignment along Leesburg Pike or International Drive to recommend trails be located on-road, the Applicant shall work with FCDOT, VDOT and DPZ to locate a 5 foot trail on the roadway(s) in lieu of the trail described above. To comply with the Comprehensive Plan or Trails Plan, such modification shall be subject to the approval of the Zoning Administrator in accordance with the provisions of Sect. 16-403, provided that the adjustments are in substantial conformance with the CDP/FDP and do not materially adversely affect other features shown on the CDP/FDP.

44. Loop Trail. With the Development with Rail, the Applicant shall provide a Loop Trail around the Property, as indicated in the Development With Rail CDP/FDP on Sheets 8, 9 and 10 (or an interim loop trail with the Development Prior to Rail or Phase 1 as indicated on Sheet 8 of the Development With Rail CDP/FDP). This trail facility shall be constructed in phases with the phases of the Development With Rail as indicated in the CDP/FDP and in Proffers #6 and #43. The Applicant shall provide signage and mileage markers to demarcate the loop trail around the Property.

45. Route 123 Sidewalk/Trail. In lieu of an 8’ paved trail along the Route 123 frontage east of the Route 123 entrance to the Property, the Applicant shall contribute funds to the Providence District Trails Fund as determined by DPWES at the time of the first site plan approval (as per the then current Fairfax County Unit Price Schedule) for use by the County or others in constructing this portion of the trail and sidewalk at such time as a safe passage across I-495 is constructed through the interchange or in another location as determined by the County.

46. Bicycle Racks. The Applicant shall provide bicycle racks convenient to the office, residential and Retail/Commercial uses, including, at a minimum, the below. To the extent possible, on-site bicycle racks shall be provided under cover. Specific locations of the bicycle racks are to be coordinated with FCDOT prior to site plan approval. The Applicant shall provide bicycle racks prior to the issuance of the first RUP or Non-RUP for each phase or building respectively.

A. The Applicant shall provide bicycle racks accommodating a minimum of 20 bicycles near the Elevated Plaza in Phase 1 as indicated on the CDP/FDP. In addition, with Phase 1 or the Development Prior to Rail, the Applicant shall
provide bicycle racks in convenient locations accessible to those traveling to the Existing Shopping Center from Route 123, Route 7 and International Drive, including a bicycle rack in a convenient location underneath the Phase 1/Development Prior to Rail Elevated Plaza.

B. The Applicant shall provide bicycle racks accommodating a minimum of 20 bicycles with each new parking garage and/or near each residential and office building in every phase prior to the issuance of the first RUP or Non-RUP.

C. With Phase 3, the Applicant shall provide bicycle racks accommodating a minimum of 20 bicycles near the Community Green.

D. If demand for the bicycle racks provided throughout the Property exceeds the bicycle parking spaces provided, the Applicant shall provide additional bicycle racks to ensure that the demand is met.

47. **On-Site Shower and Locker Facilities.** The Applicant shall provide shower and locker facilities to facilitate employees that bike to the Property. At a minimum, a shower and locker facility for each gender shall be provided in each of the following buildings: (1) either Office Building 1-B or 2-B, (2) Office Building 3-B, and (3) either Office Building 4-B or 4-C.

**PUBLIC TRANSPORTATION**

48. **Bus Shelters.** The Applicant shall provide bus shelters in the following locations. Unless otherwise noted, should FCDOT determine that a bus shelter in any of these locations is not warranted, the Applicant shall escrow $20,000 for construction of each such bus shelter to permit construction of a shelter in the vicinity of the Property. The contribution amount shall escalate on a yearly basis from the base year of 2007 based on changes in the CCI. The Applicant shall provide general maintenance of the bus shelter areas, including trash removal.

A. Prior to issuance of the first RUP or Non-RUP, the Applicant shall install bus shelters in the following locations.

   i. On ShopTysons Boulevard in the vicinity of Buildings 1-A and 1-B in a location to be coordinated with and subject to the approval of FCDOT.

   ii. On the Property’s International Drive frontage in a location to be coordinated with and subject to the approval of FCDOT.

B. Prior to issuance of the first RUP or Non-RUP for Phase 3, the Applicant shall install a bus shelter along the Property’s Route 7 frontage in a location to be coordinated with and subject to the approval of FCDOT.

49. **Bus Shelter Contributions.** The Applicant shall make contributions to Fairfax County for bus shelters as further described below. The contribution amount shall escalate on a yearly basis from the base year of 2007 based on changes in the CCI.
A. The Applicant shall contribute $20,000 prior to site plan approval for Phase 3 to be used for the installation of a bus shelter on the west side of International Drive or in the vicinity of the Property.

B. The Applicant shall contribute $20,000 prior to site plan approval for Phase 4 to be used for the installation of a bus shelter on the south side of Route 7 or in the vicinity of the Property.

50. Mall Bus Circulation Access. As may be determined necessary by the County, the Applicant shall work cooperatively with WMATA and Fairfax County toward reaching a written agreement among the parties that will assure continued access to the ring road located on the Property to buses owned and operated by WMATA, the County, and other governmentally-sponsored mass transit service providers. This agreement shall address matters such as the number of buses, the routes, stops and other relevant information and any impact of the buses, routes and stops on the circulation throughout the Property. Once this agreement is signed, the number of buses, circulation patterns and locations of bus stops may be altered by the mutual agreement of the Applicant, WMATA and the County. The agreement shall provide that WMATA, the County and such other governmentally-sponsored mass transit service providers shall maintain at all times customary public liability and property damage insurance (or adequate self insurance reserves), which names the Applicant as an additional named insured, and which covers personal injury or property damage caused by the acts or omissions of the respective parties.

51. Metrorail Station-Related Facilities. THIS PROFFER TO BE REVISED TO REFLECT THE AGREEMENTS CURRENTLY BEING COORDINATED WITH FCDOT, DRPT AND WMATA. As further described in Proffer #4, the Applicant shall not obtain approval of any plans or permits related to the Development With Rail until an agreement is established between the Applicant and the Dulles Rail Project Entities, and/or the Washington Metropolitan Area Transit Authority (“WMATA”). The Applicant shall provide these agreements to FCDOT for review prior to execution. Those agreements shall provide for: (i) the installation and operation of an elevated pedestrian bridge that is 16’ wide at the base (with respect to this, the Applicant shall provide the funds necessary to increase the width of the pedestrian bridge from 12’ wide to 16’ wide as measured at the base of the interior to provide a 16’ wide area of clearance for pedestrian use); (ii) the construction and operation of an entrance pavilion on the Property on the south side of Route 123 in the vicinity of Parking Terrace D to accommodate the elevated pedestrian bridge; (iii) the construction and operation of a bus transfer plaza on the Property on the south side of Route 123 in the vicinity of Parking Terrace D; (iv) the dedication by the Applicant of land area along Route 123 for the bus transfer plaza (without compensation therefore to be due to the Applicant); (v) the grant of easements as may be needed to accommodate the exiting of buses from the bus transfer plaza through the Property to the surrounding public street network (without compensation, therefore, to be due to the Applicant); (vi) the granting of reciprocal construction, access, utility and air rights easements pertaining to the foregoing facilities; (vii) conformity with WMATA connection policies for private development (except that the Applicant shall not be required to compensate WMATA for any connections); and (viii) maintenance of the foregoing facilities by the appropriate parties. The CDP/FDP depicts the Applicant’s preferred locations for the foregoing improvements. The Applicant shall cooperate with the Dulles Rail Project Entities to coordinate the final locations of
such improvements and shall obtain approval from the Zoning Administrator for any changes in locations from those depicted on the CDP/FDP.

The agreement with the Dulles Rail Project Entities shall also address the contingency that the extension of Metrorail could occur after the Applicant has constructed improvements under the Development Prior to Rail or where the Applicant has constructed Phase 1 under the Development With Rail but has elected to delay or not to construct Phase 2. Subject to the completion of definitive terms and conditions of the separate agreement, Sheet 21 of the Development Prior to Rail CDP/FDP or Sheet 47 of the Development With Rail CDP/FDP show certain Metrorail-related improvements or conveyances that the Applicant shall construct or make prior to the operation of the Metrorail at the Tysons Central 123 Metro Station, including (1) land dedication areas (without compensation, therefore, to be due to the Applicant), (2) relocation of the Mall ring road adjacent to Parking Terrace D to permit the frontage improvements to accommodate the Metrorail bus area on Route 123, (3) construction of a pedestrian bridge from the Metrorail south entrance pavilion on the Property to the Development Prior to Rail or to Phase 1, (4) the widening of the Property’s Route 123 frontage to accommodate the ultimate Route 123 northbound improvements, and (5) construction of a bus plaza area on the south side of Route 123.

RECREATIONAL FACILITIES

52. On-Site Recreational Facilities Contributions.

A. Pursuant to Paragraph 2 of Section 6-110 and Paragraph 2 of Section 16-404 of the Zoning Ordinance regarding developed recreational facilities, the Applicant shall expend a minimum of $955 per market residential unit on on-site recreation facilities. In order to satisfy this obligation, the Applicant shall provide the on-site recreational facilities shown on the CDP/FDP. If the Applicant does not expend the prescribed amount in any phase of the development, and any such shortfall is not expended for these purposes in a subsequent phase, then any remaining balance shall be contributed as of the completion of the fourth phase to the County Park Authority for the provision of recreation facilities located in the vicinity of the Property.

B. Prior to site plan approval for a residential building in any phase, if the County increases the standard contribution of $955 per market-rate unit, the Applicant shall increase the contribution to the County for that phase of development as indicated in paragraph A.

53. Public Amenities and Facilities. These facilities are proposed to serve or be used by members of the general public, subject to usual and customary rules and regulations governing their use. The Applicant shall complete the facilities as described in paragraphs A-F below, and as indicated in the CDP/FDP, on a phase-by-phase basis, on or before the date of issuance of that number of RUPs or Non-RUPs as set forth below for each phase.

- Development Prior to Rail/Phase 1: 260,000 square feet of office space or 130 residential units, whichever occurs first
- **Phase 2:** 260,200 square feet of office space or 130 residential units, whichever occurs first
- **Phase 3:** 13,050 square feet of office space or 100 residential units, whichever occurs first
- **Phase 4:** 140,650 square feet of office space or 107 residential units, whichever occurs first

A. **Changes to the Layout and Mix.** The layout or mix of facilities indicated below may be altered provided the proposed alterations substantially conform with and provide substantially equivalent recreation opportunities as that shown on the CDP/FDP as determined by the Zoning Administrator. The Applicant reserves the right to add public art to the site in areas not currently identified with public art on the CDP/FDP.

B. **Children’s Play Area.** The Applicant shall provide one or more indoor children’s play areas totaling not less than 1,700 SF within the Existing Shopping Center.

C. **Phase 1 or the Development Prior to Rail.** The Applicant shall provide the following facilities or equivalent as part of the Phase 1 development or the Development Prior to Rail (these facilities may be adjusted seasonally, and not all facilities are specifically indicated on the CDP/FDP):

   - i. Seasonal ice skating rink/interactive water feature
   - ii. Performance space
   - iii. Seating area adjacent to the ice rink and Retail/Commercial uses
   - iv. Public art in locations as generally depicted on the CDP/FDP with flexibility in the locations permitted with administrative approval from the Zoning Administrator
   - v. Children’s activity area
   - vi. Children’s passive area (to include a reading area or space for children’s entertainment)
   - vii. Shade structure(s) and/or shaded area(s)

D. **Phase 2.** The Applicant shall provide the following facilities as part of the Phase 2 development:

   - i. Entry water feature
   - ii. Seating adjacent to the proposed Retail/Commercial
   - iii. Dog exercise area/park, as identified on the CDP/FDP as “Dog Exercise Area”
iv. Shade structure(s) and/or shaded area(s)

E. **Phase 3.** The Applicant shall provide a community green as part of the Phase 3 development as shown on the CDP/FDP. This community green shall include the below facilities or amenities:

i. Central focal water element/interactive water feature

ii. Walking paths with seating

iii. Open events lawn/play area for special events

iv. Shade structure(s) and/or shaded area(s)

F. **Phase 4.** The Applicant shall construct the Sky Terrace on top of Parking Terrace A as part of the Phase 4 development. The Sky Terrace shall include the below facilities or amenities:

i. Walking paths with seating

ii. Gardens

iii. Children’s active play area

iv. Performance lawn with seasonal stage

v. Shade structure/pavilion

vi. Small active/passive recreational area (e.g. bocce court, putting green, sculpture lawn)

54. **Semi-Private Amenities and Recreation Facilities.** Except where indicated otherwise, these facilities are proposed to serve or be used by residents and office workers living and/or working in the residential and office buildings, subject to usual and customary rules and regulations governing their use. The Applicant shall complete the facilities as described in paragraphs A-F below, and as indicated in the CDP/FDP on a phase-by-phase basis. Except as otherwise noted, these facilities shall be completed on or before the date of issuance of that number of RUPs or Non-RUPs as set forth below for each phase.

A. **Changes to the Layout and Mix.** The layout or mix of facilities indicated below may be altered provided the proposed alterations substantially conform with and provide substantially equivalent recreation opportunities as that shown on the CDP/FDP as determined by the Zoning Administrator. Such alterations to the layout or mix of facilities may occur at any time, including after the facility has been constructed. The Applicant reserves the right to add public art to the site in areas not currently identified with public art on the CDP/FDP.
B. Health Club or Fitness Center. Each residential and office building in each phase shall have a limited service health or fitness center (providing equipment and facilities but not necessarily staffing) for use by the residents and employees, respectively, living or working in those buildings, and having an appropriate size but in all cases not less than 1,000 square feet per building. When located in an office building, the health club/fitness center shall be open for use prior to issuance of Non-RUPs as indicated below:

- Development Prior to Rail/Phase 1: 260,000 square feet of office space or 130 residential units, whichever occurs first
- Phase 2: 260,200 square feet of office space or 130 residential units, whichever occurs first
- Phase 3: 13,050 square feet of office space or 100 residential units, whichever occurs first
- Phase 4: 140,650 square feet of office space or 107 residential units, whichever occurs first

C. Phase 1 or the Development Prior to Rail. The Applicant shall provide the following semi-private facilities as part of Phase 1 or the Development Prior to Rail prior to the issuance of RUPs for the 130th residential unit.

i. Swimming pool for the residential building
ii. Seating that consists of either a seating element built into the development or actual chairs/benches, with a minimum number of seats that is not less than 5% of the number of residential units
iii. Shade structure(s) and/or shaded area(s)

D. Phase 2. The Applicant shall provide the following semi-private facilities as part of Phase 2 prior to the issuance of RUPs for the 130th residential unit. As indicated on the CDP/FDP, a structural barrier shall provide a visual separation between the below indicated semi-private amenities/facilities and the public amenities/facilities described above.

i. Semi-private terrace located between residential tower 2-A and office tower 2-B
ii. At least two court activities (with some combination of basketball, tennis or multi-use sport court) on the top level of the improved Parking Terrace A.
iii. Temporary sport court practice wall on the top level of the improved Parking Terrace A. This temporary practice wall will be removed at the time of construction of the Sky Terrace.
iv. 1,700 square foot Multipurpose Sport Court on the plaza between buildings 2-A and 2-B for use by residents in the on-site residential buildings and office workers. This court may be used as a half-court basketball court or for other court activities.

v. Swimming pool for the residential building.

vi. Seating that consists of either a seating element built into the development or actual chairs/benches with a minimum number of seats that is not less than 5% of the number of residential units within Phase 2 and an additional minimum of 12 seats to serve the office tenants in addition to the residents.

vii. Shade structure(s) and/or shaded area(s).

E. Phase 3. The Applicant shall provide the following semi-private facilities as part of Phase 3 prior to issuance of the 100th RUP for Phase 3.

i. Semi-private terrace located at residential tower 3-A

ii. Swimming pool for the residential building

iii. Seating that consists of either a seating element built into the development or actual chairs/benches with a minimum number of seats that is not less than 5% of the number of residential units within Phase 3

iv. Small active/passive recreational area (e.g. bocce court, putting green, sculpture lawn)

v. Shade structure(s) and/or shaded area(s)

F. Phase 4. The Applicant shall provide the following semi-private facilities as part of the semi-private terrace at residential building 4-A prior to the issuance of the 107th RUP for Phase 4.

i. Swimming pool for the residential building

ii. Seating that consists of either a seating element built into the development or actual chairs/benches, with a minimum number of seats that is not less than 5% of the number of residential units within Phase 4

iii. Shade structure(s) and/or shaded area(s)

55. Off-Site Recreational Facilities Contributions.

A. Contribution for Off-Site Recreation Facilities. In addition to the recreation facilities and/or contribution required by Proffer #53, the Applicant shall provide a contribution of $493 per residential unit to the Fairfax County Board of
Supervisors at the time of site plan approval for each phase. These funds are to be used for athletic facilities and fields in the vicinity of the Property.

B. **Potential Escalated Contribution.** The contribution amount shall escalate on a yearly basis from the base year of 2007 and change effective each January 1 thereafter, based on changes in the Consumer Price Index for all urban consumers (CPI-U) 1982-1984=100 (not seasonally adjusted) (“CPI”).

56. **One-Time Field Contribution.** The Applicant shall make a one-time contribution of $500,000 to the Fairfax County Board of Supervisors for athletic field improvements. The field(s) to be improved, and the scope of the improvements, shall be determined by the Providence District Supervisor in consultation with the Providence District Athletic Fields Task Force. Such contribution shall be made within 30 days of final, unappealable approval of this Application.

**PUBLIC SCHOOLS CONTRIBUTION**

57. **Public Schools Contribution.**

A. **Contribution.** Per the Residential Development Criteria Implementation Motion adopted by the Board of Supervisors on September 9, 2002, effective January 7, 2003, at the time of issuance of the first building permit for each residential building, the Applicant shall contribute $7,500 per student generated by that building (based on an assumed rate of .102 students per multifamily high-rise unit in that phase) to DPWES for transfer to the Fairfax County School Board to be utilized for capital improvements and capacity enhancements to schools in the Tysons Corner area that may serve the development.

B. **Escalation in Contribution.** Prior to site plan approval for each phase, if Fairfax County should increase the accepted ratio of students per high-rise multifamily unit or the amount of the contribution per student, the Applicant shall increase the amount of the contribution for that phase of development to reflect the current ratio and/or contribution. If the County should decrease the ratio or contribution amount, the Applicant shall provide the greater of the two amounts.

**AFFORDABLE HOUSING**

58. **Affordably Priced Rental Units.** This proffer sets forth the elements of a program that is intended to provide affordably priced rental housing units (“APRUs”), which will be affordable to future residents who have a median household income of 70% of the Washington D.C. Standard Metropolitan Statistical Area median household income (“MHI”), in order to preserve and expand the housing options available in the County to residents that have a moderate income.

A. Eight percent (8%) of the dwelling units actually constructed shall be APRUs. The APRUs shall be subject to the rental and other covenants and restrictions of these proffered conditions, and except as specifically set forth in this Proffer, shall not be subject to the rental and other restrictions applicable to Affordable
Dwelling Units ("ADUs") as defined by Article 2 of the Zoning Ordinance. The Applicant shall provide all of these units as either two (2) bedroom, one (1) bedroom, efficiency and/or studio units with one bathroom and a minimum size of 400 square feet per unit, a maximum size of 900 square feet and an average size of 550 square feet. The Applicant shall phase the provision of APRUs with each phase in order to provide a minimum of 8% APRUs within each phase of development.

B. The Applicant shall provide these APRUs as rental units within the Applicant's proposed residential buildings. The Applicant specifically reserves the right to provide APRUs as rental units within a rental building or within a condominium building (that is, the Applicant may either retain ownership of the building and rent all of the dwelling units, or the Applicant may create a condominium in order to sell market-rate units and nevertheless rent APRUs).

i. Notwithstanding the foregoing, the Applicant may provide up to 30% of the APRUs in each phase off-site in the Tysons Corner Urban Center Planning District, in one or more locations approved by the Zoning Administrator, provided that the Zoning Administrator determines that such substitute units are substantially equivalent to on-site units.

ii. Not less than ten percent (10%) of the APRUs provided in any phase (rounded to the nearest whole number) shall be designed and constructed as fully handicapped accessible units. In the event that APRUs are authorized off-site, no more than five of the handicapped accessible units may be provided off-site.

iii. All of the semi-private facilities and amenities that are available to market rate units shall also be available to APRUs on an equal access basis.

iv. Within any residential building, APRUs shall be dispersed among the market rate units.

v. In accordance with Section 2-812.6 of the Zoning Ordinance, the Applicant shall record a covenant running with the land in favor of the Fairfax County Redevelopment and Housing Authority that provides that for thirty years from the date of issuance of the first RUP for the APRUs, no such unit may be rented for an amount that exceeds the rental rates for ADUs as set by the County.

C. It is intended that the APRUs shall be administered in a manner that is similar to certain of the administrative procedures established for ADUs in Section 2-800 of the Zoning Ordinance in effect at the time of the execution of these proffers. The following specific provisions of the Zoning Ordinance shall apply to administration of the APRUs, except where such provisions directly conflict with this Proffer: (1) Section 2-811.2, (2) Section 2-811.3, (3) Section 2-812.1.D, (4) Section 2-812.6, (5) Section 2-812.7, (6) Section 2-813 and (7) Section 2-817.
When this Proffer conflicts with the administrative sections of the Zoning Ordinance, this Proffer shall control.

MISCELLANEOUS PROFFERS APPLICABLE TO DEVELOPMENT WITH RAIL AND DEVELOPMENT PRIOR TO RAIL

59. **Advance Density Credit.** The Applicant reserves density credit as may be permitted by the provisions of Paragraph 4 of Section 2-308 of the Ordinance for all eligible dedications described herein.

60. **Severability.** Any of the phases and/or buildings may be the subject of a proffered condition amendment (“PCA”), Special Exception (“SE”), Special Permit (“SP”), or Final Development Plan Amendment (“FDPA”) without joinder and/or consent of the owners of the other phases or buildings, provided that such PCA, SE, SP or FDPA does not materially adversely affect the other phases or buildings. Previously approved zoning applications applicable to a particular land bay that is not the subject of such a PCA, SE, SP or FDPA shall otherwise remain in full force and effect.

61. **Successors and Assigns.** These proffers will bind and inure to the benefit of the Applicant and his successors and assigns. Each reference to “Applicant” in this proffer statement shall include within its meaning and shall be binding upon Applicant’s successor(s) in interest and/or developer(s) of the site or any portion of the site.

62. **Counterparts.** These proffers may be executed in one or more counterparts, each of which when so executed and delivered shall be deemed an original, and all of which taken together shall constitute but one and the same instrument.

Signatures on following pages
TYSONS CORNER HOLDINGS LLC,
a Delaware limited liability company
Owner of Tax Map #39-2 ((1)) 2, 4 and 5

By: TYSONS CORNER LLC,
a Virginia limited liability company,
its sole member

By: MACW TYSONS, LLC,
a Delaware limited liability company,
its member

By: _______________________________
Name: _______________________________
Title: _______________________________

TYSONS CORNER PROPERTY HOLDINGS LLC,
a Delaware limited liability company
Owner of Tax Map # 29-4 ((1)) 35A and 35C

By: TYSONS CORNER PROPERTY LLC,
a Virginia limited liability company,
its sole member

By: MACW TYSONS, LLC,
a Delaware limited liability company,
its member

By: _______________________________
Name: _______________________________
Title: _______________________________
Strategic Transportation Initiatives Inc. Proposed Plan Transportation Demand Management MetroWest.
Submitted on behalf of Pulte Homes.
PROPOSED PLAN
TRANSPORTATION DEMAND MANAGEMENT

MetroWest

SUBMITTED ON BEHALF OF
Pulte Homes

BY Strategic Transportation Initiatives Inc.
The MetroWest Transportation Demand Management (TDM) Strategic Plan has been reformatted for presentation purposes, only, and is the same document submitted to Fairfax County as part of the Proffer requirement.
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Pulte Homes has designed a new transit-oriented, mixed-use community adjacent to the Vienna-Fairfax-GMU Metrorail Station south side facilities. The community will incorporate a variety of residential, office, retail, service, institutional, governmental and other uses. MetroWest will create a new and greatly enhanced pedestrian-friendly interface with the Vienna-Fairfax-GMU Metrorail Station, a town center plaza combining retail and public outdoor activity space, pedestrian connections to and through East Blake Lane Park and adjacent existing neighborhoods, as well as provide a new public recreation/community center.

The project provides many transportation (motorized and non-motorized) improvements and/or enhancements in the immediate and surrounding area. Most notable is the construction of a critical long-anticipated, four-lane, median-divided boulevard to connect Lee Highway with Saintbury Drive. This new link to the Vaden Drive Bridge will enhance circulation in and around the Vienna-Fairfax-GMU Metrorail Station area, and provide a relief for north-south traffic in the Lee Highway corridor. The project also provides for the redesign and reconstruction of Saintbury Drive as a public street east of Vaden Drive to Nutley Street. Improvements to both the pedestrian interface with the Metrorail Station and vehicular circulation and access to the various uses in and around the station are also proposed. Significant improvements to south side station facilities will also be provided and include ramp widenings, new traffic signals, crosswalks, modifications to existing signals and improved bus and kiss-and-ride facilities.

The project also includes a pedestrian bridge crossing of Hatmark Branch and a realignment of the City of Fairfax Connector Trail to improve pedestrian connections to both the Metrorail Station and the project from communities west of the park and east of the proposed new community.

MetroWest implements the Policy Plan of Fairfax County by concentrating development next to an existing Metrorail Station. Additionally, it furthers the Smart Growth Principles of the Metropolitan Washington Council of Governments (MWCOG). The MetroWest plan is the result of a multi-year collaborative effort among surrounding neighborhood associations, a citizens’ working group, the Fairfax County Departments of Planning & Zoning and Transportation, the Washington Metropolitan Area Transit Authority (WMATA) and the Virginia Department of Transportation (VDOT). One of the features of the MetroWest plan is the inclusion of provisions for Transportation Demand Management (TDM), which will help ensure the pedestrian orientation of the project for the future and decrease the project’s reliance on single occupant vehicle (SOV) trips.

A strategic plan for TDM at MetroWest, developed by Strategic Transportation Initiatives, Inc., a Virginia-based TDM consulting firm, is presented in the pages that follow.
This document presents the Strategic TDM Plan for the MetroWest transit-oriented development (TOD) proposed by Pulte Homes. The properties comprising the proposed new development are generally located on the south side of I-66, north of Lee Highway, west of the existing Hunters Branch community and east of East Blake Lane Park in Fairfax County, Virginia. The applicant proposes to rezone and subsequently develop the site with the following mix of land uses:

- Up to 300,000 Gross Square Feet (GSF) of office space
- Up to 2,248 residential dwelling units
- A minimum of 100,000 GSF of combined retail, service, institutional and governmental uses

TDM is a general term for strategies that result in more efficient use of transportation resources. In an effort to decrease reliance on the personal automobile and encourage the use of transit, ridesharing, telecommuting, bicycling, and walking, the Fairfax County Comprehensive Plan provides that the applicant implement a TDM Plan. Many different TDM strategies, with a variety of impacts, can be used in a TDM plan. Some reduce the need for physical travel through mobility substitutes or more efficient land use. Some improve the transportation options available to consumers, while others provide an incentive to choose more efficient travel patterns. TDM strategies can change travel timing, route, destination, or mode.

The Comprehensive Plan specifies that the TDM Plan for MetroWest be “...evaluated initially in at least three stages during the development process; first at the time of rezoning, second before and during construction and third after project completion or “build-out.” The Plan further provides that at the time of rezoning, the applicant should demonstrate the feasibility of the peak-hour trip reductions established for the community (47% for residential uses and 25% for office uses.) To that end, the Fairfax County Department of Transportation, through Pulte Homes (as the applicant), solicited proposals from qualified applicants and/or firms to develop TDM program recommendations for the new community, as well as to evaluate the feasibility of the potential peak-hour trip reductions for the project.
UrbanTrans Consultants were selected by the County to conduct the work and a final report was issued in July 2005. The final report concluded that the “...trip reduction targets for the proposed project (peak-hour vehicle trip reductions of 47% for the residential uses and 25% reductions for the office uses) can be achieved through a combination of physical design characteristics of the site, as proposed, and the full application of the TDM programs and strategies” as they recommended. This TDM Plan provides a methodology and protocol for implementing, funding and monitoring the recommended MetroWest TDM strategies.

Initially, Pulte Homes will be responsible for the start-up and the operation of the TDM program. Eventually, the program will be handed over to the management of a building management firm or other agent of the Umbrella Owner’s Association.

The MetroWest TDM Plan will be a community-wide effort. All future owners, tenants and homeowner’s associations within the MetroWest community will be made aware of the TDM program and its ongoing activities. Every resident and employer/employee will be a part of the TDM strategy for MetroWest. All residents, employers and employees will directly benefit from the TDM program and will directly or indirectly fund its implementation. Part of the TDM strategy for MetroWest is to align the interests of project residents, employers and employees so that all work to ensure the success of the program and the continued achievement of the TDM objectives.
In its final report, UrbanTrans summarized the process used and the results generated from research and analyses they conducted. The process involved five research and analysis tasks:

1. Forecasting peak-period vehicle trip generation for the proposed development using established ITE and Fairfax County trip generation rates as appropriate.

2. Assessing existing commuting and travel patterns, along with transportation-related attitudes and preferences, within the existing Vienna-Fairfax-GMU Metrorail Station Area (the area generally defined by the Fairfax County Comprehensive Plan as within the 1/2-mile radius from the station.) Methods utilized included:
   
   a. RESIDENT & EMPLOYER SURVEYS:
      Surveying residents and employees within the study area, and, proximate to other existing stations, to assess attitudes and preferences about travel choices, and to understand current travel behavior and demographics.

   b. TRAFFIC COUNTS:
      Conducting peak-hour vehicle counts of entering/exiting traffic at communities proximate to the Vienna-Fairfax-GMU transit station, and observing vehicle occupancy during peak periods.

   c. CENSUS ANALYSIS:
      Utilizing 2000 Census and Journey to Work data, along with supplemental 2005 demographic data, to understand demographic and household information and commute patterns within the 1/2-mile radius of the Vienna-Fairfax-GMU Metrorail Station Area.

3. Investigating TDM “best practices” and lessons-learned throughout the region and across the country.

4. Understanding current TDM programs offered within Fairfax County as a whole, and identifying opportunities and barriers to successful TDM implementation at the MetroWest site.

5. Meeting with, responding to, and receiving input and suggestions from neighborhood groups and residents within and proximate to the study area.

The results of these tasks yielded specific TDM program recommendations for MetroWest, and forecasted that peak period vehicle trip reductions could be reasonably achieved given the combination of uses proposed, the transit oriented design of the development, and the recommended TDM program elements.
This MetroWest TDM Strategic Plan is the next step and is intended to build on the UrbanTrans recommendations to develop programmatic details and specifications for the implementation of TDM at MetroWest. Its intended purpose is to transform all of the recommended strategies into a coordinated program of TDM operations during and after construction of the project. This TDM Strategic Plan is organized around the following areas:

- Site & Physical Amenities/Improvements
- TDM Products, Programs and Services, including branding and targeted marketing
- TDM Program Strategies
- TDM Program Management
- Parking Management
- TDM Implementation and Funding
- Monitoring and Evaluation
Transportation Demand Management (TDM), as stated earlier, refers to strategies employed to reduce vehicle demand. TDM strategies consider how people’s choices of travel mode are affected by land use, development design, parking (availability and cost), and convenience and availability of alternative modes. One of the most important components of a TDM plan at a transit-oriented development (TOD) is the design of the site and supporting facilities. By designing the site to provide for its safe and convenient use by pedestrians, bicyclists, and transit users, the effects of the programmatic elements of the TDM plan are enhanced.

One of the most influential long-term factors in trip choice is the physical environment. In the TOD, how comfortable does it feel to walk to/from the transit station, bus facilities and on-site amenities; for adults, persons alone, people with mobility challenges, and children? How far is it to a mix of services? Is the site designed for people or vehicles? Are there major barriers that impede access to the station and community?

The conceptual plan for MetroWest reflects the collaborative efforts of the development team, public agency staff and surrounding community representatives in creating a true transit-oriented community. The plan reflects a mix of density, diversity and design elements.

**Density**

The highest densities within the community are located closest to the transit station and transition down to the south, east and west. Locating higher residential densities proximate to the Vienna-Fairfax-GMU Metrorail Station serves to support the peak hour headways currently provided and planned by WMATA. The location of the office buildings close to the south side station platform bolsters the marketability of the office uses on-site and would encourage employees and/or visitors to utilize the station, increasing off-peak, off-directional usage. Transitioning residential density down towards the east, west and south conforms to the Comprehensive Plan’s goal and objective of integrating TOD’s with existing stable communities.
Diversity of Uses
A diverse mix of residential unit types, sizes and price points, as well as commercial and on-site personal service uses, serves to enhance the ability of the community to provide opportunities for mode choice and to reduce the need for off-site trips. The following mix and type of uses are proposed as part of the new community:

- Low, mid and high-rise multi-family rental and/or condominium units;
- Age-restricted residential dwelling units;
- Single family attached dwelling units;
- Potential for Live/Work units;
- Onsite transit store that will be located in one of the core area buildings;
- Grocery store;
- Personal service retail uses (i.e., dry cleaners, coffee shop, deli, restaurants, day care center, etc.);
- A +/- 29,700 gross square footage (GSF) community center; and
- 300,000 GSF of office uses.

Site Design
The following design elements will be included throughout the MetroWest community:

- Sidewalks that are safe, attractive, well-lit and that connect main entrances of buildings/residences to the street or activity area without barriers.
- Building entrances that are oriented to the streets or activity areas and are not separated by vast parking areas or fences.
- On-street, short-term carpool/vanpool drop-off and off-peak delivery parking spaces at convenient locations situated close to out-of-weather waiting or retail areas.
- Structured parking for mid- and high-rise buildings.
- Safe bicycle access to area services.
- Showers in commercial office buildings.
- Bicycle lockers and designated spaces/racks throughout the community.
- Pedestrian connections to/from adjacent communities and streets to facilitate broader community access.
- A raised pedestrian table at the northern boundary of the site to facilitate access to/from the south side station facilities.
- Provision of south side station enhancements including bus canopies, improvements to the kiss-and-ride lot, bus bays, ramp improvements, etc.
- Pedestrian crossing improvements along Saintsbury Drive to include count down pedestrian heads at signalized intersections, crosswalks, and improvements for visually-challenged residents where permitted by VDOT.
- Roadway improvements including new traffic signals and designated pedestrian pathways.
- Street furnishings for pedestrians.
- Informational kiosks in one or more onsite buildings.
- Bus shelters, trash receptacles, etc.
- Wiring for Internet access in residential and commercial buildings and availability of high-speed wireless to facilitate telework.
- Onsite residential business center for use by project residents, including meeting space, computer stations, facsimile machine and copy machine to facilitate telework.
The MetroWest community will have a substantial choice of transportation products to choose from, some that are unique to MetroWest and others that are offered as part of living in Fairfax County, and the Metropolitan Washington DC region.

TRANSPORTATION PRODUCTS/SERVICES DEVELOPED SPECIFICALLY FOR METROWEST WILL INCLUDE:

- A designated onsite, full-time Transportation Coordinator (TC) responsible for the implementation, monitoring and management of the MetroWest TDM program. The TC will be located within the MetroWest mixed-use development. Only that portion of the TC’s time that is spent on TDM will be charged to the TDM budget, such portion of the TDM budget to increase as the project builds-out.

- A branded transportation management program that will have an identity that represents the MetroWest community and the developer. The program branding will be developed through a series of focus groups directed to commuters in the region who fit the profile for residents or employees living and working at MetroWest.

- Customized materials marketing the branded program that will be targeted to likely transit users and that will give the community a sense of ownership, as a stakeholder in the MetroWest transportation program. These materials will be included in any materials marketing the sale or lease of space at MetroWest.

- An on-site retail transit store that will have TDM products, services and program offerings available to residents, businesses, customers and visitors to MetroWest, as well as a staff person that will operate the store and assist customers with their travel planning. The space will be approximately 350-400 s.f. and provided by the developer. Hours of operation for all TDM facilities will be readily available in printed materials and online, and the space will be open during convenient times for commuters.

PRODUCTS AND SERVICES THAT ARE OFFERED REGION-WIDE INCLUDE:

- Commuter Connections, the region-wide TDM program administered by the Metropolitan Washington Council of Governments (MWCOG), www.commuterconnections.org.
The Commuter Connections (CC) program provides several important services to commuters throughout the Washington, DC region that will greatly assist in supporting the MetroWest TDM Plan implementation. The most widely used program is the ridematching service which links commuters to one another to form carpools and vanpools by filling out an application (online or printed) and sending it to the CC staff. Information on the application is downloaded into the region-wide computer database and applicants are matched to potential pooling partners through their home and work locations. The commuter is sent a “match list” and given the names and contact information for their potential pooling partners. This service is free of charge. The service database can be customized for MetroWest residents, exclusively, and made available to the TC at any given time.

The TC will assist interested commuters in applying to the program and setting up carpools and vanpools among residents at MetroWest. The TC will also schedule pooling partner meetings throughout the year to encourage participation in the Commuter Connections ridematching program.

- NuRide, an on-time, state-of-the-art matching service for casual carpooling and vanpooling. [www.nuride.com](http://www.nuride.com).

The matching service that NuRide offers is similar to airline travel ... the difference is that the commuters travel by car. Each commuter plans his/her commuting trips online and earns reward points every time they travel with other people. Similar to the Commuter Connections ridematching service, NuRide customers register and sign onto the NuRide website and plan their trip by specifying a date and time, where they want to go, and related travel criteria. Just like with frequent flyer miles, the commuter earns NuRide Miles, an exclusive reward points program wherein points can be redeemed at a list of retail stores, such as Starbucks, Old Navy, etc. Participation as a NuRide customer will help to mitigate the impact of traffic in and through the MetroWest residential community.

The TC will provide information on NuRide to all residents and employees working at MetroWest. Information will also be available at the MetroWest Transit Store.
Guaranteed Ride Home, or GRH, the ridesharing insurance program provided by MWCOG, is marketed by the Fairfax County, Ridesources customer service representatives. 1-800-745-RIDE.

Participation guidelines require that Commuters must call Commuter Connections and receive authorization from Commuter Connections prior to using the GRH service. MWCOG Commuter Connections staff will issue authorization number(s) to participating commuters and/or the MetroWest TC to certify a GRH trip. Commuters will not be reimbursed for trips not authorized by Commuter Connections. Depending on the commuter’s employment site, an Employee Transportation Coordinator (ETC) may have to be contacted first in order to make the appropriate arrangements for this service.

Commuters must be officially registered with Commuter Connections before using the GRH service. Registered commuters are those who have received an official registration letter and a GRH ID card from Commuter Connections. Commuters who have not been officially registered may use the GRH service one time, providing they meet all other eligibility criteria. This is referred to as a “one-time exception.” Any commuter granted a one-time exception must be officially registered before additional GRH trips are granted. Registered and one-time exception commuters must be carpooling, vanpooling, taking transit, bicycling, or walking to their site of employment at least two (2) days per week and on the day they use the GRH service.

Registered commuters may use the GRH program up to four (4) times annually from their official registration date. Commuters who received a one-time exception, then officially register with Commuter Connections may use the GRH service three (3) more times within 12 months from the date of their one-time exception GRH trip.

Commuters must re-register annually to maintain their GRH registration. Commuters must contact Commuter Connections to re-register and update their registration information.

The GRH program may only be used in cases of unexpected personal or family emergency, unexpected illness, or unscheduled overtime. Cases in which the GRH program cannot be used include, but are not limited to, the following: previously scheduled medical appointments, trips to the hospital or emergency room by a commuter that needs medical attention, personal errands, transit service disruptions and/or delays, business related travel and working late without a supervisor’s request, weather emergencies, any type of building closings or evacuations, and natural acts of God.
Requests to use the GRH program because of unscheduled overtime must be made *before* the commuter’s registered work end time, and a supervisor’s verification will be required at the time of the request.

GRH service is available between 6:00 a.m. and 10:00 p.m., Monday through Friday, except holidays and unplanned Federal Government office closings. *GRH TRIPS MUST BE TAKEN BEFORE 10:00 P.M.* Holidays include: New Year’s Eve, New Year’s Day, Martin Luther King’s Birthday, Washington’s Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran’s Day, Thanksgiving Day, Day after Thanksgiving, Christmas Eve, and Christmas Day.

In order to be eligible, a commuter must be physically working in the Washington, D.C. Metropolitan Statistical Area (MSA) as defined by the United States Office of Management and Budget. The MSA includes the District of Columbia, the Maryland counties of Calvert, Charles, Frederick, Montgomery and Prince George’s, the City of Alexandria and the Virginia counties of Arlington, Fairfax, Loudoun, Prince William and Stafford, and all cites within the aforementioned counties.

Eligible commuters can live anywhere inside the MSA or in any of the following areas: Allegany, Anne Arundel, Baltimore, Calvert, Carroll, Cecil, Charles, Harford, Howard, Queen Anne’s, St. Mary’s, or Washington counties, the City of Baltimore, and any point along the Upper Eastern Shore in Maryland; and Caroline, Clarke, Culpeper, Fauquier, Frederick, King George, Lancaster, Northumberland, Orange, Page, Rappahannock, Richmond, Shenandoah, Stafford, Spotsylvania, Warren, or Westmoreland counties, the City of Fredericksburg, or the City of Winchester in Virginia; and Jefferson County in West Virginia; and Adams, or York counties in Pennsylvania. Any other destination points outside of the above-mentioned areas will be considered on a case-by-case basis.

All GRH trips must originate from the commuter’s office location. Depending on the nature of the emergency, and home and work locations, a commuter using the GRH service may be required to use a taxi, car rental, transit, or any combination of these services to reach their destination point. MWCOG’s Commuter Connections staff and/or their designees will determine the type of service used and will issue a valid GRH authorization number at that time.

Commuter Connections will pay for one vendor service and/or one transit service per request. If the GRH trip is made by a taxi, MWCOG’s Commuter Connections program will pay for all charges, excluding gratuity, to the destination. The commuter is responsible only for tipping the taxi driver. Cancellation on the part of the commuter of a GRH trip may count as one of the four annual trips.
If a transit option is used for the GRH, the participant will be mailed a transit reimbursement voucher. The transit reimbursement voucher must be submitted back to MWCOCG within thirty days of transit use in order for payment to be made. Please allow 45 days for reimbursement.

If the GRH trip is made by rental car, the commuter is responsible for signing a standard rental agreement, showing a valid driver’s license, proof of insurance, providing a credit card number for collateral, returning the rental car within a 24-hour period, and the following charges: gasoline refueling charges, taxes, purchase of insurance (if necessary), additional rental charges if auto is not returned within a 24-hour period (unless Commuter Connections has given prior approval for additional rental time.) The commuter will be responsible for any loss or damage to the rental car.

GRH is a free service provided by the Metropolitan Washington Council of Governments (MWCOCG.) MWCOCG will use its best efforts to provide the Guaranteed Ride Home in accordance with the guidelines shown above. By requesting assistance from the Guaranteed Ride Home program, the participant in the program explicitly acknowledges that MWCOCG assumes no liability for the timeliness of the GRH participating vendor(s) or any accidents that may occur on the conveyance. The MetroWest TC will track the usage of each of the GRH participant who lives in the development and keep records on-hand at the TDM office.

- Participation in the region-wide Air Quality Action Days program.

Air Quality Action Days are called when air quality in the Baltimore/Washington region is expected to reach unhealthy levels. These days occur during the summer months when hot, humid, and stagnant weather conditions contribute to the formation of air pollution. Poor air quality affects children, individuals with respiratory and heart ailments, and older adults. Even healthy people can experience problems associated with high levels of air pollution.

When an Air Quality Action Day is forecasted, all participants are either emailed or faxed an unhealthy air alert. The media is also notified. On unhealthy days, individuals and organizations area asked to take action to protect their health and also to reduce air pollution.

Public and private sector Air Quality Action Days participants have agreed to develop voluntary Air Quality Action Day plans. These plans range from notifying employees and customers of an Air Quality Action Day to rescheduling operational activities. Air Quality Action Days empower government agencies, businesses, and residents in the Baltimore/
Washington region to do their share for cleaner air. During Air Quality Action Days, all sectors of the community will be called on to take voluntary actions to reduce air pollution.

The MetroWest TC will promote participation in the region-wide program to employers and provide information regarding alerts to residents of the community through the website. There will be a consideration to fly the Air Quality Action Days flag with permission of the Clean Air Partners program. The flag, flown on days when the air quality is unhealthful, will be visible to commuters in the MetroWest community, as well as those traveling along I-66 and the Metrorail Orange line.

- Telework Resource Center (TRC), administered by the MWCOG, provides information and assistance to employers on how to set up a work-site telework program. TRC staff will work with employers to help them create telework policy for their businesses, as well as select and train qualified employees on the benefits of teleworking and how to work remotely in an effective and productive manner. Information from this program should be made available to residents and used to assist in the set-up of the telework center onsite.

The MetroWest TC will work with the TRC to secure information on teleworking for the residents of the development. The TC will also be available to assist residents in choosing the best telework location option for them, which will be either at home or in a telework center.

- SmarTrip and SmartCard technology provided by the Washington Metropolitan Area Transit Authority (WMATA) to purchase and fulfill media fare card value.

SmarTrip is a permanent, rechargeable farecard. It’s plastic—like a credit card—and is embedded with a special computer chip that keeps track of the value of the card.

Each new resident of MetroWest will be given the option of receiving a SmartCard at
the signing of their lease or purchase agreement. The TC will be responsible for the purchase of the SmartCards from WMATA, distributing the cards to the residents, and tracking the use of the card through a registration process and annual survey of each resident.

SERVICES OFFERED BY FAIRFAX COUNTY GOVERNMENT INCLUDE:

RideSources customer service representatives will assist with the following TDM services in support of the MetroWest residential and business communities:

- Employer outreach
- Residential community-based TDM program
- Event planning for transportation fairs, etc.
- Ridematching service
- Design of mode split surveys and appropriate methodology
- Assists in the formation of vanpools
- Provides ongoing marketing and technical support

OTHER TDM SERVICES THAT WILL BE PROVIDED INCLUDE:

- Vanpool formation by the Transportation Coordinator and third party vanpool companies.

  The TC will work with the residents and employees located at MetroWest to form vanpools using the services of a third-party vendor who will own the vehicle and assume liability for the poolers who travel in the vehicle each day to work. This will be accomplished by holding vanpool formation meetings for residents and employees interested in participating in vanpools. The date and location of these meetings will be posted on the MetroWest website and flyers will be sent to the residents and businesses announcing the event. The meetings will be attended by recommended third party vendors who will explain the details on how to form a vanpool using their services. The TC will have information available at the MetroWest Transit Store on the benefits of vanpooling and a list of the available vendors.

- Coordination with shuttle bus services by others that currently provide service to/from the Vienna Metrorail Station.

  The TC will research all existing shuttle bus services that operate to and from the Vienna Metrorail station. Information will be provided to the residents and employees at MetroWest
on the service schedules, costs and criteria for use. The TC will also coordinate any TDM programs at MetroWest with approved transportation service vendors. Information will be available at the MetroWest Transit Store and on the website.

- Bus service that currently operates to and from the Vienna Metrorail Station, including the Fairfax Connector bus services that operate to and from the Vienna Metrorail Station.

As is the case with shuttle bus services, the TC will provide information on all bus services that currently serve the Vienna Metrorail Station. Information will be available at the MetroWest Transit Store and on the website.

- Car-sharing program agreements with the developer and, eventually, the homeowner’s association.

The TC will be responsible for meeting with car-sharing program vendors to establish a program at the Vienna Metrorail station for residents and employees working at the development. The TC will work directly with the vendor to set up the program criteria. Information on the car-sharing service will be available at the MetroWest Transit Store and on the website.

RESOURCES AND TECHNICAL ASSISTANCE FOR THE FOLLOWING TDM PROGRAM OFFERINGS WILL BE AVAILABLE:

- Parking cash-out programs.

An incentive program to encourage commuters to give up their parking spaces in trade for the purchase of fare media for transit has been a very positive initiative in achieving prescribed traffic mitigation requirements such as the trip reduction goals required for MetroWest.

The TC will develop the criteria for the program and present it at the MetroWest individual employee transportation coordinator meetings, discussing how to implement the program at each business site. The TC will provide the sale of transit fare media through the MetroWest Transit Store with information on the website.

- Pre-tax benefit programs for transit, bus and vanpools.
The current pre-tax benefit program, which is offered through the Internal Revenue Service Regulation Section 132, allows employers to offer employees up to $105 per month for the purchase of transit fare media (bus & rail) and vanpooling. This program benefit is only available through a commuter’s employer.

The MetroWest TC will conduct an annual seminar for businesses operating at the development on the pre-tax benefit and how to implement the program at their work-sites. Information will be available on the IRS regulation and program implementation at the MetroWest Transit Store and on the website.

- Alternative workplace and compressed and flexible work hour programs to assist in diverting traffic from peak-hour periods.

The TC will also offer a seminar each year on alternative, compressed and flexible work hour programs. Flexible work hour programs allow commuters to travel to and from the worksite during off-peak periods. Compressed work hours and teleworking allow the commuting employee to avoid traveling to work one or two days a week, helping to achieve the trip reduction goals.

- Ridematching software for ridesharing arrangements for carpooling and vanpooling.

As discussed, the TC will use the MWCOG rideshare matching service to assist commuters arriving at the work-site and residents living at MetroWest to become carpoolers and vanpoolers.

- Senior discount program.

The TC will research all senior discount programs that are available in the MetroWest area and also region-wide, such as the WMATA senior pass program that allows seniors 65 years of age or older to receive discounts on travel by bus or rail in the region. Seniors will be able to obtain a senior pass discount card (ID) and information regarding all available senior discount programs at the MetroWest Transit Store.
A commuter and telework club that will provide incentives for residents and employees who work at the MetroWest to use transit alternatives.

The TC will organize two clubs, or membership organizations, that will provide incentives for residents and employees to use commute alternatives – commuter and telework clubs. The commuter club will provide discounts at local retail to encourage the use of alternatives. Carpoolers and vanpoolers may receive free gasoline, an oil change or carwash. Transit users may receive free fare media cards. The criteria may be longest distance for daily commute, frequency in using the alternatives, or the number of miles logged. The TC will also prepare a plan for implementing both programs. Annual recognition meetings will be held at the Transit Store at MetroWest.

Vanpool program designed for members of the commuter club and residents of MetroWest.

The members of the residential vanpool club will meet at least once during the year and will be recognized by the TC for their participation in vanpooling and also rewarded with incentives for their efforts. The meetings will be advertised through the MetroWest residential newsletter and on the website.

Special promotional activities, with various incentive awards, to sustain awareness of, and interest in, the TDM program.

The TC will organize an annual sponsored event promoting TDM activities in the residential communities. The event will be attended by all vendors who offer their services in the community and they will be encouraged to provide promotional materials for distribution to the residents.

All of the TDM products, services and program information will be available through the transit store which will be located within close proximity to the Vienna Metrorail Station.
Residential

The success of TDM program implementation will be in the marketing and sales of the recommended TDM products and services which will include transit (rail & bus), vanpooling, carpooling and teleworking.

Target marketing

A variety of target marketing strategies will be used to encourage commuters to take advantage of their residential location – next to one of the best regional rail systems in the nation – by using the Washington Area Metropolitan Area Transportation Authority’s Metrorail system. Residential targets will include current transit riders, people working along the rail line that services MetroWest (Orange and Blue) without transfer trips, and full-time teleworkers who either work at home or at a telework center.

Marketing materials will include information on all of the available transit service and transportation offerings at MetroWest, including membership to the commuter and telework clubs. The materials will be designed to interest all residents at the development, including those in the senior high-rise community.

Target market strategies to encourage the use of transit for special audiences – such as the senior population – may include a coupon-based incentive program, the senior transit pass offered by WMATA, etc. Specific materials will also be developed for the school pool program and teleworking.

Sales kits

Materials will be prepared by the TC, or its organization, on all of the TDM products and services that are available to the target market with information included that is relevant to the particular market.

One-on-one marketing

One-on-one marketing, also known as point-of-sales, will be conducted when sales representatives are discussing lease or ownership of the residential and/or commercial office units with customers who are visiting the sales offices of the project, or discussing the project with customers over the phone.

Transit, transportation, and related incentive programs

Initial residents will be provided with incentives for transit (bus & rail), teleworking and/or
other agreed-upon TDM strategies to encourage their participation in alternative commute options as part of their new resident welcome package. In order to receive the incentive(s), the new resident must participate in a transportation information meeting. Those incentives may be in the form of transit fare media, SmarTrip cards, or any other form or instrument that may be redeemed for use as an alternative commute option. Other related incentives may include grocery delivery, pick-up and drop-off of cleaning and laundry, etc. The incentives are available one-time for those residents who are 18 or older and work full time.

Residential programs
A residential-based vanpool program will be developed using the Commuter Connections ridematching services and RideSources staff to help coordinate and organize MetroWest vanpools. The TC will work with the County to ensure that all vanpool participants are receiving all subsidies that are available to them. The program will include opportunities for preferred vanpool parking and awards for vanpools.

The residential community will have a customized page on the MetroWest website that provides information on all of the available and specialized services. This may include a ridesharing board or classified ad section for carpool opportunities.

Office/Commercial

Parking cash-out
Parking cash-out programs will be encouraged to reduce vehicle commute trips and emissions by offering employees the option of “cashing-out” their subsidized parking space and taking transit, biking, carpooling to their place of employment. “Parking cash-out program” means an employer-funded program under which an employer offers to provide a cash allowance to an employee equivalent to the parking subsidy that the employer would otherwise pay to provide the employee with a parking space. If an employer pays $160 per month for a parking space for their employee and offers a parking cash-out program, they agree to offer their employee a cash allowance of that amount to use for the purchase of fare media for transit (bus/rail) or ridesharing (carpooling and vanpooling), or bike modes of travel.

Pre-tax, transit benefit, Federal IRS regulation
Federal regulation allows employers to give employees up to $105 per month as a pre-tax payroll deduction or a tax-free employee benefit. Any expenses associated with the program are also fully deductible by employers. Detailed information on how the program is implemented can be found on several websites including www.TransitCenter.com and www.CommuterCheck.com and http://www.irs.gov/irb/2004-29_IRB/ar10.html. Such programs will be encouraged for all office owner/tenants. These programs are implemented through a payroll deduction, better known as a cafeteria plan, for each individual business. Details on the program’s criteria can be found on the IRS website, under Section 132f,
**Alternative work-hour programs**

Flextime, staggered work hours and alternative work schedules are effective ways in which to further trip reduction goals by altering the daily work schedules of employees and taking trips out of the AM peak period. Flexible work-hour programs provide employees with the option of starting their work day during an AM period – for example between the hours of 6 AM to 10 AM - and working a full work shift thereafter. This option spreads the AM peak period. Staggered work hour programs are generally applied to an entire business operation that begins its business hours after 10 AM each day, working a full shift thereafter. Again, the result is to mitigate the impact of traffic during peak periods. Alternative work schedule programs include compressed work weeks – working four (4), 10-hour work days or three (3), 12-hour work days each week, and 9/80 work hour programs, allowing employees to work four (4), 10-hour work days one week and five (5), 8-hour work days the next week. All tenants will be required to participate in a briefing or orientation on the MetroWest transportation program and encouraged to provide such options to their employees. It is important to note that the TDM aspects of alternative schedules work to shift trips to off hours and are secondary to those that eliminate trips.

**Rideshare matching and associated programs**

The Metropolitan Washington Council of Government’s, Commuter Connections ridematching service is used for the formation of carpools and vanpools, as well as disseminating information on available transportation programs and services offered throughout the region, specifically through Fairfax County’s RideSources program. Residents may learn about the rideshare matching program through the TC or [www.commuterconnections.org](http://www.commuterconnections.org) website. Application for the service may be completed online.

**The Guaranteed Ride Home (GRH) program**

GRH is administered by MWCOG through Commuter Connections, the regional TDM program. GRH provides commuters who regularly (twice a week) carpool, vanpool, bike, walk or take transit to work with a free and reliable ride home when one of life’s unexpected emergencies arise. Commuters may take advantage of GRH up to four times per year to get home for unexpected emergencies such as a personal illness or a sick child. GRH can also be used for unscheduled overtime when an employer mandates that they must stay late. GRH was designed to rescue commuters who are worried about how they’ll get home when an emergency arises. Knowing there’s a guaranteed ride home allows one to use commuting options like transit and carpools with peace of mind and confidence. Residents may learn about the guaranteed ride home program through the TC or [www.commuterconnections.org](http://www.commuterconnections.org) website. Application for the service may be completed online.
General

A safe routes to school, or school pool program, will be developed and coordinated with the RicEd@sources program employer outreach staff. A school pool is a group of parents who take turns carpooling and dropping off their children at the same school.

A car-sharing program will be implemented subject to agreement with a third-party vendor(s) such as FlexCar/ZipCar. This program provides an available vehicle that is parked within the community and is used by the residents of the community for quick trips, such as errands, etc. Implementation for the car-sharing program can be found on Page 19.
Program management for the implementation of the TDM plan will be directed by a designated transportation coordinator (TC).

The most important role of the person, or organization, assigned as the TC for MetroWest, will be to ensure that all of the TDM programs and services are operating in an efficient and productive manner, with the goal being twofold:

1. To reach the prescribed trip reduction goals; and,
2. To make the MetroWest TDM program an integral part and stakeholder in the community, identifying itself as a community organization whose mission is to act as mobility manager for MetroWest, focusing on the needs of its residential and business communities.

The TC’s first task will be to review the TDM Plan and develop an operational manual that addresses the day-to-day tasks that need to be completed to implement and maintain the branded MetroWest program after total build-out.

The TC will be involved in the branding of the TDM program for MetroWest by participating in the focus group study. The outcome of the study will be the creation of marketing materials for the program to be coordinated by the TC. These materials will be used by the TC to promote the programs and services and also by the Pulte sales staff to sell and lease property at MetroWest.

The TC will be located in a central space onsite and will work with each new resident and business that locates to MetroWest to introduce them to the TDM product, service and program offerings and seek individuals who will assume the role of TDM contacts for each commercial and residential building. The exception to this will be if the commercial or residential building is managed by the same property management company. In this case, the company would assign a single TDM contact for all of their properties.

The TC will also oversee the implementation of the TDM strategies and any and all tasks required by Fairfax County, Department of Transportation (FCDOT) such as conducting annual transportation mode split surveys. They will be tasked to report the outcome of the survey each year and provide an annual report of TDM activities within MetroWest to FCDOT. A by-product of the survey results will be a strategic plan that will propose TDM activities for the following year, including marketing strategies and budget.
The TC will provide FCDOT with an annual report as provided in the proffers, tracking the level of development, number of residents/employees living and working at MetroWest, participation level and use of each of the implemented TDM programs, number of preferential parking spaces, budget allocated for TDM program operation, and any other pertinent information.

They will also track the success of each of the employed TDM strategies by following the monitoring and evaluation techniques developed for the TDM plan. This may include parking management activities such as checking to make sure the carpool spaces are filled with vehicles that are registered carpools. The TC will also track the sale of transit fare media that will be sold at the transit store. They will also make sure that the bike facilities are kept safe, secure and clean. They will negotiate contracts with any third-party vendors who may provide services for MetroWest, such as car-sharing and shuttle bus providers.

With the assistance of Ridesources staff, the TC will schedule transportation events at MetroWest, at least once a year, to provide information to residents, employees, customers and visitors about available transportation programs and services. These events are known as transportation fairs.

The TC will represent the TDM concerns of the residents and employers of MetroWest at various transportation-related meetings, such as those hosted by FCDOT or MWCOG. The TC will also be involved in outreach activities for surrounding communities regarding the implementation and availability of TDM programs and services.
Parking management, simply stated, is how parking spaces are managed by use and space allocation in order to further the TDM objectives. By providing incentives (financial or otherwise) for commuters to travel to and from work each day in either carpools or vanpools, single occupant trips can be reduced. Parking management plans generally consist of three broad-based strategies; preferential parking, parking pricing and transportation allowances. A combination of two or more of these broad-based strategies comprises the MetroWest Parking Management Plan.

**Residential**

*For condominium units*
A maximum of one parking space will be bundled (or included) with the sale of the individual unit. Additional requested/required spaces may be purchased in addition to the sales price of the unit.

*For rental units*
One parking space will be designated for each unit at a flat fee to be determined based on a review of market conditions at the time the lease is signed. Additional spaces will be available based on a first-come/first-served basis at an additional flat fee per space. Availability of car rental services is an added service for residents of the mixed-used development and further helps to encourage one- or no-car individuals or families.

**Office/Commercial**

Parking spaces will not be bundled or included in the base square foot rental rates for office/commercial space at MetroWest. Parking pricing will be a separate charge for tenants and/or owners in the commercial office space dependent and based upon market conditions at the time of lease.

Designated areas for loading and unloading carpool and vanpool commuters will be included as part of the site plan design. Commuters will be dropped off or picked up either within the parking structure or at a dedicated stop close/adjacent to the office/commercial space.

Preferential parking spaces will be designated on the site plan and provided for those commuting employees registered as carpools or vanpools with the MetroWest TC. These spaces will be located closest to the elevators and/or core areas of the facility as is feasible and practical. Preferential parking for vanpools will be provided free of charge. Spaces will be set aside for vanpools in commercial parking facilities.
The carpool or vanpool recognized as “pool of the month” will be given the premiere preferential parking space in a garage. This distinction is given to a pool that has logged the most hours, has the longest pooling history, or travels the furthest to and from work each day.

A parking fee structure will be developed, providing an incentive for those commuting employees that participate in carpools and vanpools. A discount rate will be offered to car/vanpoolers and market rate charges will be applied for single occupant vehicle travelers.

A comprehensive parking management strategic plan will be developed that creates policy for MetroWest employee commuters, including the aforementioned parking arrangements. This will ensure that residents of the development not use WMATA parking facilities, that all on-street parking spaces will be managed by time and price, and that the parking meter revenues are allocated to the TDM program with enforcement being an objective of the monitoring and evaluation TDM plan for the project.

Spaces will be designated on the site plan and provided for taxi stands, shared-car services and delivery services on-site at select locations. These areas will be well-signed, lit and located throughout the development. Within each on-site garage, a minimum of 5% of the parking spaces shall have access with sufficient clearance for vanpools.

Carpooling and vanpooling spaces will be well-signed and monitored by the TC. Additionally, a covered area, such as an awning, building lobby, etc., will be set aside for pick-up of vanpoolers, carpoolers and any shuttle services that are implemented at MetroWest.

Spaces will be available, subject to the owner(s) of the parking garages in the commercial space, for use after-hours and on weekends by the residential community for special events, weddings, etc.
Phase I  Post-Rezoning
The first phase of the plan will begin following rezoning approval with the appointment of a TC – either an individual or a TDM specialist – who will provide oversight to the initial tasks that will be performed to implement the TDM program. The role of the TC is detailed in the section of this document entitled TDM Program Management.

The most important component of the TDM plan will be to create an operations manual to finalize the framework for a solid TDM program at MetroWest based on this TDM Strategic Plan that will provide resources and assistance to residents, businesses, customers and visitors to the mixed-use community.

THE OPERATIONS MANUAL WILL CONSIDER THE FOLLOWING TDM COMPONENTS FOR EACH TDM STRATEGY:

- **Targeted TDM program participants**
  The TC will target the use of specific TDM programs for specific groups of residents and employees. An example would be that those commuters who are most likely to use commuter alternatives, such as carpoolers and vanpoolers, are more apt to work for companies that have set schedules or have jobs that have static work hours.

- **Recommended person trips assigned for each transportation mode**
  Likewise, as mentioned above in targeting TDM participants, the strategic plan for each year may project the number of persons at MetroWest who will be using various transportation modes, knowing who the residents are and commercial businesses by industry.

- **Detailed TDM initiatives**
  Each TDM strategy will be described in detail as to service provided, how it is measured, who the target user is, what the cost is to provide or operate, etc. This type of information will be included in the TDM Operations Manual.

- **How the particular TDM strategy will be marketed**
  It will be important for the TC to work closely with the leasing agent to assist in marketing TDM to prospective owners and tenants. The TC will develop a presentation that will be given at the sales office to each person who contracts to live or lease space at MetroWest. The TC will be available to meet, one-on-one, with the new resident to describe the MetroWest TDM plan – and its brand – and how effective the program is in providing ease of mobility for them and their families or employees. The TC will also be available to participate in relocation meetings for employers moving to MetroWest.
What the TDM incentives will be for each strategy

The TDM incentives will be determined when each of the buildings is delivered. Some incentives have been mentioned in the TDM plan, however, some of these incentives may be changed and others may no longer be offered. The TC will research the best transit or transportation programs available at the time to determine what the most effective incentives will be to offer residents and tenants of MetroWest.

Recommended schedule or timeline

The schedule for the rollout of the TDM program to total build-out is illustrated in the TDM Program Implementation Chart. The first phase will include program branding, the hiring of the TC and upfront research. TDM activities before and during construction include programmatic items for the development and implementation of TDM strategies.

Associated budget for each TDM strategy

Each detailed TDM strategy description will include an associated budget for each phase of the project and maintenance.

Phase II  Before and During Construction

Phase II involves setting the framework for the implementation of the TDM Plan and implementing the TDM strategies in the early stages of development. This includes:

- Branding the MetroWest program to create an identity for the transportation program. This brand will be marketed to the existing development as well as future developments.

- Create a commuter and telework club to provide incentives for residents, employees, customers, and visitors to use alternative mobility modes such as ridesharing, transit and vanpooling or work at home or at a telework center. Incentives for both may include discounts from MetroWest retail or value-added on SmarTrip cards, or a discount on office services and supplies for teleworkers. Club members for both commuters and teleworkers will need to qualify by meeting a set of criteria established for membership.

- Develop collateral materials for the branded program and commuter and telework club. These may include brochures, posters, newsletters, etc.

- Develop a website dedicated to the TDM program with links to other transportation resources.
Create and implement a monitoring and evaluation plan to assist the TC in tracking the success of the TDM program.

Finalize the parking management program that will be used as an incentive for residents and employees to become carpoolers and vanpoolers.

Open a transit store as a retail outlet for the sale of transit fare media, provision of route information and scheduling, and other information related to mobility in and through the MetroWest area.

Set up bicycle facilities in the designated common areas.

Establish informational kiosks to provide real-time information for transit services and ridematching.

Participate in, or implement a new, ridematching service exclusive to MetroWest and those communities within the transit station area for carpooling and vanpooling.

Phase III Total Build-Out or Program Maintenance

Phase III of the TDM Plan will focus on monitoring and evaluating the TDM strategies and provide day-to-day assistance to residents, employees, customers and visitors to MetroWest on the available transportation products, programs and services. The TDM program will be considered at maintenance level when the trip reduction analyses demonstrate that the reductions are being met as provided in the proffers. Program maintenance will then occur following the post build-out trip generations.

THE METHODOLOGY USED TO MAINTAIN THE INTEGRITY OF THE STRATEGIC PLAN FOR THE TDM PROGRAM WILL INCLUDE:

- Identifying and analyzing trends in travel/commute patterns;
- Responding to trend analysis, emerging technology and evolving County services in both marketing and program elements; and
- Responding to trip generation analyses as provided in the proffer.

Additionally, the TC will need to keep apprised of any modifications in evolving County requirements and services.
## Required TDM Phases

<table>
<thead>
<tr>
<th>TDM STRATEGY</th>
<th>REZONING</th>
<th>BEFORE/DURING CONSTRUCTION</th>
<th>TOTAL BUILD-OUT</th>
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</thead>
<tbody>
<tr>
<td>Site Design</td>
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</tr>
<tr>
<td>Physical facilities amenities</td>
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<tr>
<td>Telework business center</td>
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<td></td>
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<tr>
<td>Bike racks</td>
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<tr>
<td>TDM Programs and Services</td>
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<tr>
<td>Assign Contractor/TC</td>
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<td>X</td>
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<tr>
<td>Develop &amp; Implement Operations Manual</td>
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<tr>
<td>Form partnerships</td>
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<tr>
<td>Brand the TDM program</td>
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<tr>
<td>Develop collateral materials</td>
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<td>X</td>
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<tr>
<td>Develop website</td>
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<td></td>
</tr>
<tr>
<td>Open transit store and telework/business center</td>
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<tr>
<td>Implement Parking Management Plan</td>
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<tr>
<td>Implement Pedestrian/Bicycle Plan</td>
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<tr>
<td>Assign TDM contact for each facility</td>
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<tr>
<td>Develop annual mode split survey</td>
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<td>Conduct annual mode split survey</td>
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<td>Annual TDM report to County</td>
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<tr>
<td>Form transportation organization/committee</td>
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</table>

The TDM Program Implementation Chart will be reviewed on an on-going basis with the TC through the survey analysis and will be altered, as necessary, in consultation with the County.
Monitoring and evaluation for the TDM plan will be as provided in the proffers.

**Monitoring TDM Programs and Services**

Monitoring and evaluation of TDM program and services will help make them more effective in reaching the prescribed trip reduction goals. For example it can:

- Document program successes and benefits generating future management interest and support for the program.

- Show which services work well and which do not, enabling the TC to direct future resources to successful services.

- Define why individual services do or do not work well, helping to improve their effectiveness.

- Identify who is using, or not using, a service, to target information and marketing where it’s most needed.

**SOME OF THE ACTIVITIES THAT WILL BE MONITORED AT METROWEST WILL INCLUDE:**

- Resident/employee awareness
- Use of program services by both residents and employees
- Employee/resident commute patterns
- Employee/resident attitudes and interests
- Supervisor/management attitudes
- Satisfaction of service users
- Program cost and savings
- Benefits to the organization

**SOME OF THE MONITORING TOOLS THAT WILL BE USED FOR BOTH RESIDENTIAL AND COMMERCIAL INCLUDE:**

- Registration forms and sign-up sheets
- Service log use
Tools for Tracking & Monitoring

As stated above, the information you need to collect, and the services and programs you wish to monitor, require a selected set of monitoring tools. The following chart presents examples of monitoring tools that can be used to evaluate some of the MetroWest TDM program and their offerings.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>MODE</th>
<th>ACM</th>
<th>AF</th>
<th>EL</th>
<th>FG</th>
<th>HR</th>
<th>O</th>
<th>RP</th>
<th>RF</th>
<th>SL</th>
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<td>II. Programs</td>
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<td>III. Outreach</td>
<td>Vendor Fair</td>
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</table>

**TOOL ABBREVIATIONS:**

ACM: Available contact management software
AF: Application Forms
EL: Employee Logs
FG: Focus Groups
HR: Human Resources
O: Observation
RP: Rideshare matching software
RF: Registration Forms
SL: Service Logs
S/S: Sign up sheets
S: Surveys
1/1: One-on-one
**Evaluation Process**

The purpose of monitoring and evaluation is to learn more about the TDM program and to measure its success. In the evaluation process, we identify the commute alternatives and services that residents, employers and commuters are using, any changes in their commute behavior, the reasons for the changes, how they heard about the program, and what they like and don’t like about it.

**USE INFORMATION COLLECTED TO ANSWER THE FOLLOWING QUESTIONS:**

- Did the program achieve the trip reduction goals?
- What commute alternatives are employers and commuters using now and how often do they use them?
- Did employee and commuter modes and patterns change? If so, how did they change?
- What were the reasons for the changes? (program services, personal factors such as a move to a new home, or external factors such as an increase in gas prices or construction projects.)
- Why did employees and commuters who continue to drive alone not shift to a commute alternative?
- How aware are employees and commuters of the commute program? How did they hear about the program? (information channels)
- Which incentives and services did employees and commuters use most? Why?
- Which did employee or commuter use least or not at all? Why?
- What did the program cost and what was the cost per benefit? (trips reduced, reduced absenteeism, increase in productivity)
- Which services were most effective and cost-effective? Which were least effective and cost-effective?
- Did the program cause any positive or negative change in internal company operations?
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Tysons Land Use Task Force: Transportation Demand Management (TDM) Subcommittee. Fairfax County.
The Tysons Land Use Task Force has been charged by the Board of Supervisors with soliciting community input and making recommendations to update the 1994 Tysons Corner Comprehensive Plan to incorporate the four planned Metro Stations into the Plan. The Tysons Land Use Task Force’s mission is to formulate Plan revisions that will:

- Promote mixed use
- Better facilitate transit-oriented development (TOD)
- Enhance pedestrian connections throughout Tysons
- Increase the residential component
- Improve the functionality of Tysons
- Provide for amenities and aesthetics, such as public space, public art, and parks.

To support the Task Force’s efforts, Fairfax County has recently engaged PB Placemaking, a preeminent urban design/planning firm, to develop alternative scenarios for how Tysons should look in the future with the planned Metro Rail Stations. A major consideration for PB Placemaking and Cambridge Systematics will be the transportation impact of the design alternatives and the potential to mitigate negative effects through strategies often referred to as Transportation Demand Management (TDM). PB Placemaking’s alternative design scenarios and TDM assumptions will be provided to the County’s transportation consultant, Cambridge Systematics, for use with the transportation model to evaluate traffic conditions in a fully developed Tysons Corner.

The Task Force believes that TDM should be a component of the final Comprehensive Plan recommendations. Even major VDOT capital projects in Northern Virginia, which appear unlikely in the immediate future, would not be sufficient to mitigate the traffic to be generated by the redevelopment of the Tysons Corner Urban Center. Therefore, the Task Force believes that it is important to have a TDM plan which first closely examines the demand side of transportation and then creates a meaningful Tysons Corner Urban Center area-wide TDM plan that focuses on reducing peak-hour trip generation, vehicle miles traveled and overall single occupancy trips reduction.

PB Placemaking needs to ensure that all of the TDM programs and related efforts that are currently underway are coordinated in such a fashion as to ensure that they strengthen, not hinder, the ultimate TDM Comprehensive Plan recommendation that they deliver to the Task Force. This will require PB Placemaking to immediately review TDM planning and support programs, available TDM services, the project specific TDM efforts, the proffered TDM programs, the County efforts (TDM Consultant Project, TDM Coordinator position, TOD Committee) as well as the regional congestion management plan (CMP) and the CMP’s for the Dulles Metro Rail project and the HOT Lanes project. The success of the TDM plan for the Tysons Corner Urban Center will be dependent upon the coordination of all of these efforts.
Another key to the success of the Tysons Corner Urban Center TDM plan is to develop the right mix of TDM programs and strategies that not only fit the currently built Tysons Corner environment, but also have the ability to adapt to the changing environment as Tysons Corner is redeveloped over time. PB Placemaking must recommend a plan, which is not a “cookie-cutter” approach, but rather a TDM plan that is unique to the Tysons Corner Urban Center. While individual TDM efforts can be effective, most TDM strategies are most effective when used in combination with certain other TDM strategies. PB Placemaking must recommend the right mix of TDM strategies for the Tysons Corner Urban Center.

Although PB Placemaking has TDM experts on their team, the Task Force felt that it would accelerate their evaluation if the Task Force could provide information on current Regional, State, County and Tysons Corner TDM efforts and an initial assessment of the various TDM techniques that might be most applicable at Tysons Corner. With that in mind, The Task Force created a TDM Subcommittee to prepare this assessment.

WHAT IS TRANSPORTATION DEMAND MANAGEMENT (TDM)?

Transportation Demand Management (TDM) is a term applied to a broad range of strategies to shape the design and use of a transportation system. It has a particular focus on reducing the demand for travel by single occupant vehicles, as increasing the supply (more roads and parking) is not always an effective solution to increased traffic, and is usually more costly than other transportation alternatives.

TDM focuses on offering a variety of transportation alternatives (rail, bus, bike, walking, car pools, etc.), as well as other incentives and disincentives, that will modify travel behavior. While TDM will not eliminate all increased traffic generated from the redevelopment of Tysons Corner, it will reduce travel by single occupant vehicles and change the time of day that trips are made (reducing the impact of “peak hour” travel). It will also encourage energy conservation and improve air quality. TDM strategies are inherently flexible and adaptable, but their ultimate success depends upon providing real alternatives to automobile travel in order to affect the decisions of individuals who use the transportation system. Providing these alternatives requires the active and continuing cooperation of the private sector.

WHAT ARE THE CURRENT TDM EFFORTS?

Currently there are TDM efforts underway at the state, regional, and county level. There are also TDM programs in place that specifically cover the Tysons Corner Urban Center as a result of individual proffers or efforts by local TMAs or businesses. The TDM Subcommittee has attempted to compile a comprehensive list of the TDM programs currently underway that could affect the Tysons Corner Urban Center. These efforts, which are catalogued in Attachment A, include:

- TDM Planning and Support Programs
- Available TDM Services
- Project Specific TDM Efforts
- The regional congestion management plan (CMP) as well as the Dulles Rail and HOT lanes CMPs
- Proffered TDM Programs (i.e. Metro West and Macerich)
• Fairfax County efforts (TDM Consultant Project, TDM Coordinator position, TOD Committee)

PB Placemaking needs to review and understand all of the TDM efforts underway at the state, regional, county and Tysons Corner specific level so that they can develop an area wide TDM plan that not only coordinates all of these efforts but leverages the TDM funding of these efforts as well. PB Placemaking will also have to evaluate each of these efforts as to their effectiveness as well.

**SPECIFIC TDM STRATEGIES**

The TDM Subcommittee has also reviewed numerous TDM strategies. These strategies, which have been grouped into the following six categories, and are discussed in detail in Attachment B, include:

• Alternative Mode Support Strategies: These strategies encourage the use of alternatives to single occupancy vehicles. One method is through public education and various promotions. Modes include ridematching services, public transportation, vanpools, custom transit services, and non-motorized transportation. Offsite facilities such as HOV lanes and park and ride lots are supported. Car sharing services are also supported. In order for these modes to be promoted, proper facilities are needed to make them attractive and easy to use. Examples include a pedestrian and bicycle infrastructure that must be in place, and there must be public and private commitment for financial support of construction of these facilities.

• Worksite-Based Strategies: These strategies are private sector programs and services that encourage employees to change commuting patterns on a worksite by worksite basis by providing incentives that make publicly-provided modes more attractive, disincentives to single occupant travel, and employer management policies that provide employees with flexibility in mode choices.

• Land Use Strategies: These strategies include changing density, land use, urban design and land use mix to impact travel needs and patterns. Land use strategies are potentially the most effective over time.

• Programmatic and Policy Support Strategies: These strategies introduce restrictions and regulations to automobile use and provide political/program support and guidance to new institutional relationships.

• Telecommunications Strategies: These strategies utilize modern communications technologies, principally the Internet, to reduce the need for vehicle trips. While the primary impact is on commuting trips, they also have the potential to reduce non-commuting trips.

• Pricing Strategies: Pricing strategies use financial incentives and disincentives, such as parking or gasoline taxes, to influence transportation decisions.

While PB Placemakings TDM experts are most likely familiar with all of the TDM strategies reviewed in Attachment B, the TDM Subcommittee reviewed the strategies with the Tysons
Corner already-built environment in mind and made recommendations as what strategies might therefore be the most effective.

PB Placemaking needs to review and evaluate Attachment B and develop a program of TDM strategies for the Tysons Corner Urban Center taking into consideration the currently built Tysons environment as well as the ultimate preferred design scenario.

**SUBCOMMITTEE RECOMMENDATIONS**

**Coordination of the TDM Efforts** - If TDM is to have any chance of being successful in the Tysons Corner Urban Center, it is of critical importance that all of the TDM efforts are well coordinated. While there are currently many significant TDM efforts underway, there needs to be significant improvement in the coordination of the efforts between state, regional and county and private TDM programs and services. In addition, the marketing efforts to boost company and employee participation – a key to TDM success – need to be improved.

PB Placemaking also needs to be aware of all of the County efforts as well as other projects that may have an impact on an effective TDM program for the Tysons Corner Urban Center. In particular, PB Placemaking needs to understand the TDM planning and support programs, available TDM services, the project specific TDM efforts, the proffered TDM programs, the County efforts (TDM Consultant Project, TDM Coordinator position, TOD Committee (see Attachment C)) as well as the regional congestion management plan (CMP) and the CMP’s for the Dulles Metro Rail project and the HOT Lanes project. Coordination of these efforts is critical to the success of the Tysons Corner Urban Center TDM Plan.

An active TMA for the Tysons Corner Area is essential for TDM efforts to be effective. PB Placemaking needs to evaluate the efforts of local TMA’s, in particular TYTRAN, and recommend how they can best be utilized to improve the effectiveness of the Tysons Corner area-wide TDM program.

PB Placemaking also needs to review and evaluate current County efforts and their staffing of these efforts to determine whether they are coordinated and adequate. This is important because County staff will need to have the capability to oversee and validate area, site or project performance measures.

PB Placemaking should also recommend whether there needs to be any regulations or ordinances to assist in the implementation of an effective area-wide TDM program in the Tysons Corner Urban Center. PB Placemaking has a unique opportunity to make such suggestions since the Task Force is expected to recommend new Comprehensive Plan language along with recommendations for changes to existing regulations, or for new regulations or ordinances that support the recommended Comprehensive Plan changes.

**Recommended TDM Strategies for Consideration** - The Subcommittee reviewed the available TDM strategies and programs within the context of the Tysons Corner Urban Center to identify those that should be more closely reviewed and considered by PB Placemaking. While the list below provides the views of the Land Use Task Force TDM Subcommittee, it is not intended to replace the expertise of PB Placemaking in identifying additional or more effective approaches.
PB Placemaking must recommend the right mix of TDM strategies for the Tysons Corner Urban Center.

- **Alternative Mode Support Strategies** – PB Placemaking should focus on public education and promotion of alternative modes, ridematching services, additional forms of transit beyond Metro Rail, vanpools and shuttles, non-motorized support and HOV/HOT facilities. PB Placemaking must also recommend a Tysons Corner Urban Center internal circulator system that not only serves the urban center but also allows the surrounding neighborhoods access to the transit stations along with being better connected to the opportunities and amenities of a redeveloped Tysons Corner Urban Center.

With the advent of Metro service in Tysons, transit becomes the most attractive alternate mode. Local feeder buses, both public and private, will be needed to supplement Metro. With no parking planned at the four Metro stations, non-motorized modes can play a large role in moving people from the stations. Bicycle parking facilities, bike lanes throughout the Tysons Corner area, a complete, convenient, attractive pedestrian network are all needed for this mode to succeed.

There exist a number of services such as ridematching, vanpools, and custom transit services that need to be more heavily promoted.

Currently free parking in Tysons Corner is a major reason for employees and retail customers to use single passenger vehicles. If this is to change in the future, alternative modes must be promoted at the same time that parking management strategies are implemented.

- **Worksite-based Strategies** – PB Placemaking should focus on creating worksite-based strategies that can be implemented by both the County and a TMA like TYTRAN. The recommendation should include monetary incentive and disincentives, alternative work schedules, parking management and facility amenities.

- **Land Use Strategies** - PB Placemaking should focus on density levels, land use, urban design and land use mix. Their recommendation should include suggestions for compact residential development, compact employment and activity center, an affective mix of land uses, connectivity, transit and pedestrian oriented design, the jobs/housing balance and affordable housing. PB Placemaking will also have to design an improved grid of streets to support many of the TDM land use strategies.

- **Program and Policy Support Strategies** – PB Placemaking should evaluate potential strategies such as adoption of a trip reduction ordinance, establishment of a parking district or parking authority, and creation of a transportation management district. The evaluations should assess the operating costs and the anticipated effectiveness of each strategy.

- **Telecommunication Strategies** – Although the benefits of telecommuting/telework may be limited compared to other alternatives, it is a relatively low cost option and should be considered. The issue of infrastructure (wiring and telework centers) should be addressed. The U.S. General Services Administration and other organizations should be consulted about regional telecommuting programs and opportunities.
• Pricing Strategies – As previously noted, many of these are controversial and some would require new authorities, making implementation difficult and perhaps problematic. However, parking pricing should be considered as part of the review of parking management, including the review of County minimums and maximums for parking.

Use of Complementary TDM Techniques - The literature reviewed shows that in creating an effective TDM plan it is essential to include a mix of complementary techniques and strategies. While most TDM strategies are complementary, many are most effective when used in combination with certain other TDM strategies. The synergistic benefits from using the best mix of strategies needs to be considered at both the parcel and Tysons-wide level. At the Tysons-wide level, there is also the consideration that some strategies, such as shared parking, may not be fully effective – or even feasible – without participation by multiple developers and owners.

• PB PlaceMaking should develop a strategy for emphasizing complementary TDM techniques at both the parcel and Tysons-wide level, while still providing developers flexibility in their TDM plans.
• PB PlaceMaking should specifically evaluate the feasibility and value of requiring specific TDM techniques in parcel level and Tysons-wide TDM plans.
• PB PlaceMaking should include design elements that support TDM efforts, such as parks, that reduce the need for personal travel to other locations.
• PB PlaceMaking should evaluate the feasibility and strategy for including TDM requirements in all office and commercial leases for Tysons Corner.

Monitoring, Evaluation and Enforcement - TDM efforts need to feature monitoring and evaluation components to obtain and interpret feedback on program operations. The feedback is provided to program management to enable verification of satisfactory operation or to detect gaps between desired and actual program results. Management can act on results gaps to achieve or to regain program success.

TDM programs feature monitoring and evaluation components, designed to obtain and interpret feedback on program operations. The feedback is provided to program management to enable verification of satisfactory operation or to detect gaps between desired and actual program results. Management can act on results gaps to achieve, to maintain, or to regain program success.

Monitoring is done in two ways: (1), by physical counts of vehicles at predetermined points on or at the edges of development sites, and (2), through sample surveys of people who live on, work at, or in some cases visit a site. Representative physical counts allow direct comparisons of actual observations against desired values, e.g. PM peak hour actual against program PM peak goal. Sample survey results give indications of trends, e.g. increasing/decreasing use of carpools or shuttles, and also give information on such items as preferences, e.g. which of several possible incentives might be best for persuading people to ride the bus rather than drive.

Currently, TDM programs at development sites make use of both these forms of measurement to produce reports of past performance (for example on an annual or quarterly basis) and form the basis of plans for future program operations (for example, introduction of a new incentive package or tactic). The current programs have so far evolved site by site.
The Tysons Corner Urban Center will be made up of a number of individual development sites of various sizes. The ground maps of these sites may or may not correspond with any given division of the Tysons Corner Urban Center according to convenience of access to the circulator, or to transit, or for purposes of carpooling, or for bicycling and walking. Yet people will live and work at individual buildings on these development sites. If a broader view than the site level is to be taken, it must still be possible to make measurements that can be used to diagnose TDM problems and permit the development of solutions, in other words to make measurements of the road use behavior of specific people at specific places in the Tysons Corner Urban Center.

However, that level of monitoring and evaluation should be only a part of a larger view of transportation management in the Tysons Corner Urban Center. What is now referred to as TDM should become an integrated component of an overall Tysons Corner Urban Center transportation management system which embraces all modes of movement and all purposes of travel, including but going beyond vehicle counts and daily commute trips at individual sites. The larger system should address all aspects of the transportation infrastructure, beginning with the attributes of the built environment that affect transportation and extending to all methods of transportation management, using all cost-effective measurement technologies and evaluation methods.

When monitoring and evaluation indicate a failure of TDM techniques, enforcement of penalties must be part of any TDM program. TDM programs should be developed in such a way that it is in the best interest of developers to ensure their success. However, without enforcement, travel trip reduction goals are meaningless.

The Subcommittee recommends that PB Placemaking develop a Tysons Corner area-wide and site-specific monitoring and evaluation system to support their recommended TDM plan. Recognizing that the interests of the developers and the citizens need to be protected, PB Placemaking should also suggest ways to construct proffer agreements that can be more flexible to future revisions and updates as TDM evolves. “Phasing” should be used in developer TDM proffers to allow the opportunity to measure performance in meeting TDM targets.
## ATTACHMENT A

### EXAMPLES OF CURRENT TDM EFFORTS

<table>
<thead>
<tr>
<th>Planning &amp; Support</th>
<th>Fairfax County</th>
<th>State</th>
<th>Commuter Connections and Other Regional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Benefit Financial Incentive For Employers (<a href="http://www.fairfaxcounty.gov/fcdot/match.htm">www.fairfaxcounty.gov/fcdot/match.htm</a>)</td>
<td>VDOT Regional Congestion Management Plan¹</td>
<td>Employer Services provides funding to local TDM agencies to support technical assistance to employers.²</td>
<td></td>
</tr>
<tr>
<td>Fairfax County’s Employer Services Program (<a href="http://www.fairfaxcounty.gov/fcdot/employer.htm">www.fairfaxcounty.gov/fcdot/employer.htm</a>)</td>
<td>Department of Rail and Public Transit’s Telework!VA business incentive program (<a href="http://www.teleworkva.org%C2%B3">www.teleworkva.org³</a>)</td>
<td>Telework Resource Center⁴</td>
<td></td>
</tr>
<tr>
<td>Dulles Corridor Metrorail CMP (during construction) (<a href="http://www.dullesmetro.com">www.dullesmetro.com</a>)</td>
<td></td>
<td>Public Sector Employer Outreach⁵</td>
<td></td>
</tr>
<tr>
<td>HOV Lanes Information (<a href="http://www.virginiadot.org/comtravel/hov-default.asp">www.virginiadot.org/comtravel/hov-default.asp</a>)</td>
<td></td>
<td>Northern Virginia Transportation Commission- Planning and financial support for region’s transportation system (<a href="http://www.thinkoutsidethecar.org/info.asp">www.thinkoutsidethecar.org/info.asp</a>)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carpool/Vanpool Ridematching program⁷</td>
<td></td>
</tr>
</tbody>
</table>

*Note: The chart above does not contain all of the regional, state, county, Tysons area or business TDM efforts listed on the following pages.

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¹ The contact is Barbara Reese at VDOT. Currently there is a draft regional CMP concept paper.
² Programs include: Guaranteed Ride Home; Ridematching; Transit Information; Smart Trip Cards; Transit Voucher Programs; Teleworking Assistance; Parking Management Programs; Marketing Transportation Options; Incentive Programs
³ CMP would manage or mitigate congestion during construction (2007 to 2011) of the Dulles Corridor Metrorail Project extension to Wiehle Avenue. The CMP would cover emergency response, communication, transit, and TDM. The CMP will provide cost-effective transportation options to commuters, shoppers, and residents of the corridor so that they can move safely and efficiently through the construction zones.
⁴ Provides technical assistance, speakers, training for setting up telework programs through MWCOG in cooperation with local TDM agencies (FFXCO Ridesources).
⁵ Provides sales person resources to assist local TDM agency efforts with public sector agencies for above services.
⁶ Operated through MWCOG. (www.mwcog.org/commuter/Bdy-Grh.html)
⁷ Ridematching database housed at MWCOG. Network members (local TDM agencies) offer commuter and employer assistance using this database. It is currently being revamped and will offer direct on-line matching in the future.
Regional

Metropolitan Washington Council of Governments (COG) Commuter Connections Program: COMMUTER CONNECTIONS is a regional network of transportation organizations coordinated by the Metropolitan Washington Council of Governments (COG), a non-profit. Commuter Connections offers free services to those who work in the Metropolitan Washington area. Among many services, it offers ridematching for carpools and vanpools and administers the Guaranteed Ride Home program. Commuter Connections also helps employers establish commuting benefits and assistance programs, including telework/telecommute programs, for their employees.

Commuter Connections website http://www.mwcog.org/commuter/ccindex.html

Commuter Connections FY 2007 work program http://www.mwcog.org/commuter/Work%20Program%20FY07.pdf

State

Telework!VA: The Telework!Va Program provides incentives for Virginia businesses to establish or expand telework programs for employees. The program goal is to provide more opportunity for participation in teleworking.

It is a program administered by the Commonwealth of Virginia Department of Rail and Public Transportation (DRPT) through the Metropolitan Washington Council of Governments (MWCOG) for northern Virginia companies.

The Telework!Va Program is limited to reimbursement of lease costs and consultant/technical assistance expenses. It reimburses a variable percentage of the lease expense for equipment; telework center space; technical assistance for setting up programs and installing equipment; and provides training for teleworkers and supervisors.

Telework!VA website http://www.teleworkva.org/overview.htm

Virginia’s 511 Traffic and Travel Information: Provides real-time reports of accidents and incidents on highways. http://www.511virginia.org/

Congestion Management Plans (CMP): CMPs are implemented during major construction projects and include TDM measures. A few recent examples of construction projects with significant CMPs are I-66, the Woodrow Wilson Bridge and the Springfield Interchange. In the near future, the CMPs for the Dulles Rail construction and the potential Capital Beltway HOT lane construction are critical to the Tysons area. Due to the overlapping area of these construction projects, the state is initiating a regional CMP effort.

Fairfax County

Employer Services Program (ESP): The ESP provides information and assistance regarding commuting alternatives to employers with 100 or more employees. http://www.fairfaxcounty.gov/fcdot/employer.htm
The RideSources Program: The RideSources Program provides Fairfax County citizens with free information and ridematching services. This is a cooperative program with COG Commuter Connections. [http://www.fairfaxcounty.gov/fcdot/sources.htm](http://www.fairfaxcounty.gov/fcdot/sources.htm)

Community Residential Program (CRP): This program builds partnerships with residential developments to promote use of alternative modes of transportation. [http://www.fairfaxcounty.gov/fcdot/crp.htm](http://www.fairfaxcounty.gov/fcdot/crp.htm)

TDM Consultant Project (Travel Demand Management and Associated Parking Requirements for Transit Oriented Developments and Transportation Management Districts): In 2007 Fairfax County DOT will engage a consultant to examine how to incorporate Travel Demand Management (TDM) as an integral part of the land use and development process in the County. A key aspect of this project is to determine TDM trip reductions and associated parking requirements for Transit Oriented Developments (TOD) and Transportation Management Districts (TMD). The completion of this project will assist the County and DOT staff in optimizing TDM proffers and associated parking requirements for developments including Metro station area developments.

TDM Coordinator: In the FY 2007 budget, the County Board established a TDM coordinator position within the Department of Transportation. The purpose of this position is to focus on TDM proffer development and implementation. This position was filled in October 2006.

Proffers – Proffers are voluntary commitments that a developer makes to offset the impacts of a proposed development. Due to the lack of state enabling legislation for the County to enact an adequate public facilities ordinance, or similar requirements for a new development, the proffer system, which is voluntary, is the primary mechanism by which such contributions are made. Proffers often include monetary contributions toward capital facilities such as schools, parks, roads and other public facilities. To mitigate the transportation impact of a development, proffers increasingly include a TDM plan.

The County is currently using a performance-based approach to TDM plans proffered by developers. That is, a TDM plan may include a range of techniques that may be employed, but the developer has the ability to “mix and match” which ones to use as long as he meets the agreed upon performance goals.

Existing Proffers - The following chart summarizes all Tysons Corner proffers that have a TDM component.

<table>
<thead>
<tr>
<th>Zoning case</th>
<th>Tax Map</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RZ 1980 C</td>
<td>072</td>
<td>29-1 Bus, limo or vanpool service to Dulles and other major arrival points</td>
</tr>
<tr>
<td>RZ 1982 C</td>
<td>056</td>
<td>29-3 Applicant will promote ridesharing and staggered work hours</td>
</tr>
<tr>
<td>RZ 1982 C</td>
<td>057</td>
<td>29-3 Applicant to provide a ridesharing or vanpool program</td>
</tr>
<tr>
<td>RZ 1984 D</td>
<td>049</td>
<td>29-4 Applicant to provide for on-site sale of fare media in dedicated space</td>
</tr>
<tr>
<td>RZ 1984 D</td>
<td>049</td>
<td>29-4 Conduct biennial survey of trips and coordination with DOT</td>
</tr>
<tr>
<td>RZ 1984 D</td>
<td>049</td>
<td>29-4 Triggered on not meeting 20% reduction target and no rail service at time NonRUP &gt; 1,963,474 square feet. Establish &amp; maintain fund for TDM actions subject to replenishment from tenants based on use survey results.</td>
</tr>
</tbody>
</table>
Applicant to provide incentives generally to meet target of "20% mode split goal for SOV": Rideshare program; guaranteed ride home / MetroCheck; preferential car/vanpool parking; reduced rate parking for HOV3; free parking for vanpool; bicycle storage; showers & lockers; and annual surveys to update program based on results.

Applicant must appoint TDM coordinator 60 days after site plan approval.

Provided a special taxing district is created, applicant will provide priority parking for car/van pools.

Provide priority parking for car/van pools; coordinate with County

Establish Shuttle from site to Dunn Loring - shuttle can be discontinued if public transportation service is provided from METRO to location adjacent to property is initiated.

Actions initiated by applicant must include: guaranteed ride home; preferential van/car pool parking with SOV charged market rate and HOV3+ charged half; and shuttle bus to Metro during weekday peak periods unless service to Dunn Loring provided by WAMATA or equivalent.

If applicant or land area is included in Fairfax Square agreements, applicant will provide car/van pool coordination & preferential parking.

A TDM program to meet a 20% reduction target vis-à-vis ITE 6th edition. This includes a TDM coordinator, lit drop, rideshare database and bulletin board coordinated with TYTRAN & DOT, involvement in Guaranteed Ride Home, & premium spaces for car/van pools. Other items include quarterly & annual reports and a possible shuttle bus. Program to be supported by $0.08 per square foot per year.

Penalty payment if 20% reduction not met: $0.035 per sq ft, $50,000 bond to insure payment.

Provide for office lease / purchasers a formal ride-share program with coordinator to encourage such; also distribute public transit information. May coordinate, establish, or participate with other employers in the Tyson's area.

Provision of shuttle bus service, at least hourly for eight hours each weekday; free taxi service or participation in comparable bus service by others may be substituted. Expires if five years have passed from first RUP and 2/3 of unit owners agree to abolish.

Must maintain shuttle bus service 8 trips per day min, or prepaid taxi, or participate in existing service by others. Applicant must create deed covenants for support of shuttle or alternative transit with a requirement of 2/3 majority vote to abolish.

Program to have a 20% reduction target; includes TDM coordinator; bike storage; telecommuting center; two 'level 3' activities per proffer document and annual survey.

Applies when reduction target not met: $40.00 per occupied unit per year. Expires 15 year after last RUP issued.

Applicant to encourage employee participation in TDM.

Applies under development option one only - various TDM programs including shuttle bus.

Applies under development option one only - shuttle bus service will be ended if metro stop constructed adjacent to site.

A literature drop TDM only; low priority.

New Proffers - PB Placemaking should review both of these TDM proffer documents.

MetroWest – See [http://www.restondigital.com/tysons/tdmlinks.html](http://www.restondigital.com/tysons/tdmlinks.html) (see attachment D)

Tysons Corner Center – See [http://restondigital.com/tysons/tdmlinks.html](http://restondigital.com/tysons/tdmlinks.html) (see attachment E)
Tysons Area – The Tysons Transportation Association (TYTRAN) is a non-profit membership transportation management association that seeks to achieve an effective and coordinated transportation system within the Tysons Corner Urban Center that supports the community’s economic prosperity and quality of life. TYTRAN accomplishes this through advocacy for transportation improvements and appropriate development policies, implementation of transportation demand and system management strategies and coordination of like-minded public and private organizations. TYTRAN’s programs include, but are not limited to, the TYTRAN commuter program, area-wide and employer TDM programs and services, meetings and forums, and a legislative program.

Northern Virginia Transportation Commission – Commuter info (www.thinkoutsidethecar.org/info.asp)

Business -
Nuride – automated ridesharing system (www.nuride.com)
Zipcar – in the Ballston Corridor (www.zipcar.com)
Flex Car – the nearest location is West Falls Church (www.flexcar.com)
ATTACHMENT B

SPECIFIC TDM STRATEGIES

The TDM Subcommittee has also reviewed numerous TDM strategies. These strategies have been grouped into the following six categories:

Alternative Mode Support Strategies
Worksite-Based Strategies
Land Use Strategies
Programmatic and Policy Support Strategies
Telecommunications Strategies
Pricing Strategies

Alternative Mode Support Strategies
Many of the above activities should be coordinated by the Transportation Coordinator for Tysons. A well-funded, proactive transportation management group like TYTRAN would be the logical umbrella organization. Many examples of transportation demand management organizations exist in the region, including LINK of Reston and DATA (Dulles Area Transportation Association). PB Placemaking should determine when these organizations have been effective, and when not effective, determine why not.

Public Education and Promotion - Marketing plays an important role in dissemination of information about options for travel. Commuter Connections, a regional network of transportation organizations coordinated by the Metropolitan Washington Council of Governments, conducts public education and promotion campaigns in the Metro DC area.

These efforts can be used to encourage those people who don’t normally think to use alternate modes to use them for some of their trips. Effective publicity stresses the importance of using alternate modes and tries to reduce the stigma sometimes associated with using public transit, walking, and biking. Promotional materials should be widely available and provided to all employers.

Ridematching Services – TYTRAN currently uses the Commuter Connections car and van pool matching service. There is also a Commuter Connections ridesharing bulletin board. A more effective service would allow interactive origin/destination address entry showing prospective, screened applicants. Informal slug lines exist in the area and should be supported and encouraged. Employers should be encouraged to map employee residences (while ensuring privacy) to understand their employee commute regions and to help implement effective ridesharing services. Financial incentives are available to employers and employees. Residents should be encouraged to consider using ridematching services for non-commute trips such as team sports, school carpools, shopping trips for the elderly, and others. Carpooling has developed a negative connotation that needs to be overcome.

Transit Services – Tysons is served by many bus routes. Metro bus routes 28A, 28B, and 3T and Fairfax Connector bus routes 574, 401, and 404 all stop at the Tysons Corner Mall, which is one of the busiest bus stops in the region. TYTRAN provides basic links to Metro bus and Fairfax Connector information.
Dissemination of schedule information (Web, paper, wireless, email alerts) is important, and active encouragement of the use of transit should be part of any program. Access to transit stations needs to be improved (sidewalks, crosswalks, bike routes), as many stations are located on major arterials without sidewalks, bike routes, or proper crosswalks. We need to improve the facilities at bus stops (bus shelters, trash containers and pickup, secure, covered bike parking). More comfortable buses (less noise and pollution, smaller size) and more efficient routes would lead to additional ridership. Bike racks should be placed on buses to help integrate both modes of travel.

A Tysons Transit Pass would allow Tysons residents and employees to travel cheaply using all transit services. Hotel guests could be issued passes upon arrival.

There is also a great need for station centered circulation shuttles as well as shuttle service to Tysons Corner from adjacent communities such as Vienna, McLean and Pimmit Hills.

**Vanpool Services** – TYTRAN provides a link to the Commuter Connections ridesharing service. There are Federal tax and other subsidies available. These subsidies should be publicized by employers. The Commuter Connections Guaranteed Ride Home program can help alleviate concerns that parents and others have about not being able to quickly travel in case of emergencies.

**Custom Transit Services** – There are many existing shuttle buses from hotels/businesses/shopping malls to/from Metro stations and other major destinations. The Holiday Inn provides a shuttle to the Dunn Loring Metro station. The Comfort Inn Tysons provides a free shuttle to Dulles Airport. The Tysons shuttle provides service to the West Falls Church Metro station. The Marriot and the Embassy Suites Hotel Tysons Corner provide a free shuttle to a 3-mile radius of the hotel. Tysons Corner Doubletree provides a free shuttle to Metro.

These services will need to be expanded and coordinated when Metro comes to Tysons. The shuttles need to be frequent and direct. Residents and employees should be surveyed to determine what trips could be taken by shuttle that would otherwise taken by personal vehicles.

**Non-Motorized Support** – Despite the fact that Tysons is surrounded by the Dulles Toll Road, I-495, Route 123 and Route 7, there exist a number of ways to bicycle to and through Tysons from surrounding areas, mostly using existing roads. These routes should be mapped and publicized. Bicycle advocacy groups such as Washington Area Bicyclist Association and Fairfax Advocates for Better Bicycling are available for providing information about routes and resources.

For pedestrians, while there are a number of sidewalks in Tysons, many are not connected and those that exist often do not provide a direct route to destinations. Pedestrian crossings of the major roads are dangerous or non-existent. Most office buildings were developed with only motorized access in mind. Pedestrian and bicycle connections to the street are usually via these motorized access routes, not the more direct routes. These direct ped/bike routes to the street are sometimes prevented due to landscaping or fencing.

Safe routes to Metro stations and other locations throughout Tysons are needed. This includes trails, sidewalks, marked bike lanes, and signed bike routes. The built environment should...
include interesting sights and locations along pedestrian routes that encourage walking. The street network should consist of “Complete Streets” which routinely accommodate travel by all modes. Bicyclists and pedestrians need not compete for offroad space on sidewalks and trails if bicyclists are comfortable riding on the road, which is usually the safest and most direct method of bicycle travel.

Covered, secure bicycle parking, safe crossings of major roads, including new bridges over I-495 and Dulles Toll Road, and access through surrounding neighborhoods are needed. Bike rental or loans could be provided, including very short-term rentals to facilitate trips to/from Metro from nearby locations. Bikes could be rented using a credit card or special bike rental card. Rental rates would be low, possibly subsidized by the county and developers. See the Community Bicycle Program link on TDM link page for more information and examples of such programs.

Bike stations should be available for maintenance and storage of bikes during the day, with showers, lockers and changing rooms. Due to the hilly nature of the center of Tysons, some bikes may need to be supplemented with small electric motors.

Secure, covered bike parking, shower and locker facilities and other amenities for cyclists must be provided by employers. Bike to Work Day events can be held to encourage ridership and provide resources for cyclists. Events and campaigns are useful in spreading the word that it’s OK to bike and walk. Bicycle safety and education programs can be coordinated with the bicycle advocacy groups.

Bicycles can be provided by employers to reduce mid-day auto trips. An example is the National Wildlife Federation in Reston which has a fleet of bicycles for employee use.

A multi-modal access guide should be published to inform citizens about how and why to bike and walk to and through Tysons. Maps of access routes, street crossings, public restrooms, bike parking facilities, etc. can be provided. Walking and biking times to/from various destinations can be provided. The guide can be funded by state or federal grants.

The importance of bicycling as a way to quickly evacuate an area when the road network is clogged could be stressed

**HOV/HOT Facilities** – HOV lanes are located on the Dulles Toll Road. There are two studies underway at VDOT for constructing HOT lanes on I-495 and I-66. See TDM link page. These lanes need better enforcement and if congested, the requirements for entry could be increased. High Occupancy Toll lanes are being considered as well.

**Park & Ride Lots** – The TYTRAN, COG and County web sites contain maps of regional park and ride lots.

**Car Sharing** – Flexcar has current locations in East Falls Church, West Falls Church, and Vienna metro stations. The closest Zipcar location is currently along the Ballston corridor. Discussions with these and other firms should be held to investigate innovative uses of their services.

**Worksite-Based Strategies**
On an individual site basis, TDM programs have been found to result in significant HOV use where there is a strong employer commitment to the program. TDM programs could induce a significant shift in travel behavior in the Tysons Corner Urban Center when individual employer TDM programs are coordinated with an area-wide TDM Program.

Work-site based strategies may be provided by developers or employers. All of the work-site based strategies are designed to make forms of public transportation more attractive, provide flexibility in the choice in the mode of transportation and disincentives to driving alone.

The programs can have a direct impact on the number of commuting trips generated by an individual employer, could be implemented with the assistance of a Tysons Corner Urban Center Transportation Management Association and could be monitored effectively at the individual worksite basis as well as area-wide.

**Monetary Incentives** – Monetary incentives generally take three forms, direct subsidies, transportation allowances, and parking cash outs.

Under current IRS rules an employer can provide parking with a market value of up to $165 per month, tax free to the employee. Employers can only provide a transit/vanpool subsidy of up to $65 per month tax free. Any financial incentives given by an employer to commuters who carpool, bicycle, or walk, however, are taxed in full.

Employers can also provide direct subsidies for transit passes. All of these mechanisms give employees a financial incentive to take transit, carpool, vanpool or bike/walk to work. Transit subsidies are only effective in areas with good transit service. While Tysons Corner has good bus service, the Metro will not be available until 2012. A transit subsidy program will not be able to be truly effective until the Metro is operational through Tysons Corner.

However, financial incentives are among the most effective TDM measures and can have a dramatic effect on a company’s single occupant vehicle rate. “COMSIS has estimated that a reduction in trips of between 8% and 18% can be expected at individual employment sites, although this is heavily dependent upon the availability of alternative commute options at those sites. A study of Los Angeles commuters estimates that parking cash-out programs could reduce SOV trips by as much as 24% and a parking cash out program modeled by the Puget Sound Regional Council estimated a 1% to 3% reduction in regional daily work trips.”

**Alternative Work Schedules** – Alternate work schedules include flexible work hours, compressed work weeks and multiple work shifts for certain operation. All employers should be encouraged to implement alternative work schedule options for their employers.

“According to estimates by COMSIS, compressed work weeks reduce not just work trips, but total trips – on the order of 15%. The PRSC, however, estimates that alternative works schedules can only achieve up to a 1% reduction in region-wide VMT and vehicle trip reduction.”

**Guaranteed Ride Home** - Guaranteed ride home is a strategy offered to complement other TDM strategies. Employers “guarantee” some form of transportation to their employees in the event of personal/family emergencies or unscheduled overtime, to ensure that the employees can get home.
Currently there are at least two guaranteed ride home programs available in the Tysons Corner Urban Center. One is operated by the Metropolitan Washington Council of Governments (MWCOG) COMMUTER CONNECTIONS. (www.mwcog.org/commuter/Bdy-Grh.html).

Parking Management - Parking management strategies are designed to impact the availability, cost and location of parking. Parking, although provided free of charge for many commuters in the Tysons Corner Urban Center, does have a cost. Transferring this cost to employees – while giving them the ability to avoid it by using an alternative mode – is among the most effective ways to reduce the use of SOV’s for commute trips.

The County, working with a Tysons Corner Urban Center Transportation Management Association, should review parking requirements in the Zoning Ordinance to consider the full range of parking management strategies and other transportation demand management strategies. Parking management measures include the following:

- Preferential parking for HOVs/vanpools
- Parking cash out programs
- Limiting parking supply
- Parking pricing

“Aggressive parking management programs are possibly the most effective TDM measure an employer can take to reduce SOV travel. Limiting its supply is almost as effective.”

Facility Amenities – Facility amenities include the physical changes that can be made to an employment center to encourage the use of non-SOV modes by employees. Trip generating amenities like daycare, post offices, banks, gyms, restaurants, etc.) should be situated on-site to reduce the need for these trips.

In addition there are also other types of facility amenities that can reduce the need for employees to run errands like using the Internet for dry-cleaning, groceries, and allowing employees to send mail using the Company mail services. Amenities for cyclists like bike racks, showers and lockers are also effective in encouraging bike commuting.

Other facility amenities include: On-site transportation coordinators, preferred HOV parking locations, company vanpools and remote Post Office automated stations to eliminate post office trips.

Transportation Management Associations (TMAs) – Both individual TDM measures, as administered through commitments that are made as a part of the zoning process, as well as an area-wide TDM program, are needed in the Tysons Corner Urban Center as components of a successful public transportation improvement program. A Transportation Management Association (TMA) such as TYTRAN should administer a comprehensive area-wide program and coordinate the TDM actions of individual employers. Because of the public benefit that can be realized through these programs, the County should consider providing public funding to support such efforts.

The implementation of a successful comprehensive area-wide TDM program may require adoption of an ordinance governing such actions so that all property owners will be required to participate, not just properties committing to participation through the zoning progress.
Ordinance requirements may include paid parking, transit subsidies, rideshare matching services, preferential treatment of carpool/vanpools, shuttle bus services to nearby transit transfer stations, guaranteed ride home programs, marketing of commuter assistance programs, and other related measures designed to lessen use of single-occupant vehicles and boost HOV usage during peak commuting periods.

**Land Use Strategies** - Land use strategies are critical to the success of an area-wide TDM strategy for the Tysons Corner Urban Center. The use of a combination of land use strategies coupled with other TDM efforts can have a significant impact on travel need and patterns.

In the Rosslyn-Ballston Corridor of Arlington County, land use strategies have been a major factor in the overall success of its TDM strategy. Its success can be demonstrated through the following facts:

1) Since 1980, employment has increased 2x from 40k to 80k, residential units have increased 2.3x from 12k to 28k, office space has increased 3.5x from 6.5msf to 22.5msf.

2) The Corridor produces 32.8% of the County’s real estate taxes from 7.7% of its land – allowing Arlington to have the lowest property tax of any major jurisdiction in Northern Virginia. There has been an 81% increase in the assessed value of the land.

3) 73.3% of patrons walk to transit, over 61,000 trips daily, 38% of residents near stations take transit to work. 12% of Arlington County households don’t own cars, the regional average is 4%.

4) The traffic counts at five major intersections have increased only 16% from 1980 to 2000 while an 80% increase was projected.

5) Almost 30msf of development has occurred on two square miles of urban land. This development would require 14 square miles of green field land if constructed in a typical suburban location.

**Compact Residential Development** – After increasing or improving the level of transit service, an area’s housing density is the strongest predictor of alternative mode use. Also, research has suggested that increasing a community’s density may even drive the addition of mixed-use development and pedestrian friendly streetscapes, two other land use changes which can further reduce SOV use. Actions include allowing zero-lot line construction.

The time frame for this change to occur can vary as it is mostly influenced by the economy and the real estate market. The proper developer incentives should target key parcels or areas. Density bonuses, provision of upgraded infrastructure and accelerated permitting processes can all be effective incentives.

Increasing transit services is essential to see the benefits from increasing residential density.

“Pushkarev and Zupan state that when density levels approach 30 du/acre, transit demand triples, and at density levels over 60 du/acre, over half of all trips are made using public transportation.”

**Compact Employment and Activity Centers** –

“According to the 1994 study of Puget Sound travel behavior by Frank and Pivo, change from SOV to other modes becomes significant at densities of greater than 50 employees per gross
Acre. At densities greater than 125 employees per gross acre a majority of trips are made using modes other than SOVs.”

**Mixed Land Uses** – A mix of land uses including, but not limited to, commercial, residential, mixed use centers, civic uses and amenities is critical to the success of an urban center TDM plan.

**Connectivity** – Connectivity refers to the network of streets, sidewalks and trails that make it more efficient for a person to travel from one place to another. Improved connectivity can be accomplished by the following; a grid of streets for walking, bicycling and driving which provides numerous route choices, more connections to the regional network, improved connections to transit, improved connections between developments, pedestrian-friendly sidewalks as well as separate non-motorized paths and trails, and onroad bicycle routes

Improving the connectivity of road networks can improve congestion and shorten trips, but is unlikely to actually decrease auto trips. Improving sidewalk connectivity and trails can have a real impact on increasing pedestrian travel and decrease vehicle miles traveled.

**Transit and Pedestrian Oriented Design** – Numerous studies have demonstrated that factors such as safety, accessibility, amenities and aesthetics can all have a significant influence on transportation mode choice. Transit and pedestrian oriented design actions include: prominent crosswalks and complete sidewalk networks, traffic calming measures, landscaping techniques, parking, narrower streets, outward building orientation and zero lot-line frontage

Use incentives such as density bonuses accelerating permit approval for pedestrian friendly design.

**Parking Management** – Parking management refers to actions that affect the supply, location, cost and demand for parking. Strategies include the following: adjust off-street parking requirements, allowing flexible requirements, allowing shared parking, providing joint use spaces for park and ride lots, on-street parking, charging for parking costs, parking lot placement, residential parking permit zones.

**Jobs/Housing Balance** – There are approximately 15,000 residents and 120,000 workers in the Tysons Corner Urban Center. Efforts must be made to correct that imbalance as one of the keys to a successful urban center is a critical mass of residents. Placing housing close to work center is an extremely effective TDM land use strategy.

**Affordable Housing** – Housing must be available at all price points in the Tysons Corner Urban Center.

Please refer to the report from the Tysons Land Use Task Force Affordable Housing Committee.

**Programmatic and Policy Support Strategies**

**Trip Reduction Ordinances (TROs) and Programs** - Some states and localities have TROs. They can apply just to employers or be broader in coverage. The County is negotiating trip reductions, such as with Macerich and MetroWest, but it is done on a proffer basis and thus
applies only to those coming before the Fairfax County Planning Commission and the Board of Supervisors on a plan amendment or zoning change.

If there were a desire to have a TRO for Tysons, the following determinations and decisions would have to be made:

what state enabling legislation would be required;
who would be covered;
what would be the requirements;
what enforcement or penalties would there be;
what role would the County play in facilitating the implementation.

**Access Priority/Restriction** - These are carrot and stick approaches to get people to change behavior. These include things such as lanes or parking spots for HOV or van pools and limiting the number of parking spaces not for HOV or van pools. Much of this would apply to broader geographic areas and not be Tysons specific. Some of those are being implemented, such as the HOT lanes on the Beltway.

One thing that could be considered for Tysons is limiting parking spaces to encourage use of travel options other than SOVs. Something such as a parking district or parking authority could be considered for Tysons. Because of differences in history, use, and proximity to the rail stations, significant effort would be required to fashion something that would be effective and also be saleable.

**Support of New Institutional Relationships** - Transportation Management Associations (TMAs) are addressed in Employment Site Based Strategies. A Transportation Management District (TMD) could be created for Tysons. It could have responsibility for a variety of things from parking to shuttles to some of the things TYTRAN does or could do. Enabling legislation could be required to establish a TMD.

**Establish a Transportation Management District** – Tysons, or part of Tysons, could be designated as a transportation management district (TMD). Within the transportation management district, there could be both controls, such as limitations on parking spaces or use of parking space, and programs, such as operation of shuttles. Determinations would have to be made about what the limitations and responsibilities would be, who would operate the TMD, and how the costs of operation would be covered.

**Restrictions on SOV parking spaces within parts of Tysons Corner** – Limitations could be placed on the number and use of parking spaces within designated parts of Tysons Corner. These restrictions could be governed simply by ordinance, by a parking authority that would have responsibility for parking but not for other things, or by an entity operating a transportation management district. There are cost to operate either a parking authority or a transportation management district but such structures also provide greater flexibility, can be more responsive, and can provide an opportunity for those controlled to be directly involved in operations.

**Telecommunications Strategies**

These strategies utilize modern communications technologies, principally the Internet, to reduce the need for vehicle trips. While the primary impact is on commuting trips, they also have the
potential to reduce non-commuting trips. Except for telecommuting/telework, there is limited documentation on the effectiveness and implementation of telecommunications strategies.

Telecommuting/telework - Networked computers allow employees to work at home or another site, such as a telework center, rather than regular place of work. Vehicle trips can be significantly reduced for both residents of Tysons Corner and employees of businesses located in Tysons who can utilize this strategy. Telecommuting is particularly attractive to workers with longer distance commutes, so reductions in vehicle miles traveled is relatively high.

There will be, however, limitations to the use and benefits of telecommuting at Tysons. The vision of Tysons as a location where individuals both live and work reduces the need and opportunity for telecommuting. In addition, some categories of employees, such as service workers are required to be on-site, and will not be able to participate. Some employers may resist a telecommuting program due to concerns about potential loss of managerial control. Significantly, telecommuting will not have any impact on non-commuting trips, e.g., trip generation from business clients and retail and entertainment clientele or personal trips by residents. Non-commuting trips can represent 70 percent or more of total vehicle trips.

Although the application of telecommuting/telework will have some limitations, consideration should be given to providing the necessary infrastructure so they can be used where appropriate. For example, both residential and commercial development could be wired for Internet and other telecommunications services during construction. In addition, the feasibility of telework centers in Tysons could be explored with the U.S. General Services Administration and other organizations.

Other Strategies - Other telecommunications-based strategies focus on trip reduction thru Internet shopping, service transactions (e.g., Tele-shopping, Tele-banking, Electronic Government), and distance learning. Limited research has been done on the impact of Internet commerce. Given the lack of information, along with the fact that most of these services are market based and beyond control of developers or the County, these strategies may not be significant factors in a Tysons TDM Plan. Nevertheless, they might be included in the Public Education Program under “Alternative Mode Support Strategies.” In addition, the County may consider investigating expanded opportunities for residents to conduct business over the Internet.

Pricing Strategies
Pricing strategies use financial incentives and disincentives to influence transportation decisions. Many of these are controversial; some would require new authorities.

Parking Pricing - In certain situations a fee, such as a tax on parking spaces or a charge for parking, can be imposed on all parking spaces as part of a TDM strategy. Parking fees are also a revenue producer, although as much or more revenue could potentially be lost from decreased economic activity. While meters for street parking and paid parking at public or commercial parking garages may be feasible at Tysons, fees or taxes on shopping center surface parking and employee parking would be difficult to implement. Such fees would be controversial and likely opposed by property owners and developers, as well as shoppers, employees, and residents. Potential spill-over parking will be an issue with adjoining residential neighborhoods. Implementation of a fee would require [a special tax district?].
Parking Pricing is just one potential technique of a total Parking Management Program that discourages excessive parking supply and demand, and makes more efficient use of existing parking. Parking Management also includes such techniques as shared parking, parking “cash out,” more accurate and flexible parking minimums and maximums, and car sharing programs that allow members to reserve and drive a car whenever they want, eliminating the need for owning a car and an associated parking space. Parking Management efforts should be coordinated with County staff currently working on parking minimums and maximums.


**Gasoline Tax Increase** - Fuel is the largest and most visible auto operating expense. A gas tax (or applying the general sales tax to fuel) would make other transportation modes more competitive with automobile travel, as well as providing additional revenue to the County. Reduction in fuel usage would also reduce dependence on imported oil and reduce pollution. However, a significant tax would be needed to impact travel behavior. Even then, the desired traffic reduction may not be achieved, as drivers may switch to more fuel-efficient cars rather than drive less, or purchase fuel in neighboring jurisdictions. Implementation of a fuel tax would require [what authority would County need or what action would it have to take?].

**Road/Congestion Pricing** - Road pricing imposes a fee for traveling on a specific road. The most common road pricing application is a toll road, which can include HOT lanes (HOV lanes available to low occupancy vehicles if a toll is paid). Tolls can also be charged for driving in a particular area, usually a city center. Some area tolls only apply during peak periods. Congestion pricing is a variation on the toll theme, using variable pricing (higher prices under congested conditions and lower prices at less congested times and locations). As the name suggests, congested pricing is intended to reduce peak-period vehicle trips.

A Vehicle Miles Traveled (VMT) tax would, as the name suggests, charge drivers based on miles driven. In locations where it has been used it usually replaces registration and fuel taxes. Implementation would be costly, as GPS equipment for each car would be required to track mileage. Privacy issues would be raised by tracking the use of vehicles.

Like gasoline tax increases, road/congestion pricing and a VMT tax may be more suitable as County-wide or regional TDM approaches.

There are also traffic control systems in place in London, Rome and Stockholm. Stockholm and London use similar “congestion pricing” systems where drivers are charged different amount depending upon the time of day and their location. The project is essentially a ginat behavior-control experiment designed to distribute traffic more efficiently throughout the day and to spur more people to take public transportation.
The TDM Subcommittees report relied on the review of numerous sources, many of which are listed below. Much of what is contained in the report is not original thought and is taken directly from these sources.

**REFERENCES**

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17. Parking Management Best Practices, Todd Litman, October 2006 Planning Magazine

19.  Breaking the Code: 12 Code Obstacles to Smart Growth and What Cities are Doing to Remove Them, Jeffrey Tumlin, Tyson’s Corner, November 2005

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Report Assesses Transportation Demand Management at Fairlee/MetroWest Development

A report by UrbanTrans Consultants assessing Transportation Demand Management, or TDM, for the Fairlee/MetroWest development, which is within the Vienna Metrorail Station area, was released today by the Fairfax County Department of Transportation. The study was to determine if the reductions in peak hour traffic as outlined in the Fairfax County Comprehensive Plan for the Fairlee/MetroWest development were achievable.

According to the report: “The research and analysis elements of the Fairlee/MetroWest TDM Development Program conclude that the trip reduction targets for the proposed project (peak-hour vehicle trip reductions of 47 percent for the residential uses and 25 percent reduction for the office uses) can be achieved through a combination of the physical design characteristics of the site, as proposed, and the full application of the TDM programs and strategies recommended in this document.”

UrbanTrans Consultants further stated: “The trip reductions, however, remain aggressive targets. The development of the TDM program recommendations and the trip reduction analysis conducted for this effort considered the project as a whole, with the full level of development planned; the mix and quantity of residential, office and retail uses proposed; and the pedestrian-friendly design of the site as planned. All of the design elements of the proposed project, along with the recommended TDM strategies (programs and budget levels), must work collectively to achieve the trip reduction targets. With all elements in place, however, trip reductions should prove sustainable.”

In December 2004, the Fairfax County Board of Supervisors approved a change to the county’s Comprehensive Plan for certain land units within the Vienna Metrorail Station area known as Fairlee/MetroWest. One element of the revised Comprehensive Plan language pertains to TDM, or strategies aimed at reducing traffic from the development site. TDM includes alternatives to driving alone, such as ridesharing, public transit, walking and biking, as well as the supporting strategies that encourage the use of transportation modes other than the single occupancy vehicle.
Report Assesses Transportation Demand Management at Fairlee/MetroWest Development (cont.)

“In general,” states the Comprehensive Plan, “at build out, it is expected that, for the residential portion of the development, a reduction in peak hour trips of 47 percent should be achieved through the use of transit and other means; for the office portion of the development, a peak hour reduction of 25 percent is expected to be achieved through the use of transit and other means.”

It is expected that the Fairlee/MetroWest development applicants will use the information from this report to prepare a draft proffer package and TDM program for the county to review that addresses the need for transportation alternatives and trip reductions for the site.

An advisory team with representatives from the community, county government and the development applicant provided background information and feedback during the development of the report.

The full report is available at www.fairleemetrowest-tdm.com. For further information regarding the report, contact Kevin Luten or Justin Schor with UrbanTrans Consultants at 202-248-1790 or Angela Rodeheaver with the Fairfax County Department of Transportation at 703-324-1100, TTY 711.

###
Fairlee - MetroWest
TDM Development Program

Prepared for:
Fairfax County

Prepared by:
UrbanTrans Consultants, Inc.
Washington, DC

with

LDA Consulting
Washington, DC

July 2005
# Fairlee-Metro West TDM Development Program

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Project Background

In December 2004, the Fairfax County, VA, Board of Supervisors approved a change to the County’s Comprehensive Plan for certain land units within the Vienna Transit Station Area. The plan change was made in order to provide the opportunity for mixed-use transit-oriented development (TOD) at the Vienna-Fairfax-GMU Metro Station.

The December 6, 2004, Board Motion notes:

“TDM measures employed during the initial and subsequent development phases will have an objective of reducing vehicular trips in the peak hours by a specified amount, with the exact number to be negotiated between the County and the applicant based upon the number and types of units and uses being developed. In general, at build out, it is expected that, for the residential portion of the development, a reduction in peak hour trips of 47% should be achieved through the use of transit and other means; for the office portion of the development, a peak hour trip reduction of 25% is expected to be achieved through the use of transit and other means.

“The TDM program will be evaluated initially in at least three stages during the development process; first at the time of rezoning, second before and during construction and third after project completion or ‘build out.’ In the first stage of evaluation, at the time of rezoning, a development application should demonstrate that TDM [measures] will be provided to achieve the peak hour trip reduction goals stated above.”

Following the December 6, 2004, action by the Board of Supervisors, the Fairfax County Department of Transportation, through Pulte Home Corporation, solicited Requests for Proposal from qualified applicants and/or firms to develop TDM program recommendations for the proposed Fairlee/MetroWest project, and to evaluate the peak period vehicle trip reduction potential of the proposed project (with the inclusion of the TDM program recommendations). The project was not intended as a comprehensive traffic impact study addressing broader traffic or transportation issues beyond the proposed development site.

After reviewing submitted proposals, and following interviews with a number of firms, UrbanTrans Consultants (along with subcontractor LDA Consulting) were selected.

Fairfax County assembled a TDM Program Advisory Team to guide the effort in partnership with the UrbanTrans team. Members of the Advisory Team are indicated at the beginning of this document.
Project Overview

This Final TDM Development Program document summarizes the process used, as well as the results generated, from nearly three months of research and analysis. The research process involved conducting five research and analysis tasks:

1) Forecasting peak-period vehicle trip generation for the proposed development using established ITE and Fairfax County trip generation rates.

2) Assessing existing commuting / travel patterns, along with transportation-related attitudes and preferences, within the existing Vienna Transit Station Area (the area defined by the Fairfax County Comprehensive Plan as an approximately ½-mile radius from the transit station). Methods utilized included:
   a. Resident & Employer Surveys: Surveying residents and employees in the study area to assess their attitudes and preferences about travel choices and to understanding current travel behavior and demographic information.
   b. Traffic Counts: Counting vehicles entering/exiting existing subdivisions, and observing vehicle occupancy during the peak periods.
   c. Census Analysis: Utilized 2000 Census and Journey to Work data, along with supplemental 2005 demographic data, to understand demographic and household information and commute patterns, for the ½-mile radius Vienna Transit Station Area.

3) Investigating TOD “best practices” and lessons-learned throughout the region and across the country.

4) Understanding current TDM programs offered within Fairfax County as a whole, and identifying opportunities and barriers to successful TDM implementation at the Fairlee/MetroWest site.

5) Meeting with, responding to, and receiving input/suggestions from neighborhood groups and residents within the study area. The project team held six meetings in two months with neighborhood members, including a community open house held on June 1.

The Advisory Team used the information gathered from these research tasks to develop specific TDM program recommendations for Fairlee/MetroWest, and to forecast peak period vehicle trip reduction resulting from the combination of the proposed mixed-use, transit-oriented development, and the recommended TDM program for the development.

Lastly, the team developed an on-going monitoring and evaluation program, along with supplemental TDM strategies for future implementation should monitoring systems find trip generation in excess of target levels (utilizing target ranges and strategies tied to project phasing). Detail on the research and analysis is included in the pages that follow. Back-up information is included in referenced Appendices.
Baseline Trip Generation

UrbanTrans forecasted peak-period vehicle trip generation for the project site using established ITE and Fairfax County trip generation rates. Fairfax County provided detail regarding quantity and type of land uses proposed for the Fairlee/MetroWest project (including delineation of ownership versus rental units, number of buildings, and number of floors per residential building). For all trip generation analysis conducted in Fairfax County, Fairfax County directs the use of generation rates developed by Fairfax County for townhouse residential uses, and the use of ITE rates for all other residential land uses. This county-wide policy was followed in this baseline assessment.

The table below displays weekday, AM and PM peak-hour, vehicle trip generation calculations for the residential and office components of the proposed Fairlee / Metro West development. This represents the baseline trip generation calculation, and does not factor in potential vehicle trip reduction associated with the site’s transit proximity, mixed-use, or transportation demand management elements.

### Table 1: Baseline Trip Generation Summary

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Land Use Type (ITE)</th>
<th>Size</th>
<th>Units</th>
<th>WEEKDAY AM PEAK HOUR</th>
<th>WEEKDAY PM PEAK HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IN</td>
<td>OUT</td>
</tr>
<tr>
<td>Residential (222)</td>
<td>High Rise Apartment</td>
<td>900</td>
<td>DU</td>
<td>68</td>
<td>203</td>
</tr>
<tr>
<td>Residential (230)</td>
<td>Residential Condo / Townhouse</td>
<td>848</td>
<td>DU</td>
<td>55</td>
<td>234</td>
</tr>
<tr>
<td>Residential (232)</td>
<td>High Rise Condo / Townhouse</td>
<td>122</td>
<td>DU</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>Residential</td>
<td>Townhouse*</td>
<td>160</td>
<td>DU</td>
<td>10</td>
<td>44</td>
</tr>
<tr>
<td>Residential Totals</td>
<td></td>
<td>2,248</td>
<td>DU</td>
<td>166</td>
<td>620</td>
</tr>
<tr>
<td>Office</td>
<td>(710) General Office</td>
<td>300,000</td>
<td>Sq. Ft.</td>
<td>398</td>
<td>54</td>
</tr>
</tbody>
</table>


* Townhouse rates obtained from Fairfax County Department of Transportation.

With the applied vehicle trip reduction targets, the following summarizes the baseline numbers:

### Table 2: Baseline Trip Generation and Target Reductions

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Size</th>
<th>Baseline (peak-hour vehicles)</th>
<th>Reduction Required (peak-hour vehicles)</th>
<th>Target (peak-hour vehicles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>2,248 units</td>
<td>904</td>
<td>Residential - 47% Office - 25%</td>
<td>479</td>
</tr>
<tr>
<td>Office</td>
<td>300,000 sq. ft.</td>
<td>452</td>
<td></td>
<td>339</td>
</tr>
</tbody>
</table>
Current Travel Patterns & Preferences
The team used multiple methods to better understand current travel patterns and traveler attitudes and preferences with the Vienna Transit Station Area.

- Resident & Employer Surveys: Surveying residents and employees in the study area to assess their attitudes and preferences about travel choices and to understanding current travel behavior and demographic information.
- Traffic Counts: Counting vehicles entering/exiting existing subdivisions, and observing vehicle occupancy during the peak periods, and comparison of traffic counts to ITE/Fairfax County trip generation forecasts.
- Census Analysis: Utilized 2000 Census and Journey to Work data, along with a 2005 demographic assessment (Claritas, Inc. SiteReports, June 2005), to understand demographic and household information and commute patterns, for the Transit Station Area and surrounding areas.

Resident & Employee Surveys
To better understand dynamics within the existing Transit Station Area, the team conducted two surveys. One survey was conducted with residents living near the Fairfax/Vienna Metro station. A second survey was conducted with employees who worked near a Metrorail station. The surveys were performed for two primary purposes:

1. To present a “snapshot” of current commute travel patterns in the Fairfax/Vienna Metro Station area.
2. To identify transportation-related attitudes and preferences, as well as station area household and demographic data, to help inform the development of TDM strategies and trip reduction analyses.

The first step involved discussing and finalizing the travel survey process with the Advisory Team, and assembling a Travel Survey Group consisting of citizen representatives from the area to be surveyed. After receiving the approval of the survey process, the Advisory Team drafted survey instruments for employee and resident surveys. The survey instrument (questions and layout) were discussed with Advisory Team and the Travel Survey Group and revised per suggestions made by both groups.

Upon receiving approval from the Advisory Team, the design of both hard copy and web-based surveys was completed. The online travel surveys included both employee and resident surveys which were tested and revised before being posted to the project website. Hard copy resident surveys were designed, printed and distributed to 3,700 households. This involved printing 7,400 hard copy resident surveys, each with an individual identification number, as well as sorting mailing addresses for the transit station area (approximately ½-mile radius from the station), affixing postage to the surveys, preparing a pre-paid return postage identifier and system, and sorting and delivering hard copy surveys to the US Postal Service for delivery. Due to the nature of
the survey mailing area (defined around USPS Zip+4 boundaries), 14% of survey respondent live outside of a ½-mile radius from the transit station.

The Advisory Team took additional measures to ensure the hard copy surveys were effectively distributed and completed. This involved following up with area Home Owner’s Association (HOA) groups to confirm deliveries, hand-delivering surveys to two locations where surveys were not initially received, and cross-referencing mailing addresses for consistency. It also involved coordinating with HOAs to distribute prepared emails and flyers for use in communicating with their members about the survey. Additional communication with HOAs was done in coordination with the Supervisor’s office to ensure maximum survey completion rates.

For the employee survey, three employers within ½-mile of a suburban Metrorail Station were identified and asked to assist in distributing information about the travel survey to their employees. Within ½-mile of the Vienna Metro Station, ICF Consulting (photo, left) is the only employer who was surveyed. In order to provide comparable results to that of ICF Consulting, employees from Serco and L3 Communications were selected to be surveyed due to their proximity to the Dunn-Loring/Merrifield Metro Station, which is also on the Orange Line and suburban in nature. The employee survey was conducted entirely online, with no hard copy surveys distributed.

**Survey Findings**

For the resident survey, the exact number of qualified respondents within these households is not known. However, the 2005 demographic data for the ½ mile radius Transit Station Area indicates that approximately 20% of the households within this area have only one person, while the remaining households consist of two or more. Assuming that most of the two-plus-resident households consist of two adults, the consulting team estimated the number of qualified respondents at approximately 6,600. The response rate for the resident survey was approximately 7%, with 482 residents responding. The response rate for the employee survey was 10%, with 148 employees responding.

Because these samples did not constitute random samples (nor were they intended to, as part of the survey design), it was not possible to compute precise confidence levels for the survey results. However, for the resident survey, the analysis of survey results compared demographic and travel pattern results against data from the 2005 Demographic Data (Claritas, 2005) and other published statistics as were available to
validate the responses from the survey. Demographic distributions for the survey sample very closely tracked the distributions for these other sources, suggesting the respondents were similar in primary characteristics to what would have been expected for the entire sample frame. Additionally, residents within the survey area are relatively homogenous in key demographic characteristics. With the survey respondent demographic profile consistent with the known 2005 demographic data, and the homogenous nature of the survey population, the survey results provided a high-level of value in understanding the travel patterns and attitudes/preferences.

Key findings of the **Resident Survey** included:

- Table 3 presents mode shares as a percentage of weekly commute to work trips. This table includes both the traditional types of transportation: drive alone, Metrorail/train, carpool/vanpool, bus, and bicycle/walk, and two additional categories – compressed work schedule day off and teleworking. These are not actually travel modes but are included to show the percentage of weekly work trips that were eliminated through use of these work schedule options.

<table>
<thead>
<tr>
<th>Transportation Type</th>
<th>Percentage of Weekly Commute Trips</th>
<th>Average Days Used per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive alone</td>
<td>51%</td>
<td>4.4</td>
</tr>
<tr>
<td>Metrorail/other train</td>
<td>36%</td>
<td>4.0</td>
</tr>
<tr>
<td>Carpool/vanpool</td>
<td>7%</td>
<td>3.2</td>
</tr>
<tr>
<td>Bus</td>
<td>3%</td>
<td>3.4</td>
</tr>
<tr>
<td>Bicycle/walk</td>
<td>1%</td>
<td>2.5</td>
</tr>
<tr>
<td>Compressed work schedule day off</td>
<td>1%</td>
<td>1.1</td>
</tr>
<tr>
<td>Telework/work at home</td>
<td>2%</td>
<td>1.5</td>
</tr>
</tbody>
</table>

- The mode distribution shown above is for all employed respondents. But the mode distribution was different for respondents who worked in different states. As shown in Table 4, 80% of respondents who worked in Virginia and 68% of respondents who worked in Maryland drove alone to work. By contrast, only nine percent of respondents who worked in the District of Columbia drove to work; 77% of these respondents chose Metrorail. About 1/3 of all respondents worked in Washington, DC.
Table 4: Primary Commute Mode by Work Location

<table>
<thead>
<tr>
<th>Commute Mode</th>
<th>Virginia (n= 202)</th>
<th>Maryland (n=19)</th>
<th>DC (n=120)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive alone</td>
<td>80%</td>
<td>68%</td>
<td>9%</td>
</tr>
<tr>
<td>Carpool/vanpool</td>
<td>4%</td>
<td>5%</td>
<td>9%</td>
</tr>
<tr>
<td>Metrorail</td>
<td>13%</td>
<td>16%</td>
<td>77%</td>
</tr>
</tbody>
</table>

- 40% work a flexible schedule – that is, they can choose their start and end times as long as they work a required number of hours in a day or week. TOD research has shown availability of a flexible work schedule as a key determinant of transit ridership (Lund, 2004).
- Of respondent who use Metrorail to go to work, a large majority (88%) walk to the station. Only about seven percent of respondents drive alone and park.
- Respondents traveled on average 13.1 miles and 35 minutes to work. The distance was less than the regional average of 16.5 miles one way, but the time was about the same as the 34 minute average for the region in 2004.
- Respondents generally have good access to transit at their work location: 52% work within 10 minutes walk of a Metrorail station and 60% work within 10 minutes of a bus stop.
- More than half (56%) have free parking at work. The remaining 44% pay a fee to park.
- About four in ten (44%) respondents said their employers offer discount transit passes or will reimburse part of their commute cost.
- Respondents who said they drive alone were most likely to have free parking at their worksites:
  - 84% of these respondents said they did not have to pay to park.
  - 13% of respondents who primarily use Metrorail to get to work had free parking available at their work location.
- About two-thirds of respondents who primarily used Metrorail said their employers offered financial incentives, other than for parking. But only about one-quarter (27%) of respondents who drove alone could receive a financial incentive.
- 78% of all respondents made one or more non-work trips in the two workdays preceding the survey. Most (67%) of these trips were made by driving alone. About 27% were made by driving or riding with someone (carpool).
- Demographics:
  - About half (48%) of the respondents said two people live in their household. About a third (36%) said they have three or more people in the household. The remaining 16% said they live alone.
  - Most (62%) of the respondents said they do not have any children under 16 in the household.
Fairfax County
Fairlee-MetroWest TDM Development Program

- About one-third (34%) of the respondents said they have one vehicle (car, truck, SUV, van, motorcycle) in their household. Most (64%) said they have two or more vehicles. Only two percent said they do not have any vehicles.
- About half (47%) of the respondents were between the ages of 25 and 44. About a third (38%) were between 45 and 64. One in ten (12%) was 65 or older.

Key findings of the **Employee Survey** included:

- Driving alone is the most popular commute transportation among respondents, with over more than three-fourths (76%) of respondents using this as the primary mode. The second most popular mode was Metrorail. About one in five (17%) respondents primarily used Metrorail to travel to work.
- Driving alone accounts for about 73% of weekly commute trips for these respondents and Metrorail accounts for about one in five (18%) weekly trips.
- A large proportion (76%) of respondents said they live in Virginia: 48% in Fairfax County and 28% in another Virginia County. About one in ten (10%) lived in the District of Columbia. The remaining 14% lived in Maryland.
- Respondents traveled on average 15.3 miles and 39 minutes to work.
- Nearly all (95%) respondents park on-site when they drive to work.
- About one-third (31%) said they park for free. The remaining 69% said they pay a fee to park, with an average fee of $13.00 per month.
- Most (88%) respondents said their employers offer discount transit passes or offer to reimburse part of their commuting expense. About two-thirds of these respondents (64%) said the employer offers between $31 and $60 per month. Another quarter (23%) said they can receive less than $31.

A complete summary of survey methodology, the survey instruments, and complete survey results are available in Appendix 1: Resident & Employee Survey Summary.

**Census Analysis**
The following information summarizes findings regarding commute mode choice and demographic data for the Vienna Transit Station Area, alongside data for Fairfax County as a whole. Commute mode split information is also included for the area within a 3-mile radius of the Vienna Metro station. All data is from the 2000 Census, including data from the Census Transportation Planning Package (CTPP), which includes 2000 Census Journey to Work data. All data pertains only to residents living within the defined geographies.

Key findings from the 2000 Census data analysis include:

- Transit mode share approximately three times higher within the Transit Station Area than the County as a whole. See summary chart below (Figure 1).
Higher individual income levels, across all modes, with the Transit Station Area. Particularly high income representation among Transit Station Area carpoolers. High-income representation for transit users:
  - 56.7% of Transit Station Area transit riders earn >$50,000 (47.8% County-wide).

Greater representation of residents aged 25-44 within the Transit Station Area, tracking across modes.

Race/ethnicity distribution distinct for carpooling only, in the Transit Station Area and County-wide. No significant race/ethnicity distinctions between the Transit Station Area and the County.

Greater male representation in the Transit Station Area than County-wide across all modes except transit riders.

Lower levels of vehicle ownership within the Transit Station Area, with the largest number of households owning 1 or fewer vehicles being transit riders (39.5% of transit riders with the Transit Station Area own <1 vehicle in their HH).

Residents with the Transit Station Area (65.4%) and specifically transit riders within the Transit Station Area (75.3%) live in households with no children under age 18.
The team also utilized 2000 Census data to assess origin-destination patterns for residents living within a one-mile radius of the Vienna Transit Station Area. The map below displays the density of work locations (the darker the shaded area, the more people that work in these locations). This mapping reveals an existing high concentration of people working in proximity to the existing Metrorail lines, with higher concentrations in Arlington County and Downtown D.C. Additional employment locations include other activity centers within Fairfax County, as well as others along the Metrorail lines into Maryland (such as Bethesda and Silver Spring). This data is consistent with the resident travel survey finding, where 52% of residents reported having access to Metrorail within 10 minutes walk from their work location (Appendix 1, Table 13).

**Figure 2: Work Locations for Transit Station Area Residents, 2000 Census**
Traffic Counts
The team completed manual and machine traffic counts to capture information about existing travel patterns and average vehicle occupancies within the Vienna Metro Station Area.

The Advisory Team identified 13 locations in the study area for machine and manual traffic counts and defined traffic count processes. These locations were reviewed with the Travel Survey Group, who also commented on the processes and helped obtain permission from HOAs for placement of machine counters.

Upon receiving permission from all affected HOAs, the team conducted field visits to finalize exact count positions. Machine counters were then placed at 13 locations for a 72-hour period at each location (Tuesday-Thursday). The raw data collected from the traffic count machines was then used to calculate hourly and daily average traffic volumes for each location.

In addition to collecting vehicle volumes with traffic counter machines, the team conducted manual/visual traffic counts at 13 locations during two, three-hour period for each location (AM and PM peaks). The raw data gathered from manual traffic counts (volumes, occupancy, turning movements) was used to calculate summaries and average vehicle occupancies (AVO).

The team obtained base maps to develop a map of all count locations as well as each specific location. The maps were then used as part of graphic summaries that visually displayed manual and machine counts, vehicle volumes, directions, and AVO for each of 13 locations. Full traffic count summaries are included in Appendix 2: Traffic Counts.

Preliminary data summaries and maps were presented to and reviewed by the Advisory Team, Travel Survey Group, and Open House attendees.

Comparing Traffic Counts to Trip Generation Forecasts
Utilizing the machine traffic count data collected throughout the Vienna Transit Station Area in late April 2005, UrbanTrans attempted to complete a comparison of trip generation forecasts for four station area subdivisions (using ITE/Fairfax County trip generation rates, along with tallies of the number of dwelling units and types of land uses in each existing subdivision) and the machine traffic counts for each of the subdivisions. (The counts for the Hunter's Branch area were not incorporated, since vehicle counts included trips generated from both the residential units and the adjacent office uses at the ICF building.) Sites assessed included:
Vienna Station  
Marquis / Acadia  
Virginia Center/Country Creek Townhouses  
Circle Woods

A direct, accurate comparison of the machine traffic counts and the ITE/Fairfax trip generation forecasts is not possible. This is because the machine traffic counters tallied vehicles at the entry/exit point of a development (referred to as measuring the vehicle trips of a “generator”), and the ITE/Fairfax trip generation rates refer to the vehicle trips forecast for the “adjacent street.” This distinction between “generator” and “adjacent street” numbers does not allow for direct, accurate one-to-one comparisons.

However, there are still several points of note which can be gleaned from this comparison. A closer look at subdivision locations (relative to the transit station), traffic directional flow data, and vehicle occupancy data reveals the following:

- **Off-peak, off-direction (i.e., entering a development in the AM peak period) travel appears to be notably higher that forecasts would suggest.** During the AM and PM peak hours, the traffic count volumes exhibit a relatively high degree of off-peak, off-direction travel, which is indicative of non-commute-to-work travel (travel to schools, retail/shopping travel, etc.). This finding suggests a correlation to the lower (relative to surrounding neighborhoods) commute to work SOV rates found through the resident travel survey (51% of all weekly commute trips by single-occupant vehicle) and the census analysis (66% of daily commutes by single-occupant vehicle). These findings suggest higher levels of alternative mode use for commute to work trips, and lower levels of alternative mode use (thus, higher trip generation) for non-commute to work trips. In fact, the resident survey found that two-thirds (67%) of the non-commute trips made between 6 am and 9 am were made by driving alone (see Appendix 1, Table 15). Taken together, these findings suggest that existing transit-adjacent subdivisions within the ½ mile transit station area are seeing high levels of transit use for commute trips, and high levels of automobile use for other trip purposes.

- **Subdivisions with closer proximity to the transit station produced relatively fewer trips than sites further from the transit station.**

- **Sites with better/safer pedestrian connectivity to the site produced fewer trips than sites with poor/less safe pedestrian connections.**

- **Some, yet not a large number, of vehicle trips may be attributed to residents driving to the Vienna Metro park-n-ride.** In a November 2004 Fairfax County analysis of the home location of cars parking at the Vienna/Fairfax-GMU park-n-rides, the County identified vehicles from both the Virginia Center/Country Creek Townhouses and Circle Woods subdivisions, indicating that some vehicle trip generation from these areas could be attributed to transit riders driving to Vienna Transit Station (though this cannot be confirmed utilizing the data available).
At the Circle Woods count location, an unusually high number of high-occupancy vehicles were observed traveling in the off-peak, off-directions (into the development in the AM peak, out of the development in the PM peak). 35% of vehicles entering the area between 6-9 a.m. had 2 or more passengers, equaling an average vehicle occupancy (AVO) of 1.71 people per car. The AVO at all other count locations in the Transit Station Area fell roughly between 1.1 and 1.3. This suggests a degree of non-typical trip generation may have occurred within this subdivision during the traffic count days.

Current TDM Programs

Identifying opportunities and barriers to successful TDM strategy implementation involved researching and summarizing current TDM programs offered by state, regional, and county TDM providers. The service providers identified include:

- Metropolitan Washington TDM Services
- Fairfax County TDM Employer, Commuter and Residential Outreach
- Fairfax County HOV Lanes
- Fairfax County Current Transit Services
- Fairfax County Park & Rides
- Fairfax County Vanpool Providers
- Fairfax County TDM Organizations
- Virginia Commonwealth-Wide TDM Services

These services were identified as the foundation of TDM programs upon which the MetroWest TDM program would build.

With this foundation laid, the team could proceed with a TDM Opportunities and Barriers Assessment. The assessment considered opportunities and barriers that are part of existing conditions within the Vienna Transit Station Area. Opportunities are best understood as elements which aid and facilitate successful TDM application and barriers can be considered as hurdles to the potential success of TDM measures, if not sufficiently addressed or mitigated with other strategies or recommendations.

The assessment identified six opportunities:

- Existing Mass Transit Network
- HOV Lanes on I-66
- Neighborhood Retail
- Existing Bicycle and Pedestrian Trail Networks & Infrastructure
• FlexCar Fleet at Vienna-Fairfax Metro Station

The assessment also identified four barriers:
• Infrequent headways and limited neighborhood penetration on local bus services
• HOV lanes on I-66 nearing capacity
• Metrorail Orange Line faces capacity limitations during peak periods
• Poor pedestrian/bicycle connectivity between Vienna Transit Station Area and surrounding neighborhoods and neighborhood retail.

The complete summary of existing TDM programs and services, as well the complete analysis of TDM opportunities and barriers is included in Appendix 4: Current TDM Programs, Opportunities, and Barriers.

**TOD Peer Review**

Analyzing what TDM strategies are successfully implemented at TOD sites included investigating “best practices” and lessons learned throughout the region and across the country. The team obtained and reviewed existing TDM and TOD literature sources and prepared a listing of relevant TDM and TOD resources for the project website. UrbanTrans complemented this research with site visits to TOD sites in Oregon, Seattle, and Minneapolis, and used the opportunity to talk with TOD planners at these sites.

The results of the research were a comparison of four national examples of communities and TODs, an examination of their level of transit service, TOD characteristics, mobility programs, and results:
• Pleasant Hill, Contra Costa County, CA (San Francisco)
• Redmond Ridge PUD, King County, WA
• Lloyd District, Portland, OR
• Metropolitan Place, Renton WA

The sites were selected based on multiple criteria:
• Location outside of traditional downtowns.
• Representation of a cross section of TOD attributes of success (see below), where not every peer example exhibited all of the attributes.
• Availability of data on travel patterns and reductions.
The peer comparison looked at both traditional TOD physical attributes of success, as well as TDM attributes of success. The literature review and the case studies reveal a cross-section of TOD “attributes of success” which formed a framework for understanding different TOD characteristics and their relationship to travel demand and trip reduction. The attributes of success framework outlined the following three primary areas of importance:

1. **High-Capacity Transit Service**: Essentially, the existence of strong transit service, typically through light rail or heavy rail transit, with connections to a large number of regional activity centers.

2. **Physical Attributes of Success**: These are the more traditional attributes used in assessing TODs (often called the “Three Ds”), covering the key physical design features of a TOD, including:
   - **Intensity of Uses**. This attribute refers to location of uses within walking distance of the station (typically within ¼ - ½ mile). “At higher densities, use of alternative modes — particularly transit and pedestrian travel — is higher. Per-capita passenger vehicle trips and VMT are lower” (Kuzmyak, 2003). One point of note from the research is that density is often closely related to other factors, such as diversity of uses (as more people can support more retail at a particular location), pedestrian-friendly design, and lower levels of vehicle ownership per household. Figure 3 below illustrates the relationship between daily person trips and density.

![Figure 3: Average daily person trips per person in the United States by mode and density, 1990 NPTS survey](image)


- **Diversity of Uses / Mix of Uses**. This attribute refers to the inclusion of an integrated mix of land uses, such as residential, retail, and employment uses. Diversity of uses is often connected to the intensity of uses, as
noted above, and the impact of mixed-use developments on trip reduction is also linked to pedestrian-friendly design factors. Providing a mix of uses can impact primary mode choice decisions, and can also facilitate bike/walk access to transit (at the origin and/or destination). In one research example, analysis of over 15,000 households in 11 metropolitan areas found that “both land use mix and residential densities are linked with mode choice decisions... The analysis revealed that close proximity of retail uses and residents was associated with non-automotive commuting in two ways — more walking and cycling for short trips and marginally greater transit travel” (Parsons Brinkerhoff, 1996, from Kuzmyak, 2003).

- **Site Design.** This attribute refers to the “pedestrian-friendly” or “transit-supportive” nature of the site design. Design is also linked to both intensity of use and mix of use, as it pertains to how these uses are linked together, and the degree to which design features - such as safe / appealing walking environments (i.e., sidewalks, crosswalks), short block lengths, and direct linkages between walkways and building entrances - support walking and bicycling. Research on the individual impact of these factors, sometimes referred to as pedestrian environmental factors (or PEFs), faces challenges isolating the direct relationship between individual design attributes and travel behavior. A study of two San Francisco East Bay neighborhoods found that transit and pedestrian friendly design features were linked to an increased likelihood of using a non-auto mode for non-work trips of about 10 percentage points (Parsons Brinkerhoff, et al, 1996, as presented in Kuzmyak, 2003). In another effort, the impact of PEFs on travel behavior were modeled for the Portland, OR, region. “These tests suggested that substituting a very pedestrian-friendly neighborhood for one with an average pedestrian environment should result in 10 percent less VMT per individual in an average household, holding everything else constant” (Kuzmyak, 2003).

3. **TDM Attributes of Success:** In addition to the physical attributes, additional programmatic and policy-related factors were added to the analysis of TOD success. These TDM attributes - the “Five Ps”™ - are too often overlooked in traditional assessments of TOD performance. They include the programs and services that can significantly impact travel behavior and vehicle trip generation:

- **Promotion and Marketing** (including individual travel planning). Refers to programs that market available transportation options, as well as educate users on how different options work. Individualized marketing programs (which provide one-on-one travel assistance) have been implemented in Australia, Europe, and the U.S., with SOV trip reductions in targeted communities of between 8 and 14 percent (FTA Press Release, April 2004).

- **Pricing / Incentives.** Pricing and incentives refer to the use of financial incentives and disincentives for different travel options, including subsidies for transit and vanpool fares, reward-based incentive programs, and variable pricing (e.g., pricing which varies by time of day, to encourage
non-peak utilization). A 2001 survey of employees nationwide found that employees who have commuter assistance programs (such as discounted transit passes) were nearly eight times more likely to use public transportation that those employees that did not have such assistance (15 percent versus 2 percent), (Zylo, 2001, from ACT, 2004).

- Parking Management. Parking management refers to the management of parking through supply, pricing, and/or time-based measures. Parking management can also include provision of parking incentives, such as reserved, preferential parking spaces for carpools and vanpools.

- Policies. Policies refer to the existence of an overarching policy framework supporting development and implementation of TDM measures. Such policy frameworks can range in scale from an individual employer (where policies such as flexible work hours or parking cash out programs can support the use of non-SOV travel options), or may relate to an entire region or state (such as the commute trip reduction law in the state of Washington). Figure 4, below, illustrates the impact of employer policies on the percentage of California TOD residents using transit.

![Figure 4: Influence of Employer Policies on Transit Commuting Among Station Area Residents](Lund, 2004)

- Program Management. Unlike the physical attributes, TDM programs require continual implementation. As such, “having someone in charge,” is an essential attribute of success. This can mean a dedicated program coordinator and/or an area transportation management association

Table 5 below demonstrates the degree to which each of the TOD Peer Review sites examined exhibit the various attributes of success, and the available results from each project.
Table 5: TOD Attributes of Success

<table>
<thead>
<tr>
<th>Site</th>
<th>Location</th>
<th>Transit Service</th>
<th>High-Capacity Transit Service</th>
<th>Intensity of Uses</th>
<th>Diversity of Uses</th>
<th>Design / Ped-Transit Friendly Promotion</th>
<th>Pricing / Incentives</th>
<th>Parking Management</th>
<th>Policies</th>
<th>TDM Program Management</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan Place</td>
<td>Seattle, WA</td>
<td>Bus</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>Approximately 33% transit mode share for resident commute trips, about three times higher than surrounding areas.</td>
</tr>
<tr>
<td>Pleasant Hill</td>
<td>Contra Costa County, CA</td>
<td>Heavy Rail - BART</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>49% commute SOV rate for residents. 45% transit use, three times higher than the average rate within the city (Walnut Creek).</td>
</tr>
<tr>
<td>Lloyd District</td>
<td>Portland, OR</td>
<td>Light Rail</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>41% commute SOV rate for employees. 41% of employee commute trips are on transit.</td>
</tr>
<tr>
<td>Redmond Ridge</td>
<td>Redmond, WA</td>
<td>Minimal Bus Service</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>70% commute SOV rate for residents, about 2-3 times higher non-SOV rates than surrounding areas.</td>
</tr>
<tr>
<td>Warner Center</td>
<td>San Fernando Valley, CA</td>
<td>Bus, connections to rail transit</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>Approximately 33% of commuters to the area arrive by non-SOV modes.</td>
</tr>
<tr>
<td>Roslyn-Ballston Corridor</td>
<td>Arlington County, VA</td>
<td>Heavy Rail - Metro Rail</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>42% commute SOV rate for employees working in the 4-station corridor.</td>
</tr>
</tbody>
</table>

○ = Exhibits high level of success factor
● = Exhibits some elements of success factor
○ = Exhibits few or no elements of success factor
While the table outlines the degree to which the case examples exhibit each of the attributes of success, it also, by implication, highlights the degree to which a majority of TOD examples nationwide fail to integrate both the physical attributes and the TDM attributes. This is a clear shortcoming of many TOD projects, highlighting that good design alone is not enough to achieve the highest possible levels of trip reduction. “If You Build It They Will Come” is not the formula for TOD projects delivering on their full potential for reducing vehicle trips.

Conversely, TDM programs nationally have experienced a wide range of implementation success and failure. More often that not, where TDM programs can fall short of expectations, one or more of the following types of elements are missing: available alternatives to the automobile, sustainable program funding, active program management (by a dedicated program manager or organization), or lack of programmatic support by key implementing institutions (i.e., employers).

The team also looked at 2000 Census Data, a publication on travel characteristics of TODs in California (Lund, 2004), and other sources to compare information on Gender, Age, Race/Ethnicity, Income, Vehicles per Household, Ratio of Drivers to Vehicles, and Primary Commute Mode of four different stations and their corresponding County or City census data. Those comparisons included:

- Vienna Transit Station Area (Metrorail) vs. Fairfax County
- Rosslyn-Ballston Corridor (Metrorail) vs. Arlington County
- San Francisco: Pleasant Hill (BART) vs. City of Walnut Creek
- San Francisco: South Alameda County (4 BART Stations) vs. the South Alameda Counties of Hayward, Union City, and Fremont

The summary of this comparison is in Table 6 on the following page.

All of the TOD peer research and comparison data is included in Appendix 5: TOD Peer Research.
Table 6: Demographic & Mode Share Comparison Data for Four Areas

<table>
<thead>
<tr>
<th></th>
<th>Vienna Transit Station Area (MetroRail)</th>
<th>Roslyn-Ballston Corridor (MetroRail)</th>
<th>San Francisco: Pleasant Hill (BART)</th>
<th>San Francisco: South Alameda County (4 BART Stations)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Station Area</td>
<td>Fairfax County</td>
<td>R-B Corridor</td>
<td>Arlington County</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56.3%</td>
<td>54.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>43.7%</td>
<td>45.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65+</td>
<td>2.2%</td>
<td>2.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-64</td>
<td>30.4%</td>
<td>36.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-44</td>
<td>57.6%</td>
<td>50.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-24</td>
<td>9.9%</td>
<td>10.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Race / Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>3.9%</td>
<td>7.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>67.3%</td>
<td>67.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>17.0%</td>
<td>11.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>4.4%</td>
<td>2.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic Origin</td>
<td>7.4%</td>
<td>9.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$75,000+</td>
<td>24.8%</td>
<td>22.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$50,000 - 74,999</td>
<td>27.0%</td>
<td>20.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$30,000 - 49,999</td>
<td>23.9%</td>
<td>23.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$15,000 - 29,999</td>
<td>13.1%</td>
<td>18.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$14,999 or less</td>
<td>11.3%</td>
<td>16.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vehicle per Household</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Vehicles</td>
<td>26.5%</td>
<td>30.0%</td>
<td>6.0%</td>
<td></td>
</tr>
<tr>
<td>2 Vehicles</td>
<td>48.3%</td>
<td>48.3%</td>
<td>21.0%</td>
<td></td>
</tr>
<tr>
<td>1 Vehicle</td>
<td>23.9%</td>
<td>19.3%</td>
<td>56.0%</td>
<td></td>
</tr>
<tr>
<td>0 Vehicles</td>
<td>1.2%</td>
<td>2.3%</td>
<td>17.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Primary Commute Mode</strong></td>
<td>Residents</td>
<td>Employees</td>
<td>Residents</td>
<td>Residents</td>
</tr>
<tr>
<td>Drove Alone</td>
<td>66.0%</td>
<td>73.2%</td>
<td>41.7%</td>
<td>54.9%</td>
</tr>
<tr>
<td>2+ Carpool</td>
<td>9.2%</td>
<td>13.0%</td>
<td>8.2%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Transit</td>
<td>20.7%</td>
<td>7.1%</td>
<td>38.0%</td>
<td>23.3%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>0.3%</td>
<td>0.1%</td>
<td>1.2%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Walk</td>
<td>0.3%</td>
<td>1.4%</td>
<td>8.0%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Telework</td>
<td>2.8%</td>
<td>4.1%</td>
<td>1.9%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

* Age categories for CA examples: Over 50, 36-50, 18-35, Under 18
** Fairfax income based on Individual Income. CA examples based on Household income (categories $100k+, $60-100k, $30-60k, 15-30k, <$15k)

Sources:
Vienna / Fairfax, UrbanTrans, Census 2000 Data
R-B / Arlington, Leach, Reconnecting America Presentation, 2003
CA Examples, “Travel Characteristics of TOD in California,” 2004
Community Involvement

An integral part of the research and analysis processes was making sure that the community was involved every step up of the way. The Advisory Team ensured this occurred by meeting with and receiving input from a number of neighborhood groups in the study area. Those meetings were as follows:

Advisory Team Meetings: April 7, April 21, May 12, May 24, June 9, June 15, June 29
Travel Survey Group Meetings: April 18, May 25
Fairfax County Land Use Seminar: May 2, June 21
Collective HOA meeting: May 12
Town of Vienna Mayor & Council and Staff Meeting: May 19
Community Open House: June 1

The Advisory Team meetings were attended by residents of the neighborhoods affected by the proposed development, Fairfax County staff, Pulte employees, Fairfax County Elected Officials, and staff of the Coalition for Smarter Growth. The Advisory Team was an integral part of the decision making made about the direction of Fairlee-Metro West TDM project.

The Travel Survey Group consisted of members of several HOAs who are impacted by the proposed TOD project. In the first meeting with the Travel Survey Group they provided feedback on resident survey design and gave permission to complete traffic counts in their developments. In the second meeting with the group they provided feedback on the data collected from the resident survey and traffic counts. This group also helped promote the resident survey and Open House meeting to their HOA members by distributing emails and hard copies of a flyer designed by The Advisory Team.

The Fairfax County Land use seminar was a forum for residents to learn about how county land use decisions are made. One of the topics at the May 2 Seminar was the Fairlee Metro West TDM Development project process. The seminar, which had over 100 residents in attendance, had two breakout sessions where attendees could ask more specific questions about the TDM development project. The team presented a second time, as part of the land use seminar series, on June 21.

The Collective HOA meeting was an opportunity for several of the HOAs impacted by the proposed Vienna Metro TOD to learn about the TDM assessment process and make recommendations. The citizen groups in attendance included representatives from Blake Manor, Blake View, Country Creek, Vienna Station, Country Creek-Section 7, Circle Woods, Hunters Branch-Condos, L&M/Popular Terrace, Villa D'Este, Southwest Vienna Citizens Association, Dunn Loring Gardens, Hunter Mill Defense League, and Sierra Club.
A member of the Advisory Team met with the Town of Vienna Mayor, Council and Staff to explain the TDM assessment process and listen to their recommendations for the process.

The Fairlee-Metro West TDM Development Project Open House was held June 1, 2004 from 7:00 to 9:00 p.m. The meeting was held at the Marshall Road Elementary School located at 730 Marshall Road, Fairfax. Thirty one meeting participants signed in, not including staff or consultants. A sign in table was set up at the entrance to the open house and each meeting attendee was provided with a project overview handout and a general comment form.

Three stations, described below, were set up around the room:

- Station 1: Existing Conditions
- Station 2: Existing TDM Programs
- Station 3: TDM Opportunities & Barriers

In addition to comments received from the general comment forms, attendees were given the opportunity to post their concerns on the displays at the stations listed above.

The community was also encouraged to provide their input on the TDM Project, through Advisory Team’s project website (www.fairleemetrowest-tdm.com). The website had links to the survey and an online open house area for suggestions and comments. It included links for meetings and resources.

A full summary of all materials, meetings, and comments is included in Appendix 6: Community Involvement.
TDM Program Recommendations – “MetroWest Connections”

The following TDM program recommendations are for the proposed Fairlee / MetroWest project site. The recommendations are based on (1) the findings of the research and analysis conducted through this project and summarized in the previous sections (including surveys, traffic counts, Census analysis, TDM opportunities and barriers assessment, TOD peer research); (2) national research on travel behavior, TDM programs and program effectiveness, and national TOD experience; and (3) the direct professional experience of the project team in planning, implementing, and evaluating TDM programs nationally.

Recommended TDM strategies are organized around the following areas:

- Parking Management
- Physical Facilities
- TDM Programs & Services
- TDM Program Management
- TDM Funding Mechanisms (as noted, complete budgets pending)

Parking Management

1. For Apartment / Condo Residential Buildings:
   - Limit condo units to one parking space as a bundled asset sold with the purchase of each condo unit. For additional spaces, explore graduated market-rate pricing scale for purchase and/or leasing arrangements for access to spaces in excess of one per unit.
   - For rental apartment units, develop a graduated monthly parking fee scale for all dedicated parking spaces.
   - Provide dedicated, free preferential parking spaces in convenient locations (covered, near entry/exit locations, and close to elevators) for vanpools.

2. For Office Buildings:
   - “Unbundle” leasing and pricing for office space from leasing and pricing for parking spaces.
   - Provide for loading/unloading of carpools and vanpools.
   - Provide dedicated, preferential parking spaces in convenient locations (covered, near entry/exit locations, and close to elevators) for carpools and vanpools.
   - Develop parking rate agreements charging single-occupant vehicles market rate pricing, along with graduated parking discounts:
     - One-half market rate for carpools.
     - No parking charge for vanpools.
     - Develop carpool/vanpool verification and monitoring system linked to identification of employment with a tenant employer.

3. In General:
   - Develop a comprehensive parking management plan that documents the integration of parking management strategies across all site uses, coordinate
with Metro to assess need for measures to discourage use of Metro parking garages by MetroWest users, management of permitted uses in all locations, utilization of market rate pricing for all non-residential spaces, and disbursement of on-street parking meter revenues to the TDM program (additional detail provided in the Funding Mechanism section).

- Provide permanently designated, on-street parking spaces in central locations for:
  - Shared-car vehicles
  - Taxi vehicles
  - Loading / unloading of vanpools. Locate proximate to service-oriented retail locations.
- For all on-site garages (residential and office), ensure that 5% of all spaces provide sufficient clearance for vanpool vehicles (minimum 7’2” clearance).
- Provide parking management by time and price for all on-street spaces.

**Physical Facilities**

1. **Off-Site Pedestrian & Bicycle Connectivity.** Assessment, identification, and upgrades to off-site pedestrian and bicycle crosswalks at two locations (i.e., Blake Lane/Saintsbury Drive, Nutley Street/Lee Highway) to facilitate safe walking/biking between the Vienna Transit Station / MetroWest and surrounding communities, retail locations, and schools. Location and upgrade specifications (i.e., pavement treatments, pedestrian islands) developed under guidance from Virginia DOT.

2. **Retail Mix.** Developer/retail leasing team strongly encouraged to pursue the following retail uses on-site, and to prioritize the location of these uses in initial phasing of residential building construction:
   - Specialty, Small Grocer (e.g., Trader Joes)
   - Child Care (prioritize development of proposed childcare in early development phase)
   - Copy / Shipping Store (e.g., FedEx Kinkos, UPS Store)
   - Dry Cleaning
   - Banking / ATM Services
   - Café / Coffee Shop, Restaurants
   Market the availability of retail services, and the arrival of upcoming new retail tenants, to area residents and employees.

3. **On-Site Wireless Access.** Establish broadband wireless connectivity through the non-townhouse portion of the site.

4. **Bicycle Racks.** Provide sufficient, secure bicycle storage facilities for each condo/apartment building, and at retail locations. Locate racks in prominent locations. Utilize industry standard bike rack designs.

5. **Bike Station.** Integrate bike station into MetroWest Connections store (see Program Management recommendations below). The facility should provide indoor, valet-service parking for bicycles, bicycle support sales and maintenance, and should explore provision of free loaner bikes for project residents. Dedicate free retail
space for this use. Explore opportunities to bid out management of the bike station to interested retailers, using national best practices/experience.

6. **Shower Facilities.** Integrate shower and changing / locker room facilities into office uses.

**Programs & Services**

1. **For Residential Buildings:**
   - Develop target marketing program for new residential sales and apartment rental (programs and methods at developer discretion):
     - Integrate transportation benefit messaging into overall residential product messaging, including “one less car” messaging and education providing details on the benefits of households using TOD amenities and transit services to reduce the need for one household vehicle.
     - Integrate transportation choice information into sales kits.
     - Specifically target marketing of the residential units to (1) existing transit riders, (2) people working along Metrorail lines, particularly along the Orange/Blue lines (not transfer trips), and (3) to full-time teleworkers.
   - Integrate transportation information and education materials, specifically tailored to the site, into residential sales kits and new resident welcome kits.
   - Integrate “personalized transportation advising” into new unit walk-throughs as new residents (ownership and rental) move into new units. This concept involves one-on-discussions with new residents about utilizing transportation options for various trip types - tailored to this specific location. Transition responsibilities from residential sales teams to TDM program manager as project build-out approaches.
   - Distribute SmarTrip cards to all new residents (regardless of age).
   - Provide initial SmarTrip value loading to all residents 16 years or older. To be eligible, residents must participate in a one-on-one transportation advising session and/or visit the MetroWest Connections Store. Explore bundled shared-car membership linkages as part of this process.
   - Pursue on-going SmarTrip value loading as part of specific marketing and reward campaigns.
   - Develop marketing and incentive programs that encourage off-peak vehicle travel, specifically for non-commute trip types (which are often more discretionary). Tailor programs for the age-restricted units encouraging non-peak travel.
   - Develop residential-based vanpool program. Explore use of minivans. Provide vanpool subsidies to make minivan vanpool cost-competitive with full-sized vans offered regionally.

2. **For Office Buildings:**
   - During the leasing phase, and after occupancy, strongly encourage employers to offer the following employee benefits options:
Parking cash out (giving employees the option to choose between the value of a dedicated parking space, tax-free transit or vanpool fares, or taxable cash).

Pre-tax and/or payroll subsidy for transit and vanpool fares (up to the maximum amount allowed under federal law, currently $105/month).

Flex-time and alternative work schedule programs.

Live-near-work incentives.

- Conduct carpool and vanpool formation programs and information programs on site, including providing ridematching services. Coordinate with Fairfax County TDM program managers.
- Communicate and facilitate availability of guaranteed ride home program (offered by the regional Commuter Connections program).

3. In General:

- Safe Routes to Schools. Develop programs to encourage carpooling, walking, and biking to schools, including:
  - “SchoolPool” programs which connect parents with children attending the same schools and assist in coordination of SchoolPool scheduling.
  - Promotion of carpooling, biking, and walking among high school students attending Oakton High School, including education and reward incentives.
  - “Walking School Bus” programs which coordinate parent/child meetings at a central location (on-site retail location, for example), with two parents leading groups of children by bike/walk to school locations (targeted to elementary age students attending Mosby Woods or Marshall Road schools). Coordination of daily/weekly parent responsibility.
  - See “Physical Facilities” for additional recommendations on school routes.

- Shared-Car Programs. Integrate information and marketing materials on shared-car availability and pricing. Work with shared-car providers (e.g., FlexCar, ZipCar) to provide discounted shared-car memberships to interested residents linked to provision of Metro SmarTrip cards. Incorporate shared-car rewards (free hours) into overall rewards program.

4. MetroWest Connections Online. Develop site-specific project website replicating the MetroWest Connections storefront online (either a stand-alone site or as a direct link off of a larger project webpage for residents/employees). Integrate:

- Multimodal transportation information.
- Real-time travel and transit data (i.e., Metrorail train arrival info).
- Explore online transit pass sales and/or SmarTrip value loading (consider options utilizing existing software tools/vendors, e.g., WageWorks, CommuterDirect).
- Provide specific links and resources supporting telework.
Program Management

1. **MetroWest Connections Store.** Provide on-site retail storefront site for TDM program manager. Co-locate with residential sales office during construction phases. Provide information, promotional materials, and one-on-one consultation to all on-site users, for all trip types.

2. **Program Manager.** Designate TDM program manager as central point of contact and lead manager of all on-site programs.

3. **Program Oversight & Coordination.** Establish an Advisory Board to guide the TDM program and activities of the TDM Program Manager. Assemble the Advisory Board as needed (likely quarterly). Participants for the Advisory Board, and for overall program coordination, should include the following designated contacts:
   - Office tenant contacts and/or office property manager contacts.
   - Individual and umbrella HOA “transportation” contacts (invite each HOA to designate a transportation liaison).
   - Fairfax County TDM Program Representative. Ensure maximum coordination and economies of scale by partnering closely with Fairfax County TDM program managers, while maintaining the site-specific, tailored nature of MetroWest information and materials.
   - Others as appropriate.

4. **Residential Sales Team / Rental Leasing Agents.** Provide sufficient training for sales and leasing teams to serve as extensions of the TDM program management staff. Integrate transportation and commute considerations into sales messages and establish up-front linkages and relationships for future transportation assistance and resources.

Funding Mechanisms

1. **From Residential Buildings:**
   - Utilize Condo/Townhouse HOA fees to provide on-going, sustainable funding for the MetroWest Mobility Program. “Unbundle” monthly unit-based condo association fees from monthly parking space user fees. Graduate parking space user fees based on number of spaces linked to a unit.
   - Develop comparable per-space fees for rental apartment units. Incorporate per-space fees into rental leasing agreements.

2. **From Office Buildings:**
   - Utilize Common Area Maintenance (CAM) fees to fund the TDM program. CAM fees dedicated to providing monthly transit subsidies for all registered tenant employees, and to providing on-going, sustainable funding for the MetroWest Mobility Program.

3. **From On-Street Parking.** Dedicate on-street parking meter revenues to fund the TDM program. Maintain parking meter pricing and revenue dedication in perpetuity.
Trip Reduction Analysis
In an effort to assess the trip reduction potential of the proposed MetroWest project, with the addition of the recommended TDM strategies outlined in the previous section, UrbanTrans conducted extensive research on trip generation modification methodology. This research led us to a 5-step analysis and validation process:

1. Establish trip generation rates.
2. Identify if any trips are inter or intra-related to the site’s land uses.
3. Identify TOD and TDM attributes and programs and their forecast changes to residential land use trip generation.
4. Identify TOD and TDM attributes and programs and their forecast changes to office land use trip generation.
5. Validate against a modeling tool (possible only for office uses)

The following information summarizes the results of the trip reduction analysis. Appendix 7 includes the detailed trip reduction calculations. The sections below directly reference the tables in Appendix 7.

Step 1 confirmed the following Trip Generation Baseline and Target Trip Reductions (from Table 1: Trip Generation Baseline Summary, page 3):

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Size</th>
<th>Baseline</th>
<th>Reduction Required</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(peak-hour vehicles)</td>
<td></td>
<td>Residential - 47%</td>
<td>Office - 25%</td>
</tr>
<tr>
<td>Residential</td>
<td>2,248 units</td>
<td>904</td>
<td>425</td>
<td>479</td>
</tr>
<tr>
<td>Office</td>
<td>300,000 sq. ft.</td>
<td>452</td>
<td>113</td>
<td>339</td>
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</table>

Step 2 identified factors that would result in fewer trips as a result primarily of the physical design of the site (the TOD Physical Attributes of Success). This planning concept is further supported by the Institute of Transportation Engineers (ITE) in their recommendations regarding mixed-use developments and pass-by trips, diverted linked trips and as internal capture rate. These ITE-identified trip reduction opportunities included as part of the physical design of the site included:

- Age-Restricted Units. Different use of residential units types that will be regulated by agreement: 368 units of 55+ age-restricted condo residences. The use of ITE trip generation rates for this land use type (which is lower than for the standard condo residences included in the baseline calculations) led to a reduction of 4.4% of trips from the residential baseline. See Appendix 7, Table 2.1.
- Internal Capture Rate. Internal capture rate refers to trips “captured” entirely within the development itself (e.g., traveling from a condo to the on-site grocery,
and back home again, all within the site). With the provision of the proper mix of retail uses (as recommended in the TDM recommendations), ITE guidance suggests that as many as one in four daily trips can be associated with internal capture, due to the mixed-use nature of the site and the pedestrian-friendly design elements. Quantifying the peak-hour trip reduction associated with this factor, specific percent reductions were used for residential and office uses, leading to a reduction of 2% of trips from the office baseline and a 10.3% reduction in trips from the residential baseline, due to the availability of resources such as grocer, restaurant, convenience retail/service, banking, recreation/exercise, mail/copy services. Specific rates were developed through research results (Cervero 2004; Edwards 2003; Hedges 2005; ITE 2004; Nelson, Niles 2000; USDOT nd) and blended with professional judgment per accepted ITE practice. See Appendix 7, Table 2.2.

- External Linked Trips. External linked trips are part of what is often described as “trip-chaining,” or linking multiple trip purposes in one journey (e.g., traveling from a condo to the onsite day care facility, dropping off a child, and then continuing onto to work at an offsite location). Where one portion of the total linked trip is completed within the boundaries of the project site, a trip that would have otherwise left the site is therefore reduced. ITE guidance distinguishes these trips from simple internal capture rates. The analysis looked at both trips linked from the residential / office uses onsite to external destinations, and at trips linked from external destinations to the onsite residential / office uses, and different trip reduction factors were used for each. These factors led to vehicle trip reductions of 3.5% of trips from the office baseline and a 9.4% reduction in trips from the residential baseline. Specific rates were developed through research results (Cervero 2004; Edwards 2003; Hedges 2005; ITE 2004; Nelson, Niles 2000; USDOT nd) and blended with professional judgment per accepted ITE practice. See Appendix 7, Table 2.3.

In each element of the trip reduction analysis related to the physical characteristics of the site, the analysis approach utilized percent reductions at the conservative end of the ranges established in the research on the impact of these factors. It is important to note that internal capture and external linked trips are both directly supported by the intensity of uses proposed within close proximity of the retail, the mix of uses onsite (retail, services), as well as the TDM programs (such as parking management). Furthermore, these factors are also influenced by the number of vehicles owned per household, where lower average vehicle ownership levels are associated with higher internal capture rates and external linked trips. As the 2000 Census analysis of the Vienna Transit Station Area (supplemented by the research of residents of TODs in California) suggests, and the proposed TDM program supports, residents of the site are projected to own fewer vehicles per household.

Lastly, it is important to note that the relationship between all of these factors is wholly inclusive of the development. This means that to achieve the full trip generation
reductions, the site must be developed with all of its components and characteristics, from the mix of uses and pedestrian-oriented design to the TDM program.

**Steps 3 and 4** in the process were to identify the trip reductions related to further specifics of the TOD, such as availability of transit and, moreover, reductions affiliated with the TDM attributes of success. While the specific program details and delivery have minor differences between residential and office application, the general categories produce results that have some comparative relationships.

Using national research, supplemented by the research conducted for this project, suggested ranges of reductions even greater than identified below. In all cases, however, the analysis opted for the most conservative approach in order to not overstate planned trip reductions and to factor out the potential for interrelationships between these factors (avoiding double counting of trip reductions). Furthermore, potential trips by carpool were identified and minimized by an occupancy of 2.25 people per vehicle (not providing for a 1 reduced trip to 1 person ratio).

The trip reduction factors analyzed for the residential (Step 3) and office (Step 4) uses included (see Appendix 7, Tables 3.1 and 4.1):

1. Transit Proximity/Accessibility: Associated with the availability of high-capacity transit service, the orientation of uses with within walking distance of transit, and existence of pedestrian-friendly design characteristics. These factors led to vehicle trip reductions of 10% of trips from the office baseline and a 10.1% reduction in trips from the residential baseline. The transit proximity/accessibility represents trip reductions tied to transit use above and beyond the reductions partly associated with transit use described below (onsite TDM programs and active parking management), which also lead to enhanced transit ridership. The range of reductions was developed by combining and interpreting research (Cervero et al 2004; Chrisholm 2002; ITE 2004; Kuzmyak et al 2003) followed by a use of professional judgment to identify specific factors.

2. On-Site Transportation Programs: On-site TDM programs and services summarized in the TDM program recommendations. These factors led to vehicle trip reductions of 4% of trips from the office baseline and a 3.9% reduction in trips from the residential baseline. The range of reductions was developed by combining and interpreting research (Cervero et al 2004; Chrisholm 2002; Kuzmyak et al 2003; US DOT nd) with professional experience followed by a use of professional judgment to identify specific factors.

3. Active Parking Management: Parking pricing and time management for residential, office, and on-street uses. These factors led to vehicle trip reductions of 8.4% of trips from the office baseline and an 8.5% reduction in trips from the residential baseline. The range of reductions was developed by combining and interpreting research (Kuzmyak et al 2003; US DOT nd; Vaca et al
2003) with professional experience followed by a use of professional judgment to identify specific factors.

4. **Residence-to-Office:** Commute to work trips captured within the site by people working and living on site. Assessing this factor required taking a look at the likely demographics and household characteristics for the project (see Appendix 7, Table 3.2 and 3.3). 5% of population is assumed to both live and work on site. This population is likely to emerge primarily from office employees working onsite and then deciding to live onsite as well. The natural turnover of both rental and ownership units onsite will allow for this element to emerge over time. The 5% of people both living and working onsite equates to vehicle trip reductions of 6% of trips from the office baseline and a 4.1% reduction in trips from the residential baseline. The range of reductions was developed by combining and interpreting research (Cervero et al 2004; Chrisholm 2002; Kuzmyak et al 2003; US DOT nd; Vaca et al 2003) followed by a use of professional judgment to identify specific factors.

What is significant about these findings, which were substantiated by various Transportation Research Board (TRB) documents and studies, was that with the planned, focused attention to these TDM Attributes of Success, more than 240 residential and 128 office trips, as shown on the Trip Generation Adjustment Summary Table (Table 7 below), can be re-distributed via other travel modes, to other travel times of the day, or eliminated altogether (as with telework).

In **Step 5**, one of the few models that exists relative to travel choice programs was loaded with site data to assess before and after situations related to programmatic elements, and to test and validate the overall methodology used in this trip reduction analysis. The intent was to determine if the methodology used in this effort could be validated by use of a wholly separate model. This model, developed by the Center for Urban Transportation Research (CUTR), is focused on work trips and modeling the impacts of workplace programs designed to reduce trips. This model is a neural network model based on approximately 7,000 real-world programs, and has been field tested by the developers with a higher success rate than previous regression models.

After site data is loaded and potential programmatic elements are input, the number of trips per 100 employees is calculated. See Appendix 7, Tables 5.1 and 5.2.

Through this validation process, the office trip reduction forecast from the methodology used for this effort and the modeled trip reduction from the CUTR model were within 3%. Based on this model validation process, 3% of trips were added back into the calculations for the office uses. This comparison served as a useful validation that the trip reduction analysis used for this effort was accurately reflecting likely travel behavior changes, and not reflecting double counting of reductions or other potential concerns.

Table 7 below summarizes all elements of the trip reduction analysis.
### Table 7: Trip Reduction Assessment Summary

<table>
<thead>
<tr>
<th>Description</th>
<th>AM Peak Hour - Office Uses</th>
<th>PM Peak Hour - Residential Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IN</td>
<td>OUT</td>
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<tr>
<td>Trips Generated Related to the Office Peak Hour Per ITE Calculation</td>
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<td>Trips Generated Related to the Residential Peak Hour Per ITE Calculation</td>
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<td></td>
</tr>
<tr>
<td>Target Trip Generation Reduction as a % ITE Rates for Peak Hour Land Use</td>
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<tr>
<td>Target Trip Generation Reduction</td>
<td>-99</td>
<td>-14</td>
</tr>
<tr>
<td>Target Peak Hour Trip Generation (Trip Generation less Trip Reduction Targets)</td>
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<td>Modifiers from Physical Attributes - Step 2</td>
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<td></td>
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<td>Age Restricted Residential</td>
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<td>0</td>
</tr>
<tr>
<td>Internal Trips</td>
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<tr>
<td>Linked Trips</td>
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<td>Modifiers from TDM Attributes - Step 3 &amp; 4</td>
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<td>Onsite Transportation Programs</td>
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<td>Residence to Office</td>
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<td>Total Adjustments - Steps 3 &amp; 4</td>
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<td>Adjustments to Trip Generation - Steps 2-4 (Removes Trips from system)</td>
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<tr>
<td>Adjustment of Trips based on CUTR Model - Step 5 (Adds Trips back into system)</td>
<td>12</td>
<td>2</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>AM Peak Hour - Office Uses</th>
<th>PM Peak Hour - Residential Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>OUT</td>
</tr>
<tr>
<td>Net Adjusted Peak Hour Trip Generation</td>
<td>283</td>
</tr>
</tbody>
</table>
Monitoring and Evaluation

As identified by the Board of Supervisors in the December 2004 Board Motion, “The TDM program will be evaluated initially in at least three stages during the development process; first at the time of rezoning, second before and during construction and third after project completion or ‘build out.’”

Rigorous monitoring and evaluation are absolutely critical to this proposed TDM development program. To ensure credibility and performance, the monitoring and evaluation program must assess whether the development and implemented TDM measures are, in fact, meeting the forecast peak-period vehicle trip reduction targets.

The process below is recommended for implementation during the final two phases identified by the Board Motion.

1. During the construction period
2. One year after project completion or “build out”

The peak-period vehicle trip reduction targets are the baseline of this measurement process, and as such, the following methodology outlines a vehicle-based measurement system. The vehicle-based measurement system should be supplemented by onsite, online surveys of residents and employees, with a goal only to continue to refine and improve TDM program and service offerings.

**Phase 1 – During Construction**
Phase one monitoring and evaluation should be implemented at such time as buildings representing 55% of total planned residential dwelling units are certified for occupancy. The following phase one monitoring plan assumes that a proportionate amount of planned retail uses have also be constructed and occupied, but assumes offices uses have not been constructed.

Monitoring systems could include:

- **Cordon machine traffic counts.** Conduct machine traffic counts at the adjacent streets to all vehicle entry/exit locations providing access to/from the site as a whole at the time of measurement. Calibrate the cordon machines to pick up vehicle size in order to take into account construction vehicles entering and exiting the site. Conduct counts over a one-week period, collecting vehicle count data at 15-minute intervals for the entire week and supplement that data with peak hour turning counts.

- **Residential machine counts.** Conduct machine traffic counts at all completed condo/apartment building parking garage entry/exit location during the same period as the cordon counts.

- **Manual retail and residential counters.** Position individuals at retail parking locations, during three weekday AM and PM peak periods (Tuesday-Thursday) to
identify vehicles accessing retail service locations that are not MetroWest residents or employees. Depending on parking management systems in place, a method for identifying MetroWest residents and employees is needed (i.e., vehicle parking permit stickers). Alternatively, at garage entrances providing retail parking, visual or verbal assessments of residency can be conducted. This system should be used to determine the percentage of all non-resident vehicles accessing the site for retail purposes.

In order to assess peak-period vehicle trip generation for the project at this phase, cordon machine traffic counts should be averaged for weekday and weekend trips, and a single peak hour identified. The peak-hour identified should represent the four consecutive 15-minute increments which, when totaled, represent the highest volume of vehicles. The percentage of trips associated with non-resident travel should be subtracted from this total to isolate the total trip generation of all collected residential uses on site.

**Phase 1A - During Construction**

If Phase One monitoring indicates that trip reduction performance is not on track, then an additional phase of monitoring and evaluation is recommended. Determination that Phase 1A is needed should occur within 30 days of the final assessment (from Phase 1) that trip reduction is not on track. This additional phase requires a preliminary assessment of TDM measures already in place and evaluation of what is working (based on phase one survey results and traffic count / travel pattern analysis).

Assessment and evaluation systems should include:

- **Residential Travel Survey Analysis.** Identify which current TDM Measures are best received and utilized by residents of the development and explore which measures that have not been implemented have the greatest potential to be used.
- **Strategy Development.** Focus more attention on aggressively implementing the TDM measures that will be most effective and yield the best results.
- **Implement Additional/More Aggressive TDM Measures.** Timely implementation (within 90 days of phase one determination) is critical to ensure that TDM measures can take effect and yield behavior change before time of subsequent monitoring and evaluation.

Upon completion of the preliminary assessment of existing TDM measures, strategic planning for what additional measures need to be taken, and implementation of those additional measures, conduct a supplemental monitoring and evaluation phase to again assess performance between the initial monitoring phase and full build out. Phase 1A monitoring and evaluation should be implemented at such time as buildings representing 75% of total planned residential dwelling units are certified for occupancy.
Implement the same monitoring program outlined for phase one. However, supplement the monitoring program with delineations to enable specific assessment of travel behavior changes for the new residential buildings constructed following phase one. Compare survey results for residents that moved to the site following the phase one monitoring.

**Phase 2 - One Year After Build Out**

Phase two monitoring and evaluation should be implemented one year after all planned residential and office buildings are certified for occupancy. The following monitoring plan assumes that all planned retail uses have also be constructed and occupied.

Monitoring systems should include:
- All elements included in phase one.
- Machine counts at office uses. Mirror the cordon machine count process (in terms of count times and increments) by locating vehicle count devices at all entry/exit locations for garages serving office buildings.

In order to assess peak-period vehicle trip generation for the residential portion of the project at this phase, cordon machine traffic counts should be averaged for weekday and weekend trips, and a single peak hour identified. The peak-hour identified should represent the four consecutive 15-minute increments which, when totaled, represent the highest volume of vehicles. The percentage of trips associated with non-resident retail travel should be subtracted from this total. Additionally, the counts from the office locations should be subtracted from the total to isolate the total trip generation of all collected residential uses on site.

In order to assess peak-period vehicle trip generation for the office portion of the project at this phase, office entry/exit machine traffic counts should be averaged for weekday and weekend trips, and a single peak hour identified. The peak-hour identified should represent the four consecutive 15-minute increments which, when totaled, represent the highest volume of vehicles.

**Additional Evaluation**

Supplementing the vehicle-based monitoring of vehicle trip generation at each of the monitoring phases, an online survey of residents and employees (when relevant) should be conducted. The purpose of the survey should not be connected to the measurement of vehicle trip generation relative to the established baseline. The purpose of the survey should be to better understand:
- Transportation attitudes and preferences.
- Interest in, effectiveness of, and potential improvements to existing TDM programs and services on site.
- Travel and trip-making patterns, for the purpose of targeting future TDM programs.
- Demographics and household characteristics of residents and employees.
Oversight and Responsibilities
Fairfax County Department of Transportation should lead the monitoring and evaluation processes at each of the two phases, utilizing outside contractors as needed. Funding for these activities should be provided by the project developer, utilizing a separate escrow account to fund outside contractors managed by Fairfax County, as appropriate. Monitoring and evaluation efforts should be closely coordinated with the MetroWest TDM Program Coordinator.

Results of each monitoring and evaluation phase should be reported to the Board of Supervisors and be available publicly.

Phase One Trip Reduction Targets
The vehicle trip reduction analysis summarized in a previous section identifies forecast trip reductions upon full build out of all elements of the proposed development. In order to assess progress toward the ultimate build-out trip reduction targets, the Phase One monitoring and evaluation process should determine if the site is “on track” midway through the phased development process.

The table below summarizes potential phasing of the project, in two phases, utilizing initial phasing concepts provided by the project developer (actual phasing will be dependent on market conditions and absorption). The table utilizes the same trip generation rates used in the baseline computations.

Table 8: Trip Generation by Phase

<table>
<thead>
<tr>
<th>Site Plan</th>
<th>Building #s</th>
<th>Size</th>
<th>Units</th>
<th>WEEKDAY AM PEAK HOUR</th>
<th>WEEKDAY PM PEAK HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IN</td>
<td>OUT</td>
</tr>
<tr>
<td>Phase One Residential</td>
<td>(222) High-Rise Apartments</td>
<td>10</td>
<td>319 DU</td>
<td>24</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>(232) 6-8 Story Condominium</td>
<td>14-17</td>
<td>289 DU</td>
<td>18</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>(232) 4 Story Condominium</td>
<td>11-13, 19-20</td>
<td>160 DU</td>
<td>10</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>(232) 6 Story 55+</td>
<td>2-4</td>
<td>230 DU</td>
<td>15</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>(230) Stacked - 2 over 2</td>
<td>122 DU</td>
<td>9</td>
<td>45</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>Townhouses</td>
<td>218 DU</td>
<td>24</td>
<td>94</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>RESIDENTIAL TOTAL</td>
<td>100</td>
<td>394</td>
<td>494</td>
<td>360</td>
</tr>
<tr>
<td>Phase Two Residential</td>
<td>(222) High-Rise Apartments</td>
<td>6-7</td>
<td>588 DU</td>
<td>44</td>
<td>132</td>
</tr>
<tr>
<td></td>
<td>(232) 10 Story 55+</td>
<td>5</td>
<td>138 DU</td>
<td>9</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>(232) 8-9 Story Condominium</td>
<td>18</td>
<td>200 DU</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>RESIDENTIAL TOTAL</td>
<td>66</td>
<td>225</td>
<td>291</td>
<td>205</td>
</tr>
<tr>
<td></td>
<td>OFFICE TOTAL</td>
<td>8-9</td>
<td>300,000 SQ FT</td>
<td>398</td>
<td>54</td>
</tr>
</tbody>
</table>

Based on the peak-period vehicle trip generation summarized above, each of the trip reduction factors discussed in the prior Trip Reduction Analysis section, UrbanTrans assessed each of the TOD and TDM attributes (i.e., inclusion of age-restricted units, internal capture rate, etc.) in light of the amount of development planned in an initial phase (where phase one is selected as representing about 55% of the residential dwelling units – just past the half-way point in the development of the full project). For
each of the attributes, the team determined a forecast “percent of the total trip reduction” impact that could be expected given that the full project was not yet complete at the end of Phase 1. These forecasts are based on professional judgment of the interaction of each attribute with the presence/absence of different land uses and site design characteristics. As such, the forecasts for Phase 1 are expressed as ranges.

Phase 1 assumes approximately 55% of residential units are certified for occupancy, that no office uses have been completed, and that approximately 50% of planned retail square footage is available. For Phase 1, the forecast target range for measured peak-period vehicle trip reduction is between 22-29% for residential uses (compared the build-out target of 47% reduction, and measured against the trip generation baseline for Phase 1 of 570 peak-period vehicles). This is associated with the incomplete development of all retail space, the lack of office uses on site, and the incomplete nature of the development generally. Details of the assumptions regarding each attribute is shown in the table below.

Table 9: Phase One Trip Reduction, Target Range

<table>
<thead>
<tr>
<th>Trip Reduction with Only Phase 1 (assumes 50% retail build-out)</th>
<th>Full Build-Out Trip Reduction</th>
<th>Percent of Total Trip Reduction Impact at Each Phase - RANGE</th>
<th>Trip Reduction at Each Phase - RANGE</th>
<th>Summary of Phased Trip Reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Reductions</td>
<td>LOW</td>
<td>HIGH</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
<tr>
<td>Age Restricted</td>
<td>3.9%</td>
<td>62.5%</td>
<td>62.5%</td>
<td>2%</td>
</tr>
<tr>
<td>Internal Capture Rate</td>
<td>9.2%</td>
<td>25.0%</td>
<td>45.0%</td>
<td>2%</td>
</tr>
<tr>
<td>Linked / Pass-by</td>
<td>8.4%</td>
<td>25.0%</td>
<td>45.0%</td>
<td>2%</td>
</tr>
<tr>
<td>Transit Proximity</td>
<td>9.0%</td>
<td>70.0%</td>
<td>90.0%</td>
<td>6%</td>
</tr>
<tr>
<td>On Site Transportation Programs</td>
<td>3.5%</td>
<td>70.0%</td>
<td>90.0%</td>
<td>2%</td>
</tr>
<tr>
<td>Active Parking Management</td>
<td>7.6%</td>
<td>90.0%</td>
<td>100.0%</td>
<td>7%</td>
</tr>
<tr>
<td>Residence to Office</td>
<td>5.4%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0%</td>
</tr>
<tr>
<td>TOTAL TRIP REDUCTION</td>
<td>47%</td>
<td></td>
<td></td>
<td>22%</td>
</tr>
</tbody>
</table>

The ranges presented are linked to the following concepts relating to the sensitivity of various trip-reduction areas to build out levels:

- **Age-Restricted:** Based on straight linkages to percent of units built.
- **Internal Capture and Linked Trips:** Reductions particularly sensitive to the availability of retail, as well as the diversity of retail available. The less retail on site, the more trips that will need to go external to the site, or not link to site uses.
- **Transit Proximity:** Sensitive primarily to the availability of pedestrian connections, and the quality of experience associated with the pedestrian link.
- **On Site Transportation Programs:** Programs are targeted directly to individuals, and thus have independent results. However, some programs may not come on line or be as fully developed prior to build-out (e.g., bike station).
- **Active Parking Management:** The majority of programs are targeted to individuals, though small scale impacts could be associated with more vehicles competing for on-street parking spaces at full build-out.
- **Residence to Office:** Direct connection to presence of office uses.
In general, this analysis again highlights the importance of the mixed-use nature of the project. As noted previously, the Trip Reduction Analysis assumes all elements of the proposed project are completed as planned, and that all elements of the TDM program are implemented.

Supplemental TDM Program Concepts
Following the monitoring and evaluation process conducted in Phase 1, if measured peak-period vehicle trips are not within the forecast 22-29% reduction range, or are at the low end of this range (measured against the baseline peak-period vehicle trips forecast for this initial phase), supplemental TDM programs must be implemented to ensure improved performance of the project through the remaining phases of construction and, notably, by the next Phase 1A monitoring and evaluation phase.

The supplemental TDM concepts provided below introduce sample additional demand management measures, as well as dedication of additional funding to strategies highlighted in the previous section on TDM Program Recommendations. Importantly, the resident survey conducted in Phase 1 should be utilized to inform development of supplemental TDM programs, in order to better tailor programs to fit stated preferences within the survey and build on what is working.

Supplemental TDM programs concepts include:

1. **Additional funding for transit pass subsidies.** Core strategies included initial addition of value to resident SmarTrip cards to establish transit use patterns initially following occupancy, and on-going addition of value to cards as part of marketing and promotion campaigns. This step would transition transit subsidies onto a more permanent schedule (addition of a transit card value on a monthly or quarterly basis, for registered residents visiting the Connections Store).

2. **Enhanced telework target marketing and home office subsidy program.** Utilize more aggressive target marking for residential sales/rental to full-time and part-time teleworkers by offering home office set-up incentives (i.e., computers, telecommunications equipment, and broadband internet access) and free telework support and training upon move-in.

3. **Off-peak travel incentives.** Fund reward-based incentive programs (prizes, SmarTrip value) encouraging off-peak travel for non-commute trips. Explore implementation options to reward residents for shifting discretionary travel off-peak. Focus on incentives targeted to 55+ residential condos.

4. **On-site concierge and courier services.** Fund free/discounted concierge and courier services, staffed out of the Connections Store, to eliminate off-site retail/service trips.

5. **MetroWest fleet vehicles.** Work with shared-car companies to establish a “fleet car” system for project residents. This idea builds on the shared-car recommendations by ensuring availability of a dedicated number of shared-car vehicles on-site, and providing a specified number of free shared-car hours for all
residents. Market this amenity to potential residents, linked to previously recommend “one less car” marketing.

6. Additional part-time TDM Program staff. Dedicate .5 FTE additional TDM Program staff member through one-year following project build out. Focus staff member resources on “personalized transportation advising” to expand availability of this service. Dedicate additional funding to provide incentives for residents to meet with program staff members.

**Long-Term Program Monitoring & Enforcement**

The TDM program is intended to be a core component of the development site in perpetuity. As a result, the following long-term monitoring and enforcement structures should be considered:

- **Long-term Monitoring.** In the period following the Phase 2 monitoring and measurement program, the MetroWest Connections TDM Program Manager should submit biennial reports to the Fairfax County DOT and TDM Program Manager. Reports could include:
  - Results of an online survey of residents and employees assessing travel patterns, mode splits, and attitudes and preferences regarding current and potential TDM programs.
  - Budget summaries of TDM program revenues and expenditures.
  - A TDM Program Workplan, with budgets, for the upcoming two year period.
  - Traffic counts.
  - Certification that all elements of the development agreement related to the TDM program remain in place.

- **Long-term enforcement.** Following project build-out, as described in the funding mechanisms portion of the TDM strategy recommendations, residential HOAs fees and office CAM fees will provide the sustainable, long-term funding required to maintain the MetroWest Connections TDM program activities and staffing. Upon submittal of the biennial report, Fairfax County DOT should determine continued compliance with the core elements of the TDM related proffers (including TDM funding mechanisms and program staffing). A finding of non-compliance would render the area in violation of the site’s zoning code (to be determined through the rezoning process), subject to standard County zoning enforcement processes.
TDM Program Staffing & Budget
At the point of full project build-out, a full-time TDM Program Manager is recommended for implementation of the TDM Program. National experience suggests a TDM program coordinator spend a minimum of one hour per week for every 200 people (employees or residents). Using employee per square foot and residential occupancy estimates equates to approximately 5,100 driving-age residents and employees, which translates into about 25 hours per week for a TDM Program Manager. Given the aggressive nature of the proposed TDM plan and the importance of achieving the project's trip reduction targets, a full-time staff person (40 hours per week) is recommended at full build-out.

During the initial phases of project marketing and sales, an employee (likely a member of the project sales staff) should be designated at .25 FTE as the TDM Program Manager. During this phase, the TDM Program Manager will work to refine TDM programs, develop initial marketing approaches and materials, and detail a multi-year TDM Business Plan. Upon issuance of the first residential certificate of occupancy, the TDM Program Manager should shift to .5 FTE hour commitment.

By the completion of Phase 1, as outlined in previous sections, the TDM Program Coordinator should shift to .75 FTE hour commitment.

By project build-out, the TDM Program Coordinator should be at 1 FTE.

Budget
Annual budgets for the recommended TDM program, in the four phases referenced above relative to staffing levels, are provided in the table below. Forecast expenses and revenue streams are detailed on an annual basis. The following concepts and assumptions are part of the proposed budget:

- Expenses for physical facility recommendations are assumed to be covered as part of overall development costs, and are not reflected in this budget.
- Assessments between residential and office uses are determined based on the percentage of overall project trips reduced by the proposed TDM program (75% of trips reduced are from residential uses, 25% from office uses).
- Program revenues from residential uses, outside of initial developer contributions, are derived from parking space user fees. User fees tied to TDM program funding should be assessed on a per-space basis, with each additional spaces (if any) assessed higher rates on a graduated scale. Individual HOAs should be responsible for a pro-rata share of TDM program funding and given flexibility, as needed, to manage HOA revenues and expenses as needed.
- Revenues from on-street parking meters are not included in this budget, but should also be dedicated to the TDM program to fund additional TDM programs and services (i.e., higher levels of incentives and subsidies).
- Retail space rent for the storefront / bike station is not assumed in the overhead calculations below.
- “Incentives / Subsidies” expenses are intended to cover a broad array of programs, from transit pass and shared-car incentives to vanpool subsidies.

### Table 10: TDM Program Annual Budget Outline

<table>
<thead>
<tr>
<th></th>
<th>Pre-Construction</th>
<th>Start-Up</th>
<th>Phase One</th>
<th>Build Out</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential Units</strong></td>
<td></td>
<td>0</td>
<td>300</td>
<td>1,324</td>
</tr>
<tr>
<td><strong>Office SF</strong></td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Program Coordinator</strong></td>
<td>.25 FTE</td>
<td>.5 FTE</td>
<td>.75 FTE</td>
<td>1 FTE</td>
</tr>
<tr>
<td><strong>Salary - $65,000</strong></td>
<td>$16,250</td>
<td>$32,500</td>
<td>$48,750</td>
<td>$65,000</td>
</tr>
<tr>
<td><strong>Labor Fringe &amp; Storefront Overhead (1.5 multiplier)</strong></td>
<td>$8,125</td>
<td>$16,250</td>
<td>$24,375</td>
<td>$32,500</td>
</tr>
<tr>
<td><strong>Collateral &amp; Marketing Materials</strong></td>
<td>$50,000</td>
<td>$0</td>
<td>$5,000</td>
<td>$15,000</td>
</tr>
<tr>
<td><strong>Web Development / Maintenance / Upgrades</strong></td>
<td>$65,000</td>
<td>$5,000</td>
<td>$10,000</td>
<td>$20,000</td>
</tr>
<tr>
<td><strong>SmarTrip Cards (initial + on-going via turnover)</strong></td>
<td>$16,860</td>
<td>$500</td>
<td>$2,000</td>
<td>$3,500</td>
</tr>
<tr>
<td><strong>Incentives / Subsidies</strong></td>
<td>$5,000</td>
<td>$30,000</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td><strong>Promotional Events</strong></td>
<td>$5,000</td>
<td>$25,000</td>
<td>$40,000</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL EXPENSES</strong></td>
<td><strong>$156,235</strong></td>
<td><strong>$64,250</strong></td>
<td><strong>$145,125</strong></td>
<td><strong>$226,000</strong></td>
</tr>
<tr>
<td><strong>Residential Assessment (75% of revenue at build-out)</strong></td>
<td>$22,620</td>
<td>$120,153</td>
<td>$169,500</td>
<td></td>
</tr>
<tr>
<td><strong>Per parking space annual user fee (primary space)</strong></td>
<td>$56.55</td>
<td>$56.55</td>
<td>$56.55</td>
<td></td>
</tr>
<tr>
<td><strong>Per parking space annual user fee (additional spaces, 25%)</strong></td>
<td>$75.40</td>
<td>$75.40</td>
<td>$75.40</td>
<td></td>
</tr>
<tr>
<td><strong>Office Assessment (25% of revenue at build-out)</strong></td>
<td>$0</td>
<td>$0</td>
<td>$56,500</td>
<td></td>
</tr>
<tr>
<td><strong>Per square foot</strong></td>
<td>$0</td>
<td>$0</td>
<td>$0.19</td>
<td></td>
</tr>
<tr>
<td><strong>Developer Assessment</strong></td>
<td>$156,235</td>
<td>$41,630</td>
<td>$24,972</td>
<td>$0</td>
</tr>
<tr>
<td><strong>TOTAL REVENUE</strong></td>
<td><strong>$156,235</strong></td>
<td><strong>$64,250</strong></td>
<td><strong>$145,125</strong></td>
<td><strong>$226,000</strong></td>
</tr>
</tbody>
</table>

Note: All figures in 2005 dollars.
Conclusions
The research and analysis elements of the Fairlee/MetroWest TDM Development Program indicate that the trip reduction targets for the proposed project (peak-hour vehicle trip reductions of 47% for the residential uses and 25% reductions for the office uses) can be achieved through a combination of the physical design characteristics of the site, as proposed, and the full application of the TDM programs and strategies recommended in this document.

The trip reductions, however, remain aggressive targets. The development of the TDM program recommendations and the trip reduction analysis conducted for this effort considered the project as a whole, with the full level of development planned; the mix and quantity of residential, office, and retail uses proposed; and the pedestrian-friendly design of the site as planned. All of the design elements of the proposed project, along with the recommended TDM strategies (programs and budget levels), must work collectively to achieve the trip reduction targets. With all elements in place, however, trip reductions should prove sustainable.
References


Chrisholm, Gwen, (October 2002), Transit-Oriented Development and Joint Development in the United States: A Literature Review, Research Results Digest, Number 52, Transit Cooperative Research Program.


Leach, Dennis M. Rosslyn-Ballston Corridor: 30 Years of TOD Community Outcomes & Performance Measurement. Presentation available at: http://www.reconnectingamerica.org/


Glossary
The following terms and definitions are provided for reference:

Access - The ability to enter or approach a facility or to make use of a facility.

Accessibility - Measure of the ability or ease of individuals to travel among all origins and destinations in an area.

Access Mode - Mode or type of transportation used to reach the major mode of transportation used to reach a destination. Walking, bicycling, or driving to a park-and-ride lot are all examples of access modes.

Advanced Traveler Information Systems (ATIS) - A categorization of intelligent transportation systems (ITS) and other advanced technologies to provide real-time traffic, transit, weather, and other information to commuters, commercial operators, and travelers. Technologies and approaches include in-vehicle systems, changeable message signs, and computers in the home and office.

Alignment - The horizontal and vertical ground plan of a roadway, HOV lane, transit route, rail system or other transportation facility as it appears in plan and profile.

Alternative Transportation - Modes of transportation other than the single-passenger motor vehicle, including but not limited to carpools, vanpools, buspools, public transit, walking, and bicycling.

Alternative Work Schedule - Work policies and programs such as flexible and staggered work hours, variable work hours, flextime, and compressed work weeks that allow employees to avoid commuting during the most congested or peak travel periods in the morning and afternoon.

Arterial Street or Roadway - A major thoroughfare serving higher speed through trips, with limited access to adjacent property.

Average Daily Traffic (ADT) - The average number of vehicle trips generated during a 24-hour period from a specific site or area. This term also applies to traffic volumes on a roadway over a 24-hour period.

Average Vehicle Occupancy (AVO) - The total number of persons in all vehicles divided by the number of vehicles traveling past a selected point during a predetermined time period. AVO is usually expressed to two or three significant decimal places, such as 1.2 or 1.26.

Average Vehicle Ridership (AVR) - The average number of employees who report to a work site divided by the average number of vehicles driven by these employees, calculated for an established time period. This calculation recognizes vehicle trip reductions from telecommuting, compressed work weeks, and non-motorized transportation.
Barrier-Separated HOV Facility - An HOV lane that is physically separated from the adjoining general-purpose lanes by some type of barrier. A concrete barrier is the most commonly used approach, but wide buffers, movable barriers, and pylons may be used. A barrier-separated HOV lane may be a one direction/reversible facility or a two lane bi-directional facility.

Bicycle Lane or Bike Lane - A portion of a roadway reserved for preferential or exclusive use by bicycles through striping, signing, and pavement markings.

Bicycle Path or Bike Path - A path or trail reserved for exclusive use by bicycles and physically separated from motorized vehicle traffic by an open space or barrier. A bicycle path may be in a separate right-of-way, such as the use of an abandoned railroad line, or in a roadway right-of-way. Bicycle paths or trails may also be open to other user groups such as walkers, joggers, or in-line skaters.

Bicycle Facilities - Shelters, racks, storage facilities, and other elements for bicycles.

Bus - A self-propelled, rubber-tired vehicle designed to carry a substantial number of passengers.

Bus, Express - A bus that operates a portion of the route without stops or with a limited number of stops.

Bus, Feeder - A bus service that picks up and delivers passengers to a rapid transit station or express bus stop or terminal.

Capacity - The maximum number of vehicles (vehicular capacity) or persons (person capacity) that can pass over a given section of roadway in one or both directions during a given period of time under a prevailing management strategy that assures an acceptable level of free-flow service, usually expressed as vehicles per hour or persons per hour.

Capital Cost - The costs associated with the purchase, development or construction of fixed assets such as land, roadways, guideways, stations, buildings, and vehicles.

Carpool or Carpooling - Any automobile or private vehicle containing two or more occupants including the driver.

Carpool Lane - Another term used to describe an HOV lane, especially in areas with lower levels of bus service and high numbers of carpools.

Casual Carpool - Term used to describe the formation of a carpool on a periodic basis, with no formal arrangement for regular riders, or where drivers pick up random passengers at predetermined locations. Often used interchangeably with informal and instant carpooling.

Central Business District (CBD) - The major concentration of business activity in a downtown area. Formally defined by the Census Bureau.

Collector (Distributor Street) - A road generally parallel to an expressway which collects and distributes traffic at access points to the expressway involving through lanes.
Commute Trips - Trips that are made on a daily or regular basis to work, including those with intermediate stops to and from a work site.

Commute Alternatives - Alternatives to driving alone such as carpooling, vanpooling, transit, bicycling, and walking, or alternative work schedules that shift, commute trip to less congested periods, or remove work trips from the system altogether.

Commuter - A person who travels regularly between home and work or school.

Commuter Assistance Programs - Programs which provide services to help commuters identify and use alternative modes, such as ridesharing and transit, and provide support facilities and services.

Commuter Rail and Commuter Rail Transit - Passenger rail service which is often operated on existing railroad rights-of-way or on trackage shared with freight railroads. Commuter rail is characterized by long distance trips, faster operating speeds, and limited service, with longer distances between stops.

Compressed Work Week - One alternative work schedule technique that consists of condensing the standard 5-day work week into a fewer number of longer workdays. Common schedules include 4-10 hour days with one day off a week, and 9-9 hour days, with one day off every two weeks.

Congestion Pricing - The concept of charging for the use of a transportation facility, such as a roadway, based on the level of traffic congestion. The greater the level of congestion, which usually occurs during the morning and afternoon peak-periods, the higher the cost to use the facility.

Corridor - A geographical area usually defined by a freeway, roadway, or other physical element and its immediate surrounding area, including collector routes, that has similar characteristics.

Delay - The increased travel time experienced by a person or a vehicle due to circumstances that impede the desirable movement of traffic. Delay is measured as the time difference between the experienced travel time and the travel time during free-flow conditions.

Demand - The quantity of a good or service, such as transportation, desired. The desire for a good or service may be different based on different costs or benefits.

Demand-Responsive Transit Services - A bus, van, or other vehicle that is dispatched and operated only in response to a specific request for a passenger.

Destination - The point, area, or zone in which a trip terminates.

Directional Split - The distribution of traffic flows on a two-way facility, usually expressed as a percentage of the total two-way traffic.
**Disincentive** - Programs, policies, and techniques aimed at discouraging a specific type of behavior, such as driving alone.

**Employee Transportation Coordinator (ETC)** - An individual designated by a company or a group of companies to develop, implement, and administer an employee transportation demand management program. Duties may include coordinating vanpool and carpool programs, providing information on commute options, promoting the use of public transit, monitoring employee participation, and other related activities.

**Estimated Trip Reduction** - The estimated percentage of vehicle trips to be reduced through implementation of various commute alternative strategies, usually at one worksite or a small area.

**Fare** - The payment required to ride public transit. A variety of payment methods or media may be used including cash, tokens, tickets, passes, and other techniques.

**Flexible Work Hours and Flextime** - One alternative work schedule technique that gives employees the option of varying their starting and stopping times each workday. The intent is to allow employees more flexibility to adjust their work hours to individual needs and to avoid congested travel periods. Most policies specify a core period in the middle of the workday, such as 10:00 A.M. to 3:00 P.M., when all employees are required to be present.

**Forecasting** - The planning process of estimating future conditions, such as population and employment levels, demographic characteristics, and demand for roadway and transit facilities.

**Frequency of Service** - The number of vehicles on a route traveling in the same direction often expressed as the number of vehicles that will pass a certain point in the route within an hour period.

**General-Purpose Lanes** - The travel lanes on a freeway or roadway that are open to all motor vehicles.

**Grade Separation** - The vertical separation of an intersecting transportation facility to prevent conflicts.

**Guaranteed Ride Home Program** - Programs that provide commuters who rideshare, take transit, or use other alternative modes with a way to get home or to another location in the case of an emergency. A Guaranteed Ride Home program may be offered by an employer, a group of employers, a transit agency, or other groups, and a variety of techniques may be used to provide the service.

**Headway** - The time interval between buses operating on a route or out of a transit facility.

**High-Occupancy Toll (HOT) Lane** - Concept of using congestion or priority pricing on a toll or HOV facility. An example would be charging variable toll rates depending on the number of people in a vehicle and the time of day.
High-Occupancy Vehicle (HOV) - Motor vehicles with at least two or more persons, including carpools, vanpools, and buses. Individual HOV facilities may require different vehicle occupancy levels, which are usually expressed as either two or more (2+), three or more (3+), or four or more (4+) passengers per vehicle.

Home-Based Trip - A trip where either the origin or the destination is the traveler's home.

Home-Based Work Trip - A trip to or from the home for the purpose of one's employment.

Inbound - A trip toward a downtown, CBD, or major activity center.

Incentive - Programs, policies, and techniques aimed at a specific type of behavior, such as taking the bus or carpooling.

Informal Carpool - The composition of the carpool passengers varies from one day to another and there is no formal arrangement for regular riders. Often used interchangeably with casual and instant carpooling.

Infrastructure - All fixed components of a transportation system including roadways and bridges, park-and-ride lots, fixed transit components, and other elements.

Intelligent Transportation Systems (ITS) - The application of a wide range of advanced technologies to enhance the operation and management of the surface transportation system.

Intermodal - The integration of multiple modes in a corridor or area.

Jitney - A privately owned vehicle operated on a fixed or semi-fixed schedule for a fare.

Joint Development - Projects that involve the joint use or improvement of a piece of property. Joint developments usually involve the public and private sectors working together on a project, but they may also include public/public partnerships.

Kiss-and-Ride Lot or Facility - Short term parking spaces and pick up/drop off areas for commuters who are driven to a transit station or park-and-ride lot and are then picked up on the return trip.

Land Use - Refers to the manner in which portions of land or the structures on them are used, i.e., commercial, residential, retail, etc.

Level of Service (LOS) - A qualitative measure that describes the operational conditions or a road or intersection, as defined by the Highway Capacity Manual. The various service levels are defined by a range from A to F, with A representing freeflow traffic conditions and F representing stop-and-go traffic.

Light Rail Transit (LRT) - A mode of transit that operates on steel rails and obtains its power from overhead electrical wires. LRT may operate in single or multiple cars on separate rights-of-way or in mixed traffic.
**Linked/Unlinked Trip** - An unlinked trip is a passenger trip made on a single vehicle, such as a single automobile or bus ride. A linked trip is a person’s entire trip between an origin and destination, which may involve transferring between vehicles (e.g., Park & Ride or bus and rail transit), or multiple stops, such as stopping at a daycare center or store along a commute trip.

**Local Bus Service or Local Routes** - Bus routes and services characterized by frequent stops and relatively slow operating speeds that usually link neighborhood areas and downtowns or major activity centers using the local street system.

**Marketing** - A comprehensive approach to identifying the need of various user groups, matching services to meet those needs, and promoting the use of specific services.

**Market Research** - Broad term used to describe a general approach to identifying markets and their characteristics and the marketing services to those markets. May include a variety of techniques and approaches.

**Mass Transit and Mass Transportation** - Transportation provided by public or private operators by bus, rail, ferry, or other mode that operates on a regular basis, and serves large numbers of riders.

**Mixed-Use Development** - Defined by the Urban Land Institute as developments with the following criteria: (1) three or more revenue-producing uses that in well-planned projects are mutually supporting, (2) significant physical and functional integration of project components, including uninterrupted pedestrian connections, and (3) development in conformance with a coherent plan.

**Mobility** - The ability to move or be moved from place to place.

**Mode** - A particular form of travel conveyances, including buses, automobiles, carpools, vanpools, single occupant vehicles, walking, bicycling, rail, air, and water-borne vessels.

**Mode Shift** - The act of changing from one mode, such as driving alone, to another mode, such as taking the bus.

**Mode Split** - The proportion of total person-trips using the various modes of travel.

**Multimodal** - More than one mode operating in a corridor or area.

**Network** - A system that comprises all transportation elements.

**Non-Commute Trips** - Vehicle-trips made for purposes other than work-related reasons. Examples of non-commute trip purposes include shopping, personal business, medical, school, day care, and recreation.

**Off-Peak Direction of Travel** - The direction of travel in a corridor experiencing lower demand during a peak commuting period. In a radial corridor, the off-peak direction has traditionally been away from the central business district in the morning and toward the central business district in the evening. This situation is no longer the case in many metropolitan areas and in suburban areas; circumferential freeways often experience congestion in both directions.
Off-Peak Period - The period of time outside the peak commuting period, usually the midday, evening, night, and early morning.

Origin - The point or zone where a trip starts.

Paratransit - Transit services that are operated on demand, rather than on a fixed route and fixed schedule. Examples include dial-a-ride, jitney services, and shared-ride taxis.

Paratransit Vehicle - Usually smaller vehicles than conventional buses used on fixed route services. Examples include taxis, jitneys, vans, mini-vans, and small buses.

Park-and-Pool Lot and Park-and-Pool Facility - A facility where individuals can park their private vehicle and join a carpool or vanpool. The facility is not normally served by public transportation.

Park-and-Ride Lot and Park-and-Ride Facility - A facility where individuals can park their private vehicle for the day and access public transportation or rideshare for the major portion of their trip. Park-and-ride lots are found with HOV facilities, LRT, heavy rail, commuter rail systems, and ferry services.

Parking Cash Out - A strategy that employers can utilize to encourage employees to use alternative modes of commuting by giving up their tax-free parking and using the cash value to pay for expenses associated with other modes like carpooling or to receive a tax-free subsidy for their transit or vanpools.

Parking Management - Policies and programs aimed at managing both the supply of and the demand for parking at employment sites and major activity centers. May include strategies focusing on pricing, space availability and location, and priority treatments for carpools and vanpools. Measures that favor carpools and vanpools, including parking charges for drive-alone commuter parking, preferential parking for pool vehicles, and the elimination of free, low-cost, or on-street parking in employment areas.

Parking Pricing - Using pricing mechanisms to control the demand for parking and to encourage carpooling and vanpooling. Approaches include charging higher rates for driving alone, reducing or eliminating fees for carpools and vanpools, parking cash-out programs, and other approaches.

Peak Direction and Peak Direction of Travel - The direction of higher travel demand during a peak commuting period. In a radial corridor, the peak direction has traditionally been toward the central business district in the morning and away from the central business district in the evening. This situation is no longer the case in many metropolitan areas and in suburban areas; circumferential freeways often experience congestion in both directions.

Peak Hour - The hour in the morning and in the afternoon when the maximum demand occurs on a given transportation facility or corridor.
Peak Period - The time period in the morning and in the afternoon when the heaviest demand occurs on a given transportation facility or corridor. Usually two or more hours.

Person Throughput - Term used to describe the number of persons, not vehicles, being carried on a facility. Usually measured at a specific point on the roadway facility for a predetermined period of time.

Preferential Parking - Parking lots, spaces, or other areas reserved for carpools and vanpools. Preferential parking is usually located closer to the destination, in a parking garage, or in some other area which is more desirable.

Preferential Treatment - Providing special privileges to a specific mode or modes of transportation, such as bus lanes or signal priority for buses at intersections.

Priority Lane - Lane providing preferential treatment to buses, carpools, and vanpools.

Proximate Commute – Working at the employer worksite closest to the employee’s home can be implemented by multi-site employers such as banks, retail, etc.

Public Transit and Public Transportation - Passenger transportation service to the public on a regular basis using vehicles that transport more than one person for compensation, usually but not exclusively over a set route or routes from one fixed point to another. Routes or schedules of this service may be predetermined by the operator or may be determined through a cooperative arrangement.

Qualified Transportation Fringe Benefit - This represents a transportation fringe benefit that is tax-free for the employee. This benefit can be in the form of a mass transit subsidy, vanpool subsidy, and employer-provided parking. Carpool subsidy does not qualify.

Rail Transit - General term used for all types of rail transit systems including light rail transit (LRT), heavy rail, and commuter rail.

Reverse Commute - Regular travel between home and work or school in the opposite direction of the peak direction of traffic. Travel from a central city area to a suburb is one example of a reverse commute trip.

Ride Matching - The process of creating carpools and vanpools through finding people whose travel characteristics (origin and destination and time of travel) closely match.

Ridesharing - The function of sharing a ride with other passengers in a common vehicle. The term is usually applied to carpools and vanpools.

Right-of-Way - The area or property reserved for a specific transportation function such as a roadway or transit guideway.

Schedule - A listing of trips and time points for buses or other transit vehicles for a given route.
Service Frequency - The number of buses or other transit vehicles on a given route, passing a specific point within a given time period.

Shared Ride - A trip other than by public transit where more than one person occupies the same vehicle.

Shuttle - A public or private vehicle that travels back and forth over a particular route, especially a short route or one that provide connections between transportation systems, employment centers, etc.

Single Occupant Vehicle (SOV) - A motor vehicle occupied by only one person.

Staggered Work Hours - One alternative work scheduling technique that allows employees to begin and end work at times different than the normal 8:00 A.M. to 5:00 P.M. schedule. Work hours are usually staggered over a range from 15 minutes to two hours. Most staggered work hour programs require that employees maintain a set schedule, such as 7:30 A.M. to 4:30 P.M., on a regular basis.

Support Program - Policies, programs, and services that enhance the public acceptance or usage of an HOV facility, including ridesharing programs, employer-sponsored incentives, public information, and marketing activities.

Taxi and Taxicab - A vehicle to be operated by a professional and licensed driver for hire for a fee.

Telecommunications - The conveyance of information by electronic means. Examples include the telephone, interactive cable facilities, computer networks, and video conference centers.

Telecommuting - A work arrangement program whereby employees work at a location other than the conventional office or central headquarters, usually from home or an office close to home. Telecommuting can remove commute trips from the roadway system or reduce the length of commute trips.

Traffic Mitigation - The use of transportation management techniques to reduce the traffic impact of new development.

Traffic Volume - The number of vehicles on a freeway, roadway, HOV lane, or other transportation facility.

Transfer - The act of changing from one vehicle or route to another. Also, the paper provided to a passenger by a transit operator upon paying a fare that allows the individual to board the second vehicle without paying another fare.

Transit - General term referring to all vehicles and systems that move more than one individual includes carpools, vanpools, minibuses, buses, coaches, LRT, heavy rail, and commuter rail.
Transit Center or Transit Station - A facility serving transit buses and other modes such as automobiles and pedestrians. Centers and stations provide locations for individuals to access transit services and to transfer between buses or between buses and other modes.

Transit Dependent - An individual or group of individuals that are dependent on public transit to meet their private mobility needs because they are unable to drive, do not own a car, are not licensed to drive, or choose not to drive. Groups often considered transit dependents include the elderly, the young, low income individuals, and households without an automobile available.

Transportation Demand Management and Travel Demand Management (TDM) - A variety of strategies and techniques aimed at increasing the use of buses, carpools, vanpools, and other alternative commute modes, reducing single-occupant vehicles, and spreading travel to less congested time periods. Strategies may include both incentives, such as employer subsidized bus passes, and disincentives, such as higher parking rates for single-occupant vehicles.

Transportation Management Association/Organization (TMA/TMO) - Organizations comprised of some combination of employers, developers, building owners, and local government representatives formed to help address local transportation problems and to encourage greater use of high-occupancy vehicles and other strategies.

Transportation System Management (TSM) - Improvements focused on enhancing the management of the transportation system, including various elements of the transportation system. Examples of TSM projects include ramp metering, HOV ramp meter bypasses, and signal improvements.

Travel Time - The length of time it takes to travel between two points.

Travel Time Reliability - Term referring to the lack of variability in travel time that can be expected using different facilities.

Travel Time Savings - The time saved by use of an HOV facility rather than driving alone. Calculated by the difference in travel times between two points using the HOV facility and the general-purpose lane.

Trip Generation Rates - The number of vehicular trips to and from a development, cited per unit of measure such as square foot, thousand square feet, housing unit, or acre. The trip rates published by the Institute of Transportation Engineers (ITE) or developed by local jurisdictions are used to identify the potential impacts of new projects and to develop approaches to mitigate negative impacts.

Trip Reduction Ordinances - Laws or policies enacted by local governments that require developers, property owners, and employers to manage the number of vehicle-trips from a work site or development and to assist in financing necessary for transportation improvements.

Unlinked Trip - Trip that goes directly from origin to destination and does not include any intermediate stops or waiting or walking time.
Vanpool - A prearranged ridesharing function in which a number of people travel together on a regular basis in a van, usually designed to carry six or more persons.

Variable Work Hours - One alternative work schedule technique that allows employees to select work starting and ending times different than the normal 8:00 A.M. to 5:00 P.M. schedules. Most variable work hour programs require that employees maintain a set schedule, such as 7:30 A.M. to 4:30 P.M., on a regular basis.

Vehicle - Any motorcycle, car, truck, van, bus, or rail car designed to carry passengers or goods.

Vehicle Miles of Travel (VMT) - The total distance traveled in miles by all motor vehicles of a specific group in a given area at a given time.

Vehicle Occupancy - The number of people in a car, truck, bus, or other vehicle.

Violation of HOV Facility Requirements - An infraction of the rules and regulations for use of an HOV facility or other transportation system. On an HOV facility, not having the required number of people in a vehicle is a violation.

Volume to Capacity Ratio - The ratio of demand flow rate to capacity for a given type of transportation facility. The flow rate is typically given in terms of the number of vehicles passing a point for a given unit of time and the capacity is given in terms of vehicles for the same period of time.

Zoning - Land use regulations that divide a community into districts which have different allowable uses, development requirements, and regulations.

**Glossary References and Additional Glossaries**


Association for Commuter Transportation, Transportation Demand Management Tool Kit, Association for Commuter Transportation (www.actweb.org), 2001.


Victoria Transportation Policy Institute, TDM Encyclopedia, (www.vtpi.org), May 2005
APPENDICES

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Resident & Employee Survey Summary
FAIRFAX/VIENNA METRO
TDM PROJECT
RESIDENT AND EMPLOYEE SURVEY RESULTS

June 9, 2005
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SECTION 1  INTRODUCTION

PURPOSE OF THE SURVEY

This report presents results of two surveys undertaken for the Fairfax/Vienna Metro TDM project. These surveys comprised one of several data collection efforts in the project. One survey was conducted with residents living near the Fairfax/Vienna Metro station. A second survey was conducted with employees who worked near a Metrorail station. The surveys were performed for two primary purposes:

1) Present a “snapshot” of current commute travel patterns in the Fairfax/Vienna Metro Station area
2) Identify the need and potential demand for various TDM services in the station area

The report is divided into three sections following this introduction:

- Section 2 – Survey methodology
- Section 3 – Resident Survey Results
- Section 4 – Employee Survey Results

Following these sections are four appendices:

- Appendix A – Resident Survey Questionnaire
- Appendix B – Employee Survey Questionnaire
- Appendix C – Resident Survey Frequency Tabulations
- Appendix D – Employee Survey Frequency Tabulations
SECTION 2  SURVEY METHODOLOGY

Described below are the following components of the survey methodology for each of the two surveys, resident and employee:

- Survey sample
- Questionnaire design
- Survey administration
- Survey analysis

SURVEY SAMPLE

Resident Survey

The sample frame for the resident survey included all residents 18 years or older, living within zip+four zip codes within a ½ mile radius of the station. The consulting team obtained address lists for all households within this area. Because the zip code area boundaries did not coincide exactly with the station area boundary, a small percentage of the households included in the sample were outside the ½ mile station area limit.

Approximately 3,800 households were included in the address list. The exact number of qualified respondents within these households is not known, but the 2000 Census data indicate that approximately 21% of the households within this area have only one person, while the remaining households consist of two or more. Assuming that most of the two+ resident households consist of two adults, the consulting team estimated the number of qualified respondents at approximately 6,600.

Employee Survey

The original sample frame for the employee survey included all employees working within ½ mile of the Fairfax/Vienna station. But this included only one employer, thus the consulting team also surveyed employees of two employers located within walking distance of the Dunn Loring Metro station. The Dunn Loring station area was chosen because it was considered similar to the area around the Fairfax/Vienna station and because, being the closest station to Fairfax/Vienna, it was expected to draw employees from similar home areas. The combined employee population at the three sites was approximately 1,500.

QUESTIONNAIRE DESIGN

The two surveys were developed by the consulting team, with review and input from two groups: 1) the project Advisory Team and 2) a Survey Area Group, consisting of citizen and homeowners representatives living in the study area. Prior to developing a draft questionnaire, the consulting team discussed the survey purpose with the Advisory Team members and described the types of questions likely to be included.

For the resident survey, these included:

- Current commuting patterns, work location, and work schedule
- Availability of TDM services at work/through employer
• Interest in/motivating value of TDM services for non-drive alone commuting
• Non-commute travel from home
• Demographic characteristics

For the employee survey, these topics included:
• Current commuting patterns, home location, and work schedule
• Availability of TDM services at work/through employer
• Interest in/motivating value of TDM services for non-drive alone commuting
• Non-commute trips made around the work location during the work day
• Demographic characteristics

The consulting team prepared draft questionnaires for each of the two surveys and distributed them to the Advisory Team for initial review. Concurrently, the consultants presented the draft questionnaires to the Survey Area Group members to solicit their comments and suggestions. This evening meeting was held on April 18. On April 21st, the consultants met with the Advisory Team to present the comments received from the Survey Area Group and to obtain other comments and suggestions from the Advisory Team members.

Following these two meetings, the consultants prepared revised draft surveys and distributed them once more to the Advisory Team for final review. A few additional minor changes were made to both drafts and they were finalized.

For the resident survey, both paper/mail or fax back and internet versions were then prepared. The employee survey was distributed only as an internet version. Links to the internet versions of the surveys were tested by the consultants and were provided to the Advisory Team members for their testing as well.

Due to the very short time available to develop and administer the survey, the survey was not formally pre-tested. However, the review performed by the Survey Area Group and the Advisory Team provided valuable suggestions on local terminology that the consultants believe enhanced the accuracy of the responses.

SURVEY ADMINISTRATION

Resident Survey
The resident survey was distributed by mail to each household in the zip+four area previously defined. As noted above, the resident survey respondents were given the option of completing the survey by mail or on-line. Thus the letter accompanying the questionnaire informed respondents that they could respond online and provided the website address for the on-line survey.

To simplify respondents’ access to the questionnaire, two copies of the questionnaire were mailed to each household. Respondents who had more than two adults in the household were told they could obtain additional questionnaires from their homeowners association or from the consulting team. To minimize the possibility of respondents submitting multiple questionnaires, each questionnaire was coded with a unique
number that was used for survey tracking purposes. Respondents who preferred to respond on-line were asked to enter this number as part of the on-line submittal.

A mail distribution firm prepared the questionnaire packets for mailing. The packet included the questionnaire, a cover letter stating the purpose of the survey and instructions on completing and submitting the questionnaires, and a flyer announcing that respondents would be entered into a prize drawing. The questionnaire packets were mailed by first-class mail. Respondents were given until June 19th, approximately 7-10 days, to complete and return the survey. Due to a two-day delay in the mail distribution of the questionnaires, the deadline for returning the questionnaires was extended by several days and questionnaires were accepted for 10 days after the original postmark date.

To enhance response rate, the consultants entered respondents who were willing to provide their names and phone numbers into the drawing for a $400 American Express gift card. Approximately 90% of the respondents participated in the drawing. Homeowners association (HOA) representatives also were asked to alert their residents that the survey would be conducted and to encourage residents to participate. Most of the HOAs did assist the consultants with this alert. Several of the HOA representatives also sent follow-up reminders to residents as the survey deadline approached.

**Employee Survey**

As noted earlier, the employee survey was conducted only by internet at three worksites. As part of the sample selection process, the consulting team contacted each of the three firms selected to request their participation and assistance in conducting the survey.

When the survey had been finalized and tested on-line, the consulting team provided a sample email, with a link to the internet survey site, to the survey coordinator at each of the employment sites. These representatives then distributed the email and link to employees at their worksites. Employees were asked to complete the questionnaire by June 19th. No extensions were needed for this survey, because the survey was distributed on schedule.

As with the resident survey, consultants entered respondents who were willing to provide their names and phone numbers into the drawing for a $400 American Express gift card. Approximately 90% of the respondents participated in the drawing.

**Survey Analysis**

When all questionnaires were returned, a datafile of responses was prepared. Resident questionnaires that had been completed in paper form were added to the file of responses entered directly from the internet. No paper questionnaires were collected for the employee survey. Next, the data were reviewed for response inconsistencies, out-of-range values, and other errors and were cleaned as needed. Three duplicate records were eliminated.

The response rate for the resident survey was 7.3%, with 482 residents responding. The response rate for the employee survey was 10%, with 148 employees responding. Because these samples did not constitute random samples, it was not possible to compute confidence levels for the surveys. However, for the resident survey, the consultants compared demographic and travel pattern results against data from the 2000
Census and other published statistics as were available to validate the responses from the survey. Distributions for the survey sample appeared to track distributions for these other sources, suggesting the respondents were similar in key characteristics to what would have been expected for the entire sample frame.

Then the following analysis activities were undertaken for the resident survey:

- Prepared frequency tabulations for each question
- Computed averages and ranges for numeric values where appropriate
- Computed or created additional variables, such as: primary travel mode, commute mode split, work location area, distance from home to Fairfax/Vienna Metro station, non-commute mode split, and other variables that would be used in the analysis
- Prepared cross-tabulations for some combinations of questions, particularly examining responses for commuters who primarily drive alone to work and those who use Metrorail for commuting

The employee survey was more limited in its questions, thus the analysis was limited to the following:

- Prepared frequency tabulations for each question
- Computed averages and ranges for numeric values where appropriate
- Computed or created additional variables, such as: primary travel mode, commute mode split, work location area, distance from home to a bus or train station, non-commute mode split, and other variables that would be used in the analysis

Preliminary results were presented to both the Advisory Team and the Survey Area Group. Both groups proposed questions that encouraged the consultants to conduct additional analysis. The Survey Area Group additionally was asked to provide assistance in grouping neighborhoods into logical groupings for distance analysis.
SECTION 3  RESIDENT SURVEY RESULTS

This section of the report presents the key findings of the resident survey. The tables show both the percentages of respondents who answered each question as well as the number of respondents who answered the question. These numbers are shown as “n=____.” Where relevant, survey results are compared for sub-groups of respondents, for example, respondents who drove alone to work compared with respondents who used Metrorail.

The results in this section are presented in the following sub-sections.

- Characteristics of the sample
- Commute patterns
- Commuting services available at work
- Non-commuting trips

CHARACTERISTICS OF THE SAMPLE

At the end of the survey, respondents were asked a series of questions about themselves and their households, including: age, number of persons in the household, number of children under 16 years old in the household, the number of motor vehicles owned or leased by household members, and neighborhood location. These results are presented first, to define characteristics of the sample. When comparable data were available from a 2005 demographic report for a ½ mile radius around the Vienna Transit Station, these comparisons are shown (Claritas, Inc. SiteReport. June 22, 2005).

Age

As shown in Table 1, about half (47%) of the respondents were between the ages of 25 and 44 and 38% were between 45 and 65. One in ten (12%) was 65 years or older. The last column of the table shows the age distribution from the 2005 demographic report. This comparison suggests that the survey sample might slightly over-represent respondents 45 year or older (50% for survey vs 46% for 2005 Demographics) and under-represent respondents under 25 (3% for survey and 7% for 2005 Demographics).

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Survey Percentage</th>
<th>2005 Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>3%</td>
<td>7%</td>
</tr>
<tr>
<td>25-34</td>
<td>26%</td>
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<tr>
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<td>19%</td>
<td>21%</td>
</tr>
<tr>
<td>55-64</td>
<td>19%</td>
<td>16%</td>
</tr>
<tr>
<td>65 or older</td>
<td>12%</td>
<td>8%</td>
</tr>
</tbody>
</table>
Household Size and Composition

Tables 2 present results on household size and composition. Table 2 shows that 48% of the respondents said two persons lived in their household. About a third (36%) said they had three or more person in the household. The remaining 16% said they live alone. As shown in the last column, the survey sample might slightly over-represent two-person households (48% for survey vs 37% for the 2005 Demographic Report).

<table>
<thead>
<tr>
<th>Number of HH Members</th>
<th>Survey Percentage</th>
<th>2005 Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16%</td>
<td>20%</td>
</tr>
<tr>
<td>2</td>
<td>48%</td>
<td>37%</td>
</tr>
<tr>
<td>3 to 4</td>
<td>30%</td>
<td>36%</td>
</tr>
<tr>
<td>5 to 6</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>7 or more</td>
<td>0%</td>
<td>1%</td>
</tr>
</tbody>
</table>

As seen in Tables 3, the majority of households (68%) had no children under the age of 16. These children comprise about 19% of the total household members. This is quite close to the 2005 Demographic Report calculation of 20% of household members under 16 years of age.

<table>
<thead>
<tr>
<th>HH Members Under 16</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>68%</td>
</tr>
<tr>
<td>1</td>
<td>16%</td>
</tr>
<tr>
<td>2</td>
<td>13%</td>
</tr>
<tr>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>4 or more</td>
<td>1%</td>
</tr>
</tbody>
</table>
Respondents were asked how many motor vehicles (cars, trucks, SUVs, or motorcycles) were owned or leased by members of their household. These results are presented in Table 4.

### Table 4
**Motor Vehicles Owned or Leased by Household Members**

<table>
<thead>
<tr>
<th>Number of Vehicles</th>
<th>Survey Percentage</th>
<th>2005 Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>1</td>
<td>34%</td>
<td>33%</td>
</tr>
<tr>
<td>2 to 4</td>
<td>63%</td>
<td>65%</td>
</tr>
<tr>
<td>5 or more</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

About a third (34%) said they had one motor vehicle. Nearly two-thirds (63%) said they had between two and four motor vehicles. One percent said they had five or more. Just two percent said they did not own any vehicles.

### Neighborhood Location

Finally, respondents were asked to indicate the “neighborhood” where they lived. More than 30 neighborhoods were cited, many noting the name of the condominium or townhouse complex in which they lived or naming a specific street. Details of the named neighborhood distribution are presented in Appendix 3 (Resident survey frequency tabulations). The locations were grouped into categories representing their approximate distances to the Fairfax/Vienna Metro station. These results are shown in Table 5 below. About 24% of the respondents lived within ¼ mile of the station. The majority (62%) lived between ¼ mile and ½ mile and 14% lived more than ½ mile from the station.

### Table 5
**Neighborhood Locations – Distance from Metro Station**

<table>
<thead>
<tr>
<th>Distance</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within ¼ mile</td>
<td>24%</td>
</tr>
<tr>
<td>¼ mile to ½ mile</td>
<td>62%</td>
</tr>
<tr>
<td>More than ½ mile</td>
<td>14%</td>
</tr>
</tbody>
</table>
COMMUTING PATTERNS

The majority (80%) of survey respondents said they regularly traveled to a work or school location outside their home, one or more days per week. A second section of the survey questioned these respondents about their weekly commute patterns, including:

- Type of work schedule
- Time arriving at work
- Work location
- Commute mode(s) used and the frequency of use
- Length of commute

Work Schedule

Days Worked Per Week – As presented in Figure 1, a large majority (76%) of respondents who were employed said they work a full-time, “standard” work schedule; that is five days per week for a total of 35 or more hours. About one in eight (13%) said they work part-time and one in ten (10%) said they work a form of compressed work schedule, in which they work a full-time work week in fewer than five days per week.

Work Schedule Flexibility – Nearly half (40%) of respondents also said they have some flexibility in setting their work hours. They can choose their starting and ending work times, as long as they work a required number of hours in a day or week. Such flexibility would allow these respondents to choose their work hours to avoid traveling during congested times.
**Work Arrival Time**

Respondents were asked what time they arrive at work. The analysis also examined the time that respondents left their homes for work. This question was not asked directly, but was computed from the work arrival time and the length of time it took to travel to work. Results for both of these variables are shown in Table 6.

**Table 6**

*Work Arrival Time and Leave Home for Work Time*

<table>
<thead>
<tr>
<th>Time Group</th>
<th>Percentage Arrival at Work (n=377)</th>
<th>Percentage Leave for Work (n=374)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 midnight - 5:59 am</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>6 am - 6:59 am</td>
<td>6%</td>
<td>18%</td>
</tr>
<tr>
<td>7 am - 7:29 am</td>
<td>11%</td>
<td>14%</td>
</tr>
<tr>
<td>7:30 am - 7:59 am</td>
<td>11%</td>
<td>18%</td>
</tr>
<tr>
<td>8 am - 8:29 am</td>
<td>19%</td>
<td>18%</td>
</tr>
<tr>
<td>8:30 am - 8:59 am</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>9 am - 9:29 am</td>
<td>19%</td>
<td>5%</td>
</tr>
<tr>
<td>9:30 am - 9:59 am</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>10 am - 5:59 pm</td>
<td>11%</td>
<td>6%</td>
</tr>
<tr>
<td>6 pm - 11:59 pm</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

About half (46%) arrive at work between 7:30 am and 8:59 am. The remaining respondents were equally divided between those who arrive before 7:30 am (17%) and arrive at or after 9 am (18%). About half (50%) also said leave home to go to work between 7:30 am and 8:59 am. But more than a third (36%) leave for work before 7:30 am. About one in eight (14%) leave home at 9 am or later.

**Work Location**

Table 7 displays the distribution of respondents’ work locations. As shown, well over half (59%) of the respondents worked in Virginia; 41% in Fairfax County and 18% in another Virginia County. About a third (35%) worked in the District of Columbia. A small percentage (6%) worked in Maryland.
Table 7
Work Locations
(n=386)

<table>
<thead>
<tr>
<th>State/County</th>
<th>Percentage</th>
<th>State/County</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia Counties</td>
<td>59%</td>
<td>Maryland Counties</td>
<td>6%</td>
</tr>
<tr>
<td>Alexandria City</td>
<td>2%</td>
<td>Montgomery Co.</td>
<td>5%</td>
</tr>
<tr>
<td>Arlington Co.</td>
<td>11%</td>
<td>Prince George’s Co.</td>
<td>1%</td>
</tr>
<tr>
<td>Fairfax Co.</td>
<td>41%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loudoun Co.</td>
<td>4%</td>
<td>Other</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>35%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Types of Transportation Used for Travel to Work

Respondents were asked what types of transportation they used to travel to work each weekday (Monday-Friday) during the previous week. If they were sick, on holiday or vacation, or otherwise absent from work one or more days, they indicated one or more “absent” days. Figure 2 and Table 7 present several different views of the use of various types of transportation type.

“Primary” Commute Mode – Figure 2 presents the distribution of respondents by their “primary” mode; that is, the type of transportation they used most days during the week. The largest percentage (53%) of respondents said they usually drove alone to work. More than a third (36%) said they usually rode Metrorail. Smaller percentages said they usually carpooled or vanpooled (7%), rode a bus (3%), or bicycled or walked (1%). About one percent said they primarily teleworked or worked from their homes.
Percentage of Weekly Trips by Mode – Table 8 presents the mode shares as a percentage of weekly commute trips. This table includes both the traditional types of transportation: drive alone, Metrorail/train, carpool/vanpool, bus, and bicycle/walk, and two additional categories – compressed work schedule day off and teleworking. These are not actually travel modes but are included to show the percentage of weekly work trips that were eliminated through use of these work schedule options.

Table 8
Weekly Trips by Mode
(n=380)

<table>
<thead>
<tr>
<th>Transportation Type</th>
<th>Percentage of Weekly Trips</th>
<th>Average Days Used per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive alone</td>
<td>51%</td>
<td>4.4</td>
</tr>
<tr>
<td>Metrorail/other train</td>
<td>36%</td>
<td>4.0</td>
</tr>
<tr>
<td>Carpool/vanpool</td>
<td>7%</td>
<td>3.2</td>
</tr>
<tr>
<td>Bus</td>
<td>3%</td>
<td>3.4</td>
</tr>
<tr>
<td>Bicycle/walk</td>
<td>1%</td>
<td>2.5</td>
</tr>
<tr>
<td>Compressed work schedule day off</td>
<td>1%</td>
<td>1.1</td>
</tr>
<tr>
<td>Telework/work at home</td>
<td>2%</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Driving alone accounted for just over half (51%) of weekly commute trips. About a third (36%) of weekly trips were made by Metrorail/train and seven percent were made by carpool or vanpool. Three percent of trips were made by bus and one percent were made by bicycling or walking. About three percent of “trips” were eliminated by use of teleworking or compressed work schedule.

Average Days Using Each Mode – Table 8 also provides the average number of days respondents used each type of transportation. Respondents generally were consistent in their choice of commute mode. All of the traditional commute modes, excluding bicycling/walking, were used at least three days per week on average. This is consistent with other results in the survey, which show that about 75% used the same type of transportation every day they commuted to work.

Respondents who drove alone or used Metrorail, used these modes on average four or more days per week. Respondents who carpooled/vanpooleed or rode a bus used these modes slightly less often, about 3.2 to 3.4 days per week. Bicycling/walking, and telworking were used 2.5 days and 1.5 days per week on average.

Travel Mode by Work Location – The mode distribution shown above is for all employed respondents. But the mode distribution was different for respondents who worked in different states. As shown in Table 9, 80% of respondents who worked in Virginia and 68% of respondents who worked in Maryland
drove alone to work. By contrast, only nine percent of respondents who worked in the District of Columbia drove to work; 77% of these respondents chose Metrorail.

Table 9
Primary Commute Mode by Work Location

<table>
<thead>
<tr>
<th>Commute Mode</th>
<th>Virginia (n=202)</th>
<th>Maryland (n=19)</th>
<th>DC (n=120)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive alone</td>
<td>80%</td>
<td>68%</td>
<td>9%</td>
</tr>
<tr>
<td>Carpool/vanpool</td>
<td>4%</td>
<td>5%</td>
<td>9%</td>
</tr>
<tr>
<td>Metrorail</td>
<td>13%</td>
<td>16%</td>
<td>77%</td>
</tr>
</tbody>
</table>

Length of Commute

Number of Miles – Commuters in the sample had a wide range of commute distances, ranging from less than one mile to 50 miles. Table 10 presents the distribution of distance. The average one-way commute distance was 13.1 miles, somewhat less than the 16.5 mile average calculated for the Washington region in the 2004 regional State of the Commute Survey conducted by the Council of Governments.

Table 10
Commute Distance (miles)
(n=373)

<table>
<thead>
<tr>
<th>Number of Miles</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 miles</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>5 to 9.9 miles</td>
<td>19%</td>
<td>30%</td>
</tr>
<tr>
<td>10 to 14.9 miles</td>
<td>22%</td>
<td>52%</td>
</tr>
<tr>
<td>15 to 19.9 miles</td>
<td>30%</td>
<td>82%</td>
</tr>
<tr>
<td>20 to 29.9 miles</td>
<td>15%</td>
<td>97%</td>
</tr>
<tr>
<td>30 or more miles</td>
<td>3%</td>
<td>100%</td>
</tr>
<tr>
<td>Average/mean</td>
<td>13.1 miles</td>
<td></td>
</tr>
</tbody>
</table>

About one-third (30%) of the respondents commuted fewer than 10 miles one-way. About half (52%) said they traveled between 10 and 19.9 miles. About one in five (18%) had commute distances of 30 miles or greater.
**Commute Travel Time** – Survey respondents commuted, on average, about 35 minutes one way, approximately the same as the 34 minute regional average as measured in the 2004 State of the Commute Survey. As shown in Table 11, about a third (37%) of respondents commuted less than 30 minutes and 53% commuted between 30 and 59 minutes. The remaining 11% traveled more than an hour.

Table 11

<table>
<thead>
<tr>
<th>Commute Time (minutes)</th>
<th>(n=378)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Minutes</td>
<td>Percentage</td>
</tr>
<tr>
<td>Less than 15 minutes</td>
<td>11%</td>
</tr>
<tr>
<td>15 to 29 minutes</td>
<td>26%</td>
</tr>
<tr>
<td>30 to 44 minutes</td>
<td>28%</td>
</tr>
<tr>
<td>45 to 59 minutes</td>
<td>25%</td>
</tr>
<tr>
<td>60 to 89 minutes</td>
<td>10%</td>
</tr>
<tr>
<td>90 or more minutes</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Average/mean</strong></td>
<td>35 minutes</td>
</tr>
</tbody>
</table>

Access to Metrorail Station

As noted earlier, about a third of the employed respondents said they use Metrorail for their commute. As displayed in Figure 3, nearly all (88%) of these respondents said they walk to the station. About seven percent said they drive themselves to the station and park. Two percent said they are dropped off, such as by a family member. The remaining three percent mentioned another access method, such as “bus,” “carpool,” or “bicycle.”

Figure 3

Access to Metrorail Station

(n=161)
COMMUTING SERVICES AVAILABLE AT WORK

Respondents who were employed were asked a third set of questions about commute assistance services that were available to them at their work. They also were asked if various commute assistance services would encourage them to use carpool, vanpool, transit, or bicycling/walking for their commute. The intent of this section was to examine both the currently available services and the motivating value of other commuting services that could be offered to residents. Results to these questions are provided below.

Parking and Commute Financial Incentives Available at Worksite

Over half (56%) of the respondents said they have free parking at their worksite. The remaining 44% said they have to pay a fee to park if they drive to work. About four in ten (44%) respondents said their employer offers free or discounted transit passes, such as Metrochek, or offers to pay or reimburse a portion of the respondents commuting expenses, other than for parking. The remaining 56% said they did not have access to this financial incentive or they did not know if their employer offered it.

But as shown in Table 12, the availability of free parking and financial incentives for commute modes other than driving alone were not uniformly distributed across respondents.

<table>
<thead>
<tr>
<th>Sub-Group</th>
<th>(n=___)</th>
<th>Percentage with Free Parking</th>
<th>Percentage with Incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Commute Mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive alone</td>
<td>195</td>
<td>84%</td>
<td>27%</td>
</tr>
<tr>
<td>Carpool/vanpool</td>
<td>25</td>
<td>60%</td>
<td>68%</td>
</tr>
<tr>
<td>Metrorail</td>
<td>127</td>
<td>13%</td>
<td>63%</td>
</tr>
<tr>
<td>Work State</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virginia</td>
<td>202</td>
<td>73%</td>
<td>26%</td>
</tr>
<tr>
<td>Maryland</td>
<td>19</td>
<td>85%</td>
<td>35%</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>120</td>
<td>14%</td>
<td>64%</td>
</tr>
</tbody>
</table>

Parking and Incentives by Commute Mode – Respondents who said they drive alone were most likely to have free parking at their worksites; 84% of these respondents said they did not have to pay to park.
About 60% of carpoolers/vanpoolers said they had free parking. But among respondents who primarily use Metrorail to get to work, only 13% had free parking available at their work location.

The third column of the table shows a different distribution for financial incentives. About two-thirds of respondents who primarily used either Metrorail (63%) or carpool/vanpool (68%) said their employers offered financial incentives, other than for parking. Only about one-quarter (27%) of respondents who drove alone could receive a financial incentive.

**Parking and Incentives by Work Location** – These results suggest that availability of free parking encourages driving alone and availability of financial incentives encourages use of train and ridesharing. Research in many areas of the U.S. supports these conclusions. However, the bottom section of Table 12 shows that free parking is primarily available to respondents who work in either Virginia or Maryland and is largely not available to respondents who work in the District of Columbia. Only 14% of respondents who worked in DC said they had free parking.

And financial incentives also are primarily available to DC workers. Two-thirds (64%) of respondents who worked in DC had access to financial incentives, compared to about one-third (35%) of respondents who worked in Maryland and one-quarter (26%) of respondents who worked in Virginia.

But respondents who worked in the District would be faced with greater impediments to driving alone, such as congestion, longer commute distances, greater availability and frequency of transit service than would be experienced by workers outside the District. And workers in downtown areas generally have greater access to shopping and convenience services at the work location, which would make it possible to conduct personal business near work without a car. These factors also could influence respondents’ commute mode choices.

**Distance from Work Location to Transit**

Respondents were asked how far they would have to walk to reach the nearest Metrorail station and the nearest bus stop. Respondents generally had good access to transit at work. Results for these questions are presented in Table 12.

**Table 13**

<table>
<thead>
<tr>
<th>Time to Walk from Work Location to Bus Stop and Rail Station</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Walk Time</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Less than 5 minutes</td>
</tr>
<tr>
<td>5 to 10 minutes</td>
</tr>
<tr>
<td>11 to 20 minutes</td>
</tr>
<tr>
<td>More than 20 minutes</td>
</tr>
<tr>
<td>Don’t know</td>
</tr>
</tbody>
</table>
Distance to Bus Stop – As illustrated, about 60% of respondents said they would have to walk no more than 10 minutes to the nearest bus stop. Another eight percent said they would have to walk 11 or more minutes. It is important to note that a third (33%) of respondents did not know the location of the nearest bus stop. It is likely that many of these respondents answered “don’t know” because they are not aware of any bus service in their work area. This suggests that the actual walk time would be more than 20 minutes away for a large portion of the “don’t know” respondents.

Distance to Metrorail Station – About half (52%) of the respondents said the nearest Metrorail station was within 10 minutes walk of their work location and 39% said the nearest station was 11 or more minutes away. It is worth noting that the percentage of “don’t know” responses was much less for rail stations than for bus stops. This is likely because the Metrorail stations are in permanent and more visible locations than are bus stops, thus respondents are more aware of where the stations are in relation to their work locations.

Distance to Transit by Primary Commute Mode – As was the case for other commute characteristics, the walk to transit time was different for respondents who drove alone to work and those who used Metrorail. The overwhelming majority (85%) of respondents who used Metrorail to travel to work said their work location was within 10 minutes of a rail station. But among respondents who drove alone to work, only one third (34%) could walk to a Metrorail station in 10 minutes or less. About 16% said the walk time would be between 11 and 20 minutes, while half (49%) said they would have to walk 20 or more minutes to reach a Metrorail station.

Interest in Other Commute Assistance Services

Respondents were asked if various commute assistance services would encourage them to use non-drive alone types of transportation for their work trips. Some of the services, such as “$100 subsidy for vanpool,” were targeted to a specific non-drive alone mode. Others, such as “Guaranteed Ride Home in case of emergency,” could be used for any non-drive alone mode. Respondents were asked to specify if each service: “would encourage,” “might encourage,” or “would not encourage” them to use transit, ridesharing, or bicycle/walk, as appropriate. Respondents who used the targeted modes now were asked to check “use this mode now.”

Table 14 presents the results of this series of questions. The 12 services presented to respondents are grouped into three categories: financial incentives, access to transit, and information/convenience services. The second column, with the heading of “n=___”, shows the number of respondents who were not currently using the targeted mode who answered the question.

Services Perceived as Most Valuable – As the table indicates, 30% or more respondents cited eight services, those shaded in the table, as services that either “would encourage” or “might encourage” them to use the targeted types of transportation. Four of the services that appear to be influential were in the “Access to Transit” category. These included: safe walking path to Metrorail station, bus/train stop within 10 min walk of work, shuttle to Metrorail station, and more Metrorail station parking. These services were noted by 44%, 42%, 35%, and 30% of respondents, respectively, as having some motivational impact.
Two services were noted in the “Financial Incentive” category. About 36% of respondents said “$100 subsidy for bus/train,” would or might encourage them to use transit and 30% said “$100 subsidy for vanpool” would or might encourage them to use vanpooling.

Two services in the “Information/Convenience Services” category also had support by more than 30% of respondents. These included: “Guaranteed Ride Home in case of emergency, cited by 38% as potentially influential, and “Convenience shopping at Metro station,” which was noted by 31%.

Table 14
Motivational Value of Various Commute Assistance Services

<table>
<thead>
<tr>
<th>Service</th>
<th>(n=__)</th>
<th>Would Encourage</th>
<th>Might Encourage</th>
<th>Would not Encourage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Incentives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$100 subsidy for bus/train</td>
<td>195</td>
<td>17%</td>
<td>18%</td>
<td>64%</td>
</tr>
<tr>
<td>$100 subsidy for vanpool</td>
<td>326</td>
<td>14%</td>
<td>16%</td>
<td>70%</td>
</tr>
<tr>
<td>Access to Transit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safe walking path to Metrorail station</td>
<td>209</td>
<td>30%</td>
<td>13%</td>
<td>56%</td>
</tr>
<tr>
<td>Bus/train stop within 10 min walk of work</td>
<td>191</td>
<td>29%</td>
<td>13%</td>
<td>58%</td>
</tr>
<tr>
<td>Shuttle to Metrorail station</td>
<td>222</td>
<td>22%</td>
<td>14%</td>
<td>65%</td>
</tr>
<tr>
<td>More Metrorail station parking</td>
<td>206</td>
<td>16%</td>
<td>14%</td>
<td>70%</td>
</tr>
<tr>
<td>Information/Convenience Services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Ride Home in case of emergency</td>
<td>183</td>
<td>19%</td>
<td>19%</td>
<td>62%</td>
</tr>
<tr>
<td>Convenience shopping at Metro station</td>
<td>199</td>
<td>17%</td>
<td>15%</td>
<td>69%</td>
</tr>
<tr>
<td>Carpool/vanpool formation assistance</td>
<td>308</td>
<td>10%</td>
<td>18%</td>
<td>72%</td>
</tr>
<tr>
<td>Bus/train schedule/route information</td>
<td>189</td>
<td>9%</td>
<td>15%</td>
<td>76%</td>
</tr>
<tr>
<td>Showers at work for bicyclists</td>
<td>315</td>
<td>10%</td>
<td>11%</td>
<td>79%</td>
</tr>
<tr>
<td>Secure bike storage lockers at work</td>
<td>315</td>
<td>9%</td>
<td>10%</td>
<td>81%</td>
</tr>
</tbody>
</table>

The importance of access to transit is notable, particularly when compared to the functions of other services that were tested in this question. While the specific factors influencing mode choice vary from one commuter to another, most commuters choose their modes based on four factors: availability, cost, time, and convenience of the modes. Since most respondents have a vehicle available for commuting, driving alone is an available option, but transit might be unavailable or difficult to access. The four services included in the “Access to Transit” category are designed to make it easier to reach transit on either the home or work end of the commute trip.
Information and convenience services, with the exception of “Guaranteed Ride Home” and “convenience shopping at Metrorail station,” were generally perceived as less valuable to respondents. It is worth noting that the lower rankings of the two bicycle support services could be due in part to other constraints on bicycling to work, such as long commuting distance or the need to drop a child at school or day care on the way to work.
NON-COMMUTE TRIPS MADE DURING WEEKDAYS

The preceding sections have described results about commuting behavior of the resident respondents who were employed or who regularly traveled to a school location on weekdays. Respondents who were not commuting to a work or school location skipped these commute questions. But all respondents were asked several questions about trips they made from their homes on weekdays for purposes other than for commuting. These questions thus were answered by respondents who are retired or otherwise not working.

Respondents were first asked if they had made any trips in the past two weekdays from their home to another location, for a purpose other than travel to work or school. As shown in Figure 4, about one quarter (22%) of respondents said they did not make any non-commute trips in the past two weekdays. The remaining 78% said they made one or more trips. One third (33%) made one or two trips, a quarter (26%) made three to five trips, and 19% made six or more trips over the two day period. On average respondents made 3.2 trips per person over the two day period or about eight trips per week per respondent.

Figure 4
Number of Non-Commute Trips Made in Past Two Weekdays
(n=476)

Non-Commute Trips Made During the Peak Morning Period

Respondents who said they had made trips for purposes other than commuting were asked how many of these trips were made between 6 am and 9 am. Only about one in five respondents said they made non-commute trips during these morning hours. On average, respondents made 0.8 trips over the two day period or about two trips per week during the morning peak period. Thus, the majority of non-commute trips made from the home location were made in the mid-day or evening hours, rather than during the early morning hours.
Types of Transportation Used for Peak Period Non-Commute Trips

As shown in Table 15, two-thirds (67%) of the non-commute trips made between 6 am and 9 am were made by driving alone. About a quarter (27%) of the trips were made by driving or riding with someone. A large portion of these trips likely were made to pick-up or drop-off someone at another location.

Table 15
Types of Transportation Used for Non-Commute Trips

<table>
<thead>
<tr>
<th>Type of Transportation</th>
<th>Percentage</th>
<th>Ave Trips Per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive alone</td>
<td>67%</td>
<td>1.3</td>
</tr>
<tr>
<td>Riding/driving with someone (CP/VP)</td>
<td>27%</td>
<td>0.5</td>
</tr>
<tr>
<td>Metrorail, other train, bus</td>
<td>4%</td>
<td>0.1</td>
</tr>
<tr>
<td>Walk or bicycle</td>
<td>2%</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Ave weekly trips per respondent</td>
<td></td>
<td>2.0</td>
</tr>
</tbody>
</table>

SUMMARY OF RESULTS

The two primary purposes of the Resident Survey were to examine current commute behavior and explore residents’ access to and interest in commute assistance services at their work locations. Following is a summary of the key results:

Work Schedule

- 80% of all respondents surveyed said they regularly travel to a work or school location. The remaining 20% were not currently working.
- 76% of employed respondents work full time (35 or more hours per week). Another 13% said they work part-time. About 10% said they work a “compressed work schedule.”
- 40% work a flexible schedule – that is, they can choose their start and end times as long as they work a required number of hours in a day or week.
- About a third (36%) of respondents said they leave for work before 7:30 am. Another 50% said they leave between 7:30 am and 8:59 am.

Commute Patterns

- Driving alone is the most popular commute mode among respondents, with over half (52%) of respondents using this as the primary mode. But Metrorail accounts for more than a third of weekly commute trips for respondents.
Respondents generally were consistent in their choice of type of transportation. About 75% said they used the same type of transportation every day they commuted to work.

A large majority (88%) of respondents who use Metrorail to go to work walk to the station. Only about seven percent of respondents drive alone and park.

More than half of the employed respondents (59%) said they work in Virginia: 41% in Fairfax County and 18% in another Virginia county. A third (35%) work in the District of Columbia.

Respondents traveled on average 13.1 miles and 35 minutes to work. The distance was less than the regional average of 16.5 miles one way, but the time was about the same as the 34 minute average for the region in 2004.

**Commuter Assistance Services at the Work Location**

- Respondents generally have good access to transit at their work location: 52% work within 10 minutes walk of a Metrorail station and 60% work within 10 minutes of a bus stop.
- More than half (56%) have free parking at work. The remaining 44% pay a fee to park.
- About four in ten (44%) respondents said their employers offer discount transit passes or will reimburse part of their commute cost.
- Respondents who said they drive alone were most likely to have free parking at their worksites; 84% of these respondents said they did not have to pay to park. But only 13% of respondents who primarily use Metrorail to get to work had free parking available at their work location.
- About two-thirds of respondents who primarily used Metrorail said their employers offered financial incentives, other than for parking. But only about one-quarter (27%) of respondents who drove alone could receive a financial incentive.
- Respondents who drive alone to work said some commute services would or might encourage them to use transit or other non-drive alone transportation to get to work. Valuable services included:

<table>
<thead>
<tr>
<th>Financial Incentives</th>
<th>Encourage</th>
<th>Maybe encourage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100 subsidy for bus/train</td>
<td>17%</td>
<td>18%</td>
</tr>
<tr>
<td>$100 subsidy for vanpool</td>
<td>14%</td>
<td>16%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Access to Transit</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe walking path to Metro station</td>
<td>30%</td>
<td>13%</td>
</tr>
<tr>
<td>Bus/train station &lt;10 min walk from work</td>
<td>29%</td>
<td>13%</td>
</tr>
<tr>
<td>Shuttle to Metrorail station</td>
<td>22%</td>
<td>14%</td>
</tr>
<tr>
<td>More Metrorail station parking</td>
<td>16%</td>
<td>14%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Services</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Guaranteed Ride Home</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>Convenience shops at Metrorail station</td>
<td>17%</td>
<td>15%</td>
</tr>
</tbody>
</table>

**Non-Commuting Trips – All Survey Respondents**

- 78% of all respondents made one or more non-work trips in the two workdays preceding the survey.
• 20% made 1 or more non-work trips between 6 am and 9 am. Respondents made an average of two non-work trips per week during the early morning hours.

• Most (67%) of these trips were made by driving alone. About 27% were made by driving or riding with someone (carpool).

**Demographic Characteristics – All Survey Respondents**

• About a quarter (24%) of the respondents live within ¼ mile of the Vienna Metro station. Most (62%) live between ¼ mile and ½ mile from the station.

• About half (48%) of the respondents said two people live in their household. About a third (36%) said they have three or more people in the household. The remaining 16% said they live alone.

• Most (62%) of the respondents said they do not have any children under 16 in the household.

• About one-third (34%) of the respondents said they have one vehicle (car, truck, SUV, van, motorcycle) in their household. Most (64%) said they have two or more vehicles. Only two percent said they do not have any vehicles.

• About half (47%) of the respondents were between the ages of 25 and 44. About a third (38%) were between 45 and 64. One in ten (12%) was 65 or older.
SECTION 3  EMPLOYEE SURVEY RESULTS

This section of the report presents the key findings of the employee survey. The tables show both the percentages of respondents who answered each question as well as the number of respondents who answered the question. These numbers are shown as “n= ____.” Where relevant, survey results are compared for sub-groups of respondents, for example, respondents who drove alone to work compared with respondents who used Metrorail.

The results in this section are presented in the following sub-sections.

• Characteristics of the sample
• Commute patterns
• Non-commuting trips made during the work day
• Commuting services available at work

CHARACTERISTICS OF THE SAMPLE

At the end of the survey, respondents were asked a series of questions about themselves and their households, including: age, number of motor vehicles owned or leased by household members, racial/ethnic background and occupation. These results are presented first, to define characteristics of the sample.

Age

As shown in Table 16, about half (54%) of the respondents were between the ages of 25 and 44 and 32% were between 45 and 65. One in ten (13%) was between 18 and 24.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>13%</td>
</tr>
<tr>
<td>25-34</td>
<td>28%</td>
</tr>
<tr>
<td>35-44</td>
<td>26%</td>
</tr>
<tr>
<td>45-54</td>
<td>18%</td>
</tr>
<tr>
<td>55-64</td>
<td>14%</td>
</tr>
<tr>
<td>65 or older</td>
<td>2%</td>
</tr>
</tbody>
</table>
Motor Vehicles in the Household

Respondents were asked how many motor vehicles (cars, trucks, SUVs, or motorcycles) were owned or leased by members of their household. These results are presented in Table 17. About a third (34%) said they had one motor vehicle. Another third (37%) said they had two motor vehicles. About one in four (22%) said they had three or more. Eight percent said they did not own any vehicles.

Table 17
Motor Vehicles Owned or Leased by Household Members
(n=148)

<table>
<thead>
<tr>
<th>Number of Vehicles</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8%</td>
</tr>
<tr>
<td>1</td>
<td>32%</td>
</tr>
<tr>
<td>2</td>
<td>37%</td>
</tr>
<tr>
<td>3 to 4</td>
<td>21%</td>
</tr>
<tr>
<td>5 or more</td>
<td>1%</td>
</tr>
</tbody>
</table>

Racial/Ethnic Background

A significant majority (83%) of respondents said they were of White/non-Hispanic ethnic/racial heritage. As shown in Table 18, small percentages of respondents said they were African-American (6%), Asian (5%), Hispanic (3%), or Other (3%) ethnic/racial background.

Table 18
Racial/Ethnic Background
(n=136)

<table>
<thead>
<tr>
<th>Racial/Ethnic Group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>White, non-Hispanic</td>
<td>83%</td>
</tr>
<tr>
<td>African-American</td>
<td>6%</td>
</tr>
<tr>
<td>Asian</td>
<td>5%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
</tr>
</tbody>
</table>
**Occupation**

Finally, respondents were asked to indicate their occupation from choices provided in the list shown in Table 19. The overwhelming majority (72%) of respondents said their jobs were “professional.” An additional 17% said they were in “executive/managerial” positions. Because the survey was conducted at only employers, all of which are consulting or professional service employers, this large percentage of white-collar occupations is not surprising. About six percent of the respondents said they worked in “administrative support or clerical” positions. A small number of respondents said they had another occupation.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional</td>
<td>72%</td>
</tr>
<tr>
<td>Executive/managerial</td>
<td>17%</td>
</tr>
<tr>
<td>Administrative support, clerical</td>
<td>6%</td>
</tr>
<tr>
<td>Technician</td>
<td>3%</td>
</tr>
<tr>
<td>Military</td>
<td>1%</td>
</tr>
<tr>
<td>Sales</td>
<td>1%</td>
</tr>
<tr>
<td>Laborer</td>
<td>0%</td>
</tr>
<tr>
<td>Precision craft</td>
<td>0%</td>
</tr>
<tr>
<td>Machine operator, assembler</td>
<td>0%</td>
</tr>
<tr>
<td>Maintenance, facilities services</td>
<td>0%</td>
</tr>
<tr>
<td>Retail, hospitality service</td>
<td>0%</td>
</tr>
</tbody>
</table>

**COMMUTING PATTERNS**

A second section of the survey questioned respondents about their weekly commute patterns, including:

- Type of work schedule
- Time arriving at work
- Home location
- Commute mode(s) used and the frequency of use
- Length of commute
Work Schedule

Days Worked Per Week – As presented in Figure 5, nearly all (93%) of respondents said they worked a full-time, “standard” work schedule; that is five days per week for a total of 35 or more hours. About one in twenty (5%) said they work part-time and a very small number (2%) said they work a form of compressed work schedule, in which they work a full-time work week in fewer than five days per week.

![Figure 5: Work Schedule Type](n=147)

Full-time, 5-day week, 93%

Part-time, 5%

CWS, 2%

Work Schedule Flexibility – Almost three-quarters (71%) of respondents said they have some flexibility in setting their work hours. They can choose their starting and ending work times, as long as they work a required number of hours in a day or week. Such flexibility would allow these respondents to choose their work hours to avoid traveling during congested times.

Work Arrival and Departure Times

Respondents were asked what time they arrived at work and what time they usually left work to go home. Results for the arrival time are shown in Table 20. Results for departure time are presented in Table 21.

Arrival Time – About half (54%) of the respondents said they arrive at work between 6 am and 8:59 am. About a quarter (23%) arrive just at the end of the peak period, between 9 am and 9:29 am. The remaining 23% of respondents arrived at or after 9:30 am.
### Table 20
**Work Arrival Time**
(n=147)

<table>
<thead>
<tr>
<th>Time Group</th>
<th>Percentage (n=147)</th>
<th>Time Group</th>
<th>Percentage (n=147)</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the a.m. Peak</td>
<td></td>
<td>After the a.m. Peak</td>
<td></td>
</tr>
<tr>
<td>6 am - 7:59 am</td>
<td>8%</td>
<td>9 am - 9:29 am</td>
<td>23%</td>
</tr>
<tr>
<td>7 am - 7:29 am</td>
<td>4%</td>
<td>9:30 am - 9:59 am</td>
<td>16%</td>
</tr>
<tr>
<td>7:30 am - 7:59 am</td>
<td>12%</td>
<td>10 am - 5:59 pm</td>
<td>7%</td>
</tr>
<tr>
<td>8 am - 8:29 am</td>
<td>15%</td>
<td>6 pm - 11:59 pm</td>
<td>0%</td>
</tr>
<tr>
<td>8:30 am - 8:59 am</td>
<td>15%</td>
<td>12 midnight - 5:59 am</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Departure Time** – Departure times were more concentrated than were arrival times. As shown in Table 21, 80% of respondents said they leave work during the peak period hours of 4 pm to 6:59 pm. Two-thirds (65%) leave work between 5 pm and 6:59 pm and 15% leave between 4 pm and 4:59 pm. Only about seven percent leave earlier than 4 pm and only 13% leave at 7 pm or later.

### Table 21
**Work Departure Time**

<table>
<thead>
<tr>
<th>Time Group</th>
<th>Percentage (n=147)</th>
<th>Time Group</th>
<th>Percentage (n=147)</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the p.m. Peak</td>
<td></td>
<td>Before the p.m. Peak</td>
<td></td>
</tr>
<tr>
<td>4 pm – 4:29 pm</td>
<td>7%</td>
<td>6 am – 9:59 am</td>
<td>0%</td>
</tr>
<tr>
<td>4:30 pm – 4:59 pm</td>
<td>8%</td>
<td>10 am – 3:59 pm</td>
<td>7%</td>
</tr>
<tr>
<td>5 pm – 5:29 pm</td>
<td>16%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5:30 pm – 5:59 pm</td>
<td>15%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During the p.m. Peak</td>
<td></td>
<td>After the p.m. Peak</td>
<td></td>
</tr>
<tr>
<td>6 pm – 6:29 pm</td>
<td>22%</td>
<td>7 pm - 7:59 pm</td>
<td>12%</td>
</tr>
<tr>
<td>6:30 pm - 6:59 pm</td>
<td>12%</td>
<td>8 pm – 5:59 am</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Types of Transportation Used for Travel to Work**

Respondents were asked what types of transportation they used to travel to work each weekday (Monday-Friday) during the previous week. If they were sick, on holiday or vacation, or otherwise absent from
work one or more days, they indicated one or more “absent” days. Figure 6 and Table 22 present two different views of the use of various types of transportation type.

“Primary” Commute Mode – Figure 7 presents the distribution of respondents by their “primary” mode; that is, the type of transportation they used most days during the week. The largest percentage (76%) of respondents said they usually drove alone to work. About one in five (17%) said they usually rode Metrorail. Smaller percentages said they usually carpooled or vanpooled (1%), rode a bus (1%), or bicycled or walked (2%). About four percent said they primarily teleworked or worked from their homes.

**Figure 6**
Primary Commute Mode

(n=145)

**Percentage of Weekly Trips by Mode** – Table 22 presents the mode shares as a percentage of weekly commute trips. This table includes both the traditional types of transportation: drive alone, Metrorail/train, carpool/vanpool, bus, and bicycle/walk, and two additional categories – compressed work schedule day off and teleworking. These are not actually travel modes but are included to show the percentage of weekly work trips that were eliminated through use of these work schedule options.

**Table 22**
Weekly Trips by Mode

(n=145)

<table>
<thead>
<tr>
<th>Transportation Type</th>
<th>Percentage of Weekly Trips</th>
<th>Average Days Used per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive alone</td>
<td>73%</td>
<td>4.2</td>
</tr>
<tr>
<td>Metrorail/other train</td>
<td>18%</td>
<td>3.7</td>
</tr>
<tr>
<td>Carpool/vanpool</td>
<td>1%</td>
<td>1.8</td>
</tr>
<tr>
<td>Bus</td>
<td>1%</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Driving alone accounted for nearly three-quarters (73%) of weekly commute trips. About one in five (18%) weekly trips was made by Metrorail/train and two percent were made by walking or bicycling. A small number (1%) were made by carpool/vanpool and one percent were made by bus. Teleworking accounted for about five percent of “trips,” but these were actually trips eliminated when the respondent did not travel to the work location on those work days.

### Average Days Using Each Mode

Table 22 also provides the average number of days respondents used each type of transportation. Respondents generally were consistent in their choice of commute mode, with most traditional commute modes, excluding bus and carpool/vanpool, were used at least three days per week on average. This is consistent with other results in the survey, which show that about 72% used the same type of transportation every day they commuted to work.

Respondents who drove alone used this mode on average 4.2 days per week. Respondents who used Metrorail or bicycle/walking also were regular users of these modes, using them on average 3.7 and 3.2 days per week, respectively. Carpoolers/vanpoolers and bus riders were less consistent users of these modes, using them on average two or fewer days per week. Respondents who teleworked used this work schedule option an average of 1.7 days per week.

### Home Location

Table 23 displays the distribution of respondents’ home locations. Over three-quarters (76%) lived in Virginia; 48% in Fairfax County, 15% in Arlington County, and 13% in another Virginia County. About one in ten (10%) lived in the District of Columbia. The remaining 14% lived in Maryland.

<table>
<thead>
<tr>
<th>State/County</th>
<th>Percentage</th>
<th>State/County</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virginia Counties</td>
<td>76%</td>
<td>Maryland Counties</td>
<td>14%</td>
</tr>
<tr>
<td>Alexandria City</td>
<td>6%</td>
<td>Montgomery Co.</td>
<td>11%</td>
</tr>
<tr>
<td>Arlington Co.</td>
<td>15%</td>
<td>Prince George’s Co.</td>
<td>3%</td>
</tr>
<tr>
<td>Fairfax Co.</td>
<td>48%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>District of Columbia</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Length of Commute

Number of Miles – Commuters in the sample had a wide range of commute distances, ranging from less than one mile to 60 miles. Table 24 presents the distribution of distance. The average one-way commute distance was 15.3 miles, about equal to the 16.5 mile regional average, as calculated for the Washington region in the 2004 regional State of the Commute Survey conducted by the Council of Governments.

Table 24
Commute Distance (miles)
(n=147)

<table>
<thead>
<tr>
<th>Number of Miles</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 miles</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>5 to 9.9 miles</td>
<td>20%</td>
<td>31%</td>
</tr>
<tr>
<td>10 to 14.9 miles</td>
<td>23%</td>
<td>54%</td>
</tr>
<tr>
<td>15 to 19.9 miles</td>
<td>20%</td>
<td>74%</td>
</tr>
<tr>
<td>20 to 29.9 miles</td>
<td>16%</td>
<td>90%</td>
</tr>
<tr>
<td>30 or more miles</td>
<td>10%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Average/mean</strong></td>
<td><strong>15.3 miles</strong></td>
<td></td>
</tr>
</tbody>
</table>

About one-third (31%) commuted fewer than 10 miles one-way. About four in ten (43%) said they traveled between 10 and 19.9 miles. About one-quarter (26%) had commute distances of 30 miles or greater.

Commute Travel Time – Survey respondents commuted, on average, about 39 minutes one way, slightly higher than the 34 minute regional average as measured in the 2004 State of the Commute Survey. As shown in Table 25, about four in ten (40%) of respondents commuted less than 30 minutes and 53% commuted between 30 and 59 minutes. The remaining 19% traveled an hour or more.

Table 25
Commute Time (minutes)
(n=147)

<table>
<thead>
<tr>
<th>Number of Minutes</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 15 minutes</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>15 to 29 minutes</td>
<td>33%</td>
<td>41%</td>
</tr>
<tr>
<td>30 to 44 minutes</td>
<td>23%</td>
<td>64%</td>
</tr>
<tr>
<td>45 to 59 minutes</td>
<td>17%</td>
<td>81%</td>
</tr>
</tbody>
</table>

NON-COMMUTE TRIPS MADE DURING THE WORK DAY

The preceding sections have described results about commuting behavior. Respondents also were asked several questions about trips they made during their work day for purposes other than for commuting. These results are shown in Figure 7 and Table 26.

About half (49%) of respondents said they did not make any non-commute trips during their work day in the past two weekdays. The remaining 51% said they made one or more trips. One third (35%) made one or two trips, 14% made three to five trips, and two percent made six or more trips over the two day period. On average, respondents made 1.2 trips over the two day period or about three trips per week.

Two-thirds (69%) of the non-commute trips were made by driving alone. About 17% were made by train or bus and one in ten (9%) trips was made by driving or riding with someone.

Table 26
Types of Transportation Used for Non-Commute Trips
(n=75)
Respondents were asked a third set of questions about commute assistance services that were available to them at their work. They also were asked if various commute assistance services would encourage them to use carpool, vanpool, transit, or bicycling/walking for their commute. The intent of this section was to examine both the currently available services and the motivating value of other commuting services that could be offered to employees. Results to these questions are provided below.

**Parking and Commute Financial Incentives Available at Worksite**

**Parking Location and Fees** – Respondents were asked where they parked if they drove to work and if they had to pay to park. Nearly all (95%) of the respondents said they parked “on-site” when they drove. The remaining five percent said they parked “off-site,” “on the street,” or in “another location.”

Table 27 shows the distribution of parking fees paid by employees. About three in ten (31%) said they have free parking at their work location. The majority (69%) said they have to pay a fee to park if they drive to work. Respondents paid between $5 per month and $115 per month to park, with an average fee of $13 per month. Sixty-five percent paid between $1 and $24 per month.

**Table 27
Amount of Parking Fee at Work**

<table>
<thead>
<tr>
<th>Monthly parking charge</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0 (free parking)</td>
<td>31%</td>
</tr>
<tr>
<td>$1 to $24 per month</td>
<td>65%</td>
</tr>
<tr>
<td>$25 to $49 per month</td>
<td>2%</td>
</tr>
<tr>
<td>$50 to $74 per month</td>
<td>0%</td>
</tr>
<tr>
<td>$75 to $99 per month</td>
<td>0%</td>
</tr>
<tr>
<td>$100 or more per month</td>
<td>2%</td>
</tr>
</tbody>
</table>
Financial Incentives for Non-Drive Alone – Nearly all (88%) of respondents said their employer offers free or discounted transit passes, such as Metrochek, or offers to pay or reimburse a portion of the respondents commuting expenses, other than for parking. The remaining 12% said they did not have access to this financial incentive or they did not know if their employer offered it.

Table 28 presents the distribution of respondents by the amount of incentive payment or reimbursement the employer provides. As shown, about two-thirds of respondents who said they had access to a financial incentive for non-drive alone commuting could receive between $31 and $60 per month. About a quarter said the incentive was less than $31 per month and 13% said they could receive more than $60 per month.

<table>
<thead>
<tr>
<th>Monthly incentive</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1 to $30 per month</td>
<td>23%</td>
</tr>
<tr>
<td>$31 to $60 per month</td>
<td>64%</td>
</tr>
<tr>
<td>$61 to $99 per month</td>
<td>3%</td>
</tr>
<tr>
<td>$100 or more per month</td>
<td>10%</td>
</tr>
</tbody>
</table>

Interest in Other Commute Assistance Services

Respondents were asked if various commute assistance services would encourage them to use non-drive alone types of transportation for their work trips. Some of the services, such as “$100 subsidy for vanpool,” were targeted to a specific non-drive alone mode. Others, such as “Guaranteed Ride Home in case of emergency,” could be used for any non-drive alone mode. Respondents were asked to specify if each service: “would encourage,” “might encourage,” or “would not encourage” them to use transit, ridesharing, or bicycle/walk, as appropriate. Respondents who used the targeted modes now were asked to check “use this mode now.”

Table 29 presents the results of this series of questions. The 11 services presented to respondents are grouped into three categories: financial incentives, access to transit, and information/convenience services. The second column, with the heading of “n=___”, shows the number of respondents who were not currently using the targeted mode who answered the question.

Services Perceived as Most Valuable – As the table indicates, 30% or more respondents cited six services, those shaded in the table, as services that either “would encourage” or “might encourage” them to use the targeted types of transportation. Two of the services that appear to be influential were in the “Access to Transit” category. These included: shuttle to Metrorail station, and more Metrorail station
parking. These services were noted by 39%, and 33% of respondents, respectively, as having some motivational impact.

Two services were noted in the “Financial Incentive” category. About 44% of respondents said “$100 subsidy for bus/train,” would or might encourage them to use transit and 34% said “$100 subsidy for vanpool” would or might encourage them to use vanpooling.

Two services in the “Information/Convenience Services” category also had support by more than 30% of respondents. These included: “Guaranteed Ride Home in case of emergency, cited by 44% as potentially influential, and “Convenience shopping at Metro station,” which was noted by 33%.
### Table 29
Motivational Value of Various Commute Assistance Services

<table>
<thead>
<tr>
<th>Service</th>
<th>(n=__)</th>
<th>Would Encourage</th>
<th>Might Encourage</th>
<th>Would not Encourage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial Incentives</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$100 subsidy for bus/train</td>
<td>102</td>
<td>27%</td>
<td>17%</td>
<td>56%</td>
</tr>
<tr>
<td>$100 subsidy for vanpool</td>
<td>130</td>
<td>13%</td>
<td>21%</td>
<td>66%</td>
</tr>
<tr>
<td><strong>Access to Transit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shuttle to Metrorail station</td>
<td>85</td>
<td>25%</td>
<td>14%</td>
<td>61%</td>
</tr>
<tr>
<td>More Metrorail station parking (home end)</td>
<td>96</td>
<td>19%</td>
<td>16%</td>
<td>66%</td>
</tr>
<tr>
<td>Safe walking path from Metrorail station</td>
<td>93</td>
<td>17%</td>
<td>12%</td>
<td>71%</td>
</tr>
<tr>
<td><strong>Information/Convenience Services</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Ride Home in case of emergency</td>
<td>105</td>
<td>18%</td>
<td>26%</td>
<td>56%</td>
</tr>
<tr>
<td>Convenience shopping at Metro station</td>
<td>99</td>
<td>21%</td>
<td>12%</td>
<td>67%</td>
</tr>
<tr>
<td>Carpool/vanpool formation assistance</td>
<td>130</td>
<td>7%</td>
<td>21%</td>
<td>72%</td>
</tr>
<tr>
<td>Showers at work for bicyclists</td>
<td>109</td>
<td>15%</td>
<td>12%</td>
<td>73%</td>
</tr>
<tr>
<td>Bus/train schedule/route information</td>
<td>100</td>
<td>10%</td>
<td>15%</td>
<td>75%</td>
</tr>
<tr>
<td>Secure bike storage lockers at work</td>
<td>114</td>
<td>13%</td>
<td>11%</td>
<td>75%</td>
</tr>
</tbody>
</table>

The importance of access to transit is notable, particularly when compared to the functions of other services that were tested in this question. While the specific factors influencing mode choice vary from one commuter to another, most commuters choose their modes based on four factors: availability, cost, time, and convenience of the modes. Since most respondents have a vehicle available for commuting, driving alone is an available option, but transit might be unavailable or difficult to access. The four services included in the “Access to Transit” category are designed to make it easier to reach transit on either the home or work end of the commute trip.

Information and convenience services, with the exception of “Guaranteed Ride Home” and “convenience shopping at Metrorail station,” were generally perceived as less valuable to respondents. It is worth noting that the lower rankings of the two bicycle support services could be due in part to other constraints on bicycling to work, such as long commuting distance or the need to drop a child at school or day care on the way to work.
SUMMARY OF RESULTS – EMPLOYEE SURVEY

The two primary purposes of the Employee Survey were to examine current commute behavior and explore residents’ access to and interest in commute assistance services at their work locations. Following is a summary of the key results:

Work Schedule

- 93% of employed respondents worked full time (35 or more hours per week). About 2% said they work a “compressed work schedule.”
- 71% worked a flexible schedule – that is, they can choose their start and end times as long as they work a required number of hours in a day or week.
- About a quarter (24%) arrived at work before 8 am. About half (53%) arrived between 8 am and 9:29 am. The remaining quarter arrived at 9:30 am or later.
- Work departure times were more concentrated than were arrival times. About two-thirds (65%) leave between 5 pm and 6:59 pm. Another 15% said they leave work between 4 pm and 4:59 pm.

Commute Patterns

- Driving alone is the most popular commute transportation among respondents, with over more than three-fourths (76%) of respondents using this as the primary mode. The second most popular mode was Metrorail. About one in five (17%) respondents primarily used Metrorail to travel to work.
- Driving alone accounts for about 73% of weekly commute trips for these respondents and Metrorail accounts for about one in five (18%) weekly trips.
- Respondents generally were consistent in their choice of type of transportation. About 72% said they used the same type of transportation every day they commuted to work.
- A large proportion (76%) of respondents said they live in Virginia: 48% in Fairfax County and 28% in another Virginia County. About one in ten (10%) lived in the District of Columbia. The remaining 14% lived in Maryland.
- Respondents traveled on average 15.3 miles and 39 minutes to work.

Non-Commute Trips During the Work Day

- About half (51%) of respondents made one or more non-commute trips during their workday in the over a two day period. Respondents made an average of 3 trips per week during their workday.
- About two-thirds (69%) of these trips were made by driving alone. About 17% were made by transit and 10% were made by driving or riding with someone. Five percent were made by walking or bicycling.

Commuter Assistance Services at the Work Location

- Nearly all (95%) respondents park on-site when they drive to work.
• About one-third (31%) said they park for free. The remaining 69% said they pay a fee to park, with an average fee of $13.00 per month.

• Most (88%) respondents said their employers offer discount transit passes or offer to reimburse part of their commuting expense. About two-thirds of these respondents (64%) said the employer offers between $31 and $60 per month. Another quarter (23%) said they can receive less than $31.

• Respondents who drive alone now said some commute services would or might encourage them to use transit or other non-drive alone transportation to get to work. Valuable services included:

<table>
<thead>
<tr>
<th>Service</th>
<th>Encourage</th>
<th>Maybe encourage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Incentives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$100 subsidy for bus/train (44%)</td>
<td>27%</td>
<td>17%</td>
</tr>
<tr>
<td>$100 subsidy for vanpool (34%)</td>
<td>13%</td>
<td>21%</td>
</tr>
<tr>
<td>Access to Transit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shuttle to Metrorail station (39%)</td>
<td>25%</td>
<td>14%</td>
</tr>
<tr>
<td>More Metrorail station parking (35%)</td>
<td>19%</td>
<td>16%</td>
</tr>
<tr>
<td>Other Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Ride Home (44%)</td>
<td>18%</td>
<td>26%</td>
</tr>
<tr>
<td>Convenience shops at Metrorail station (33%)</td>
<td>21%</td>
<td>12%</td>
</tr>
</tbody>
</table>

**Demographics**

• About two-thirds (69%) of respondents said they had one or two motor vehicles owned or leased by members of their household.

• About half (54%) of the respondents were between the ages of 25 and 44. About a third (34%) were 45 of age or older.

• Nearly three-quarters (72%) of the respondents said they worked in “professional” occupations. Another 17% worked in “executive/managerial” jobs.

• About three-quarters (76%) of respondents were of White/non-Hispanic racial background. Five percent were of Asian background, five percent were African-American, and three percent were Hispanic.
LIST OF APPENDICES

Appendix 1 – Resident Survey Questionnaire

Appendix 2 – Employee Survey Questionnaire

Appendix 3 – Resident Survey Frequency Tabulations

Appendix 4 – Employee survey Frequency Tabulations
APPENDIX 1 – RESIDENT SURVEY QUESTIONNAIRE

(Paper version, on-line version also available)

Fairfax County Resident Transportation Survey

The Fairfax County Department of Transportation is conducting this survey to find ways to improve transportation services around the Vienna-Fairfax-GMU Metrorail Station. Your participation is valuable and your answers will be confidential. Please ask each member of your household 18 years or older to complete this survey and postmark it by May 13, 2005 to: Vienna Metro Survey, c/o UrbanTrans Consultants, 318 Aspen Street, NW, Washington, DC 20012

ENTER TO WIN A PRIZE – Residents who complete the survey will be entered into a drawing for an American Express gift card worth $400. To participate, provide your name and phone number at the end of the survey.

THANK YOU – WE VALUE YOUR INPUT AND COMMENTS!

1. Do you regularly travel to a work or school location outside your home, one or more days per week?
   - No (Skip to question 11, on the other side)
   - Yes (Continue to question 2)

2. Which of the following best describes your assigned work or school schedule? (Check only one box)
   - I work or am at school less than 35 hours per week
   - I work or am at school 5 days per week, 35 or more hours per week
   - I work a 9/80 compressed (alternative) schedule (9 days every two weeks, 80 hours)
   - I work a 4/40 compressed (alternative) schedule (4 10-hour days per week, 40 hours)
   - I work a 3/36 compressed (alternative) schedule (3 12-hour days per week, 36 hours)
   - Other _______________________________________________

3. Do you work a flexible schedule or flex-time, in which you choose the times you start and stop work, as long as you work a required number of hours in a day or week?
   - No
   - Yes

4. In the table below, indicate the number of WEEKDAYS (Mon-Fri) you used each of the types of transportation shown to get to work or school LAST WEEK. If you used more than one type on any day, e.g., walked to a bus stop then rode the bus, count ONLY the type you used for the longest distance part of the trip.
   If you were NOT at your regular work or school location one or more weekdays, indicate if you worked at home all day (telecommute) or if you were absent for another reason (e.g., regular day off, sick, business trip, etc.).

<table>
<thead>
<tr>
<th>Type of Transportation (longest distance part of trip)</th>
<th>Number of Weekdays Used LAST WEEK</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drove alone in a car, truck, SUV, or motorcycle</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Rode in a taxi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drove or rode with others (carpool or vanpool)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Took Metrorail, MARC, Amtrak, or VRE train</td>
<td></td>
<td>Example: I worked five days: I drove alone 3 days, took Metrorail 1 day, and worked at home (telecommute) 1 day</td>
</tr>
<tr>
<td>Took Metrobus, Fairfax Connector, CUE, or other bus</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Walked or bicycled (entire trip from home to work)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worked at home all day (telecommuted)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Absent from work for other reason</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. If you take a bus or train from the Vienna Metrorail station to go to work or school, how do you get to the station?
   - I don’t ever take a bus or train to work/school
   - I drive myself and park
   - I walk
   - I take a bus
   - I bicycle
   - I catch the bus or train at a location other than the Vienna station
   - I carpool and we park
   - I’m dropped off (kiss & ride)

---

Example: I worked five days: I drove alone 3 days, took Metrorail 1 day, and worked at home (telecommute) 1 day
6. About how many miles is it from your home to your usual work/school location? _______ miles
   How many minutes does it typically take you to travel from home to this location? _______ minutes
   At what time do you usually arrive at work/school? ____________ a.m. / p.m. (please circle one)
   What is the zip code of your work/school location? ______________

7. Is FREE parking available to you at or near your work/school? (Please answer, even if you never drive to work)
   q Yes  q No  q Don’t know

   PLEASE TURN OVER AND COMPLETE THE QUESTIONS ON THE OTHER SIDE OF THIS SHEET

8. Does your employer/school offer you free or discounted transit passes (e.g., Metrochek) or offer to pay or reimburse part of your commute expenses, other than for parking?
   q Yes  q No  q Don’t know

9. Listed below are services that could help you travel by carpool, vanpool, bus, train, or bicycle. For each service, check if the service would encourage you to use the type of transportation underlined for your trip to work or school. For example, check “Yes,” for “safe walking route/path to Metrorail station for train, bus riders,” if that service would encourage you to take the train or bus. If you already use the type of transportation noted, check the box “Use Now.”

<table>
<thead>
<tr>
<th>Commuting Service</th>
<th>Would this service encourage you to use carpool, vanpool, bus, train, or bicycle to get to work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistance to form a carpool or vanpool</td>
<td>Yes</td>
</tr>
<tr>
<td>Route/schedule information for bus or train</td>
<td>Yes</td>
</tr>
<tr>
<td>$100 monthly subsidy for vanpools</td>
<td>Yes</td>
</tr>
<tr>
<td>$100 monthly subsidy for bus or train</td>
<td>Yes</td>
</tr>
<tr>
<td>Secure locker, storage at work for bicycle</td>
<td>Yes</td>
</tr>
<tr>
<td>Personal showers at work for employees who bicycle</td>
<td>Yes</td>
</tr>
<tr>
<td>More parking at Metrorail stations for train or bus riders</td>
<td>Yes</td>
</tr>
<tr>
<td>Safe walking route/path to Metrorail station for train, bus riders</td>
<td>Yes</td>
</tr>
<tr>
<td>Guaranteed Ride Home for carpool, vanpool, bus, or train</td>
<td>Yes</td>
</tr>
<tr>
<td>Convenience shopping near Metrorail station for train, bus riders</td>
<td>Yes</td>
</tr>
<tr>
<td>Shuttle bus to bus stop or train station</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Bus stop or train station less than 10 minutes walk from work</strong></td>
<td>Yes</td>
</tr>
</tbody>
</table>

10. How long does it (or would it) take you to walk from your work or school to the nearest...

   Metrorail station? q less than 5 min.  q 5-10 min.  q 11-20 min.  q More than 20 min.  q Don’t know
   Bus stop? q less than 5 min.  q 5-10 min.  q 11-20 min.  q More than 20 min.  q Don’t know

11. In the PAST TWO WEEKDAYS (Mon-Fri), about how many trips did you make from your home to another location for a purpose OTHER THAN travel to work or school (e.g., shopping, personal appointment, pick-up a child)?
   q No non-work trips (skip to question 13) ______________ non-work trips

12. Did you make any of these non-work trips between the hours of 6 am and 9 am?
   q No (skip to question 13)  q Yes

   12a. How many did you make by each of the following types of transportation?
   _______ Drove alone  _______ Drove or rode with others
   _______ Rode bus or Metrorail  _______ Walked or bicycled
Please also answer questions 13-16. This information will be confidential and used ONLY for classification purposes.

13. In what neighborhood do you live (e.g., Circle Woods, Country Creek)?

14. How many persons live in your home? Please count yourself, family, and anyone who may be unrelated to you such as live-in housekeepers or boarders. How many of these household members are under the age of 16?

Total persons in the household _______________

Number of household members under 16 _______________

15. How many motor vehicles (cars, trucks, SUVs, motorcycles) are owned or leased by members of your household?

☐ 0 ☐ 1 ☐ 2 ☐ 3 - 4 ☐ 5 or more

16. Which of the following categories includes your age?

☐ 18 - 24 ☐ 25 - 34 ☐ 35 - 44 ☐ 45 - 54 ☐ 55 - 64 ☐ 65 or older

THANK YOU FOR COMPLETING THE SURVEY!

If you would like to be entered into the prize drawing for the $400 gift card, provide your name and phone number below.

Name ____________________________________________________ Phone: _______________________________

Please check the submit button below. (Paper version will say: Please return the survey to____)
APPENDIX 2 – EMPLOYEE SURVEY QUESTIONNAIRE
(Paper version, but survey was conducted on-line)

Employee Transportation Survey

The Fairfax County Department of Transportation is conducting this survey to find ways to improve transportation services around the Vienna-Fairfax-GMU Metrorail Station. Your participation is valuable and your answers will be confidential. Please complete this survey and postmark it by May 13, 2005 to: Employee Travel Survey, c/o UrbanTrans Consultants, 318 Aspen Street, NW, Washington, DC 20012

ENTER TO WIN A PRIZE – Employees who complete the survey will be entered into a drawing for an American Express gift card worth $400. To participate, provide your name and phone number at the end of the survey.

THANK YOU – WE VALUE YOUR INPUT AND COMMENTS!

1. Which of the following best describes your assigned work schedule? (Check only one box)
   - I work less than 35 hours per week
   - I work 5 days per week, 35 or more hours per week
   - I work a 9/80 compressed (alternative) schedule (9 days every two weeks, 80 hours)
   - I work a 4/40 compressed (alternative) schedule (4 10-hour days per week, 40 hours)
   - I work a 3/36 compressed (alternative) schedule (3 12-hour days per week, 36 hours)
   - Other _______________________________________________

2. Do you work a flexible schedule or flex-time, in which you choose the times you start and stop work, as long as you work a required number of hours in a day or week?
   - No
   - Yes

3. At what time do you usually arrive at work? _______ a.m. p.m. (please circle one)
   At what time do you usually leave work? _______ a.m. p.m. (please circle one)

4. About how many miles is it from your home to your usual work location? _______ miles
   How many minutes does it typically take you to travel from home to this location? _______ minutes

5. In the table below, indicate the number of days (Mon-Fri) you used each of the types of transportation shown to get to your regular work location LAST WEEK. If you used more than one type on any day, e.g., walked to a bus stop then rode the bus, count ONLY the type you used for the longest distance part of the trip.

   If you DID NOT work at your regular work location any day, Monday-Friday, please indicate it you worked at home all day (telecommute) or if you were absent for another reason (e.g., regular day off, sick, business trip, etc.).

<table>
<thead>
<tr>
<th>Type of Transportation (longest distance part of trip)</th>
<th>Number of Weekdays Used LAST WEEK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drove alone in a car, truck, SUV, or motorcycle</td>
<td>3</td>
</tr>
<tr>
<td>Rode in a taxi</td>
<td></td>
</tr>
<tr>
<td>Drove or rode with others (carpool or vanpool)</td>
<td></td>
</tr>
<tr>
<td>Took Metrorail, MARC, Amtrak, or VRE train</td>
<td>1</td>
</tr>
<tr>
<td>Took Metrobus, Fairfax Connector, CUE, or other bus</td>
<td></td>
</tr>
<tr>
<td>Walked or bicycled (entire trip from home to work)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Worked at home all day (telecommuted)</td>
<td>1</td>
</tr>
<tr>
<td>Absent from work for other reason</td>
<td></td>
</tr>
</tbody>
</table>

Example:
I worked five days: I drove alone 3 days, took Metrorail 1 day, and worked at home (telecommute) 1 day
6. In the PAST TWO WORK DAYS (Mon-Fri), about how many trips did you make during your work day for purposes OTHER THAN travel to work (e.g., shopping, personal appointment, pick-up a family member, etc.)?

- No non-work trips (skip to question 7)
- _______ non-work trips

6a. How many of these trips did you make by each of the following types of transportation?

- _______ Drive alone
- _______ Drive/ride with others
- _______ Bus or Metrorail
- _______ Walk or bicycle

7. On days that you drive to work, even if you only drive occasionally, where do you park?

- I never drive to work (skip to question 8)

I park:
- in a lot/garage at my work location
- in a public lot/garage off-site
- on the street
- other ______________________

7a. How much do you pay to park?

- _______ No charge, I park for free
- _______ _______ per: day / month (circle one)

8. Does your employer offer you free or discounted transit passes (e.g., Metrocheck) or offer to pay or reimburse part of your commute expenses, other than for parking?

- No, don’t know (skip to question 9)
- Yes

8a. How much does your employer offer to pay per month?

- $1–30
- $31–60
- $61–99
- $100+
- Don’t know

9. Listed below are services that could help you travel by carpool, vanpool, bus, train, or bicycle. For each service, please check if the service would encourage you to use the type of transportation underlined for your trip to work. For example, check “Yes,” for “safe route/path to walk from Metrorail station for train riders,” if that service would encourage you to take the train. If you already use the type of transportation noted, check the box “Use Now.”

<table>
<thead>
<tr>
<th>Commuting Service</th>
<th>Would the service encourage you to use carpool, vanpool, bus, train, or bicycle to get to work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistance to form a carpool or vanpool</td>
<td>Yes</td>
</tr>
<tr>
<td>Route/schedule information for bus or train</td>
<td></td>
</tr>
<tr>
<td>$100 monthly subsidy for vanpools</td>
<td></td>
</tr>
<tr>
<td>$100 monthly subsidy for bus or train</td>
<td></td>
</tr>
<tr>
<td>Secure locker, storage at work for bicycle</td>
<td></td>
</tr>
<tr>
<td>Personal showers at work for employees who bicycle</td>
<td></td>
</tr>
<tr>
<td>More parking at home-area Metrorail station for train riders</td>
<td></td>
</tr>
<tr>
<td>Safe route/path to walk from Metrorail station for train riders</td>
<td></td>
</tr>
<tr>
<td>Guaranteed Ride Home for carpool, vanpool, bus, or train</td>
<td></td>
</tr>
<tr>
<td>Convenience shopping near Metrorail station for train riders</td>
<td></td>
</tr>
<tr>
<td>Shuttle bus to bus stop or train station</td>
<td></td>
</tr>
</tbody>
</table>

Please also answer questions 10-14. This information will be confidential and used ONLY for classification purposes.

10. What is your zip code at home? ______________________

11. How many motor vehicles (cars, trucks, SUVs, motorcycles) are owned or leased by members of your household?

- 0
- 1
- 2
- 3-4
- 5 or more

12. Which of the following categories includes your age?
13. **Which of the following categories best describes your occupation?**

- Sales
- Technician
- Executive/managerial
- Administrative support, clerical
- Laborer
- Professional
- Machine operator, assembler
- Maintenance, facilities service
- Military
- Precision craft
- Retail, hospitality service
- Other ______________________

14. **What is your MAIN racial or ethnic heritage?**

- White, non-Hispanic
- Hispanic/Latino
- Asian
- African-American
- Other

**THANK YOU FOR COMPLETING THE SURVEY!**

If you would like to be entered into the prize drawing for a $400 gift card, provide your name and phone number below.

Name __________________________________________ Phone: _____________________________

Please check the submit button below. (Paper version will say: Please return the survey to______)}
**APPENDIX 3 – RESIDENT SURVEY FREQUENCY TABULATIONS**

- Information included in the following pages.

**APPENDIX 4 – EMPLOYEE SURVEY FREQUENCY TABULATIONS**

- Information included in the following pages, following the Resident Survey Frequency Tabulations.
Fairfax/Vienna Metro TDM - Resident Survey

Final Results - June 9, 2005

Approximate Sample Frame 6,600
Total Sample Size 482 Note: This survey sample does NOT constitute a statistically "random" sample.
Response rate 7%

Web responses 83 17%
Paper responses 399 83%
Commuters in sample 386 80%
Drive alone commuters 216
Metrorail/train commuters 165

Q1 Do you regularly travel to a work or school location outside your home, one or more days per week?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>96</td>
<td>20%</td>
</tr>
<tr>
<td>Yes</td>
<td>386</td>
<td>80%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>482</td>
<td>100%</td>
</tr>
</tbody>
</table>

| Missing/Blank | 0 | 0% |

Total 482 100%

Q2 Which of the following best describes your assigned work or school schedule?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 35 hours per week</td>
<td>49</td>
<td>10%</td>
</tr>
<tr>
<td>5 days/week, 35+ hours per week</td>
<td>295</td>
<td>61%</td>
</tr>
<tr>
<td>9/80 compressed schedule</td>
<td>30</td>
<td>6%</td>
</tr>
<tr>
<td>4/40 compressed schedule</td>
<td>7</td>
<td>1%</td>
</tr>
<tr>
<td>3/36 compressed schedule</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>386</td>
<td>80%</td>
</tr>
</tbody>
</table>

| Missing/Blank                           | 0 | 0% |
| Do not commute                          | 96 | 20% |

Total 482 100%
Q3  Do you work a flexible schedule or flex-time, in which you choose the times you start and stop work, as long as you work a required number of hours in a day or week?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>230</td>
<td>48%</td>
</tr>
<tr>
<td>Yes</td>
<td>156</td>
<td>32%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>386</td>
<td>80%</td>
</tr>
</tbody>
</table>

| DK        | 0       | 0%         |
| Missing/Blank | 0  | 0%         |
| Do not commute | 96 | 20%        |
| Total     | 482     | 100%       |

Q4 - Summary of Commute Mode Split - "Primary Mode" - Mode Used Most Days

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive alone</td>
<td>203</td>
<td>42%</td>
</tr>
<tr>
<td>Carpoo/vanpool</td>
<td>26</td>
<td>5%</td>
</tr>
<tr>
<td>Metrorail/train</td>
<td>135</td>
<td>28%</td>
</tr>
<tr>
<td>Bus</td>
<td>11</td>
<td>2%</td>
</tr>
<tr>
<td>Walk/Bicycle</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>Telecommute</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Total Users*</td>
<td>380</td>
<td>80%</td>
</tr>
</tbody>
</table>

| DK        | 5       | 1%         |
| Missing/Blank | 1  | 0%         |
| Do not commute | 96 | 20%        |
| Total     | 482     | 100%       |

Q4 - Summary of Commute Mode Split (percentage of weekly bips by mode) and Average Days Modes are Used

<table>
<thead>
<tr>
<th>Mode</th>
<th>Ave Days Per Week</th>
<th>Total Wkly Round-Trip</th>
<th>Percent Wk Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive alone</td>
<td>4.4</td>
<td>941</td>
<td>51%</td>
</tr>
<tr>
<td>Carpoo/vanpool</td>
<td>3.2</td>
<td>120</td>
<td>7%</td>
</tr>
<tr>
<td>Metrorail/train</td>
<td>4.0</td>
<td>660</td>
<td>36%</td>
</tr>
<tr>
<td>Bus</td>
<td>3.4</td>
<td>51</td>
<td>3%</td>
</tr>
<tr>
<td>Walk/Bicycle</td>
<td>2.5</td>
<td>10</td>
<td>1%</td>
</tr>
<tr>
<td>Telecommute</td>
<td>1.5</td>
<td>35</td>
<td>2%</td>
</tr>
<tr>
<td>CWS</td>
<td>1.1</td>
<td>12</td>
<td>1%</td>
</tr>
<tr>
<td>Total Users*</td>
<td>1,829</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

* Subset of "commuters"
### Fairfax/Vienna Metro TDM - Resident Survey

#### Q4a - Number of WEEKDAYS last week you... DROVE ALONE (or rode in taxi)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>170</td>
<td>35%</td>
</tr>
<tr>
<td>1 day</td>
<td>9</td>
<td>2%</td>
</tr>
<tr>
<td>2 days</td>
<td>13</td>
<td>3%</td>
</tr>
<tr>
<td>3 days</td>
<td>19</td>
<td>4%</td>
</tr>
<tr>
<td>4 days</td>
<td>26</td>
<td>5%</td>
</tr>
<tr>
<td>5 days</td>
<td>149</td>
<td>31%</td>
</tr>
</tbody>
</table>

**Valid Subtotal**: 386 (80%)

#### Q4b - Number of WEEKDAYS last week you... DROVE OR RODE WITH OTHERS (carpool/vanpool)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>349</td>
<td>72%</td>
</tr>
<tr>
<td>1 day</td>
<td>5</td>
<td>1%</td>
</tr>
<tr>
<td>2 days</td>
<td>8</td>
<td>2%</td>
</tr>
<tr>
<td>3 days</td>
<td>8</td>
<td>2%</td>
</tr>
<tr>
<td>4 days</td>
<td>5</td>
<td>1%</td>
</tr>
<tr>
<td>5 days</td>
<td>11</td>
<td>2%</td>
</tr>
</tbody>
</table>

**Valid Subtotal**: 386 (80%)

#### Q4c - Number of WEEKDAYS last week you... TOOK METRORAIL OR OTHER TRAIN

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>221</td>
<td>46%</td>
</tr>
<tr>
<td>1 day</td>
<td>17</td>
<td>4%</td>
</tr>
<tr>
<td>2 days</td>
<td>17</td>
<td>4%</td>
</tr>
<tr>
<td>3 days</td>
<td>12</td>
<td>2%</td>
</tr>
<tr>
<td>4 days</td>
<td>19</td>
<td>4%</td>
</tr>
<tr>
<td>5 days</td>
<td>100</td>
<td>21%</td>
</tr>
</tbody>
</table>

**Valid Subtotal**: 386 (80%)

---

DK: 0 (0%)
Missing/Blank: 0 (0%)
Do not commute: 96 (20%)

**Total**: 482 (100%)
### Fairfax/Vienna Metro TDM - Resident Survey

#### Q4d - Number of WEEKDAYS last week you... TOOK METROBUS OR OTHER BUS

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>371</td>
<td>77%</td>
</tr>
<tr>
<td>1 day</td>
<td>5</td>
<td>1%</td>
</tr>
<tr>
<td>2 days</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>3 days</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>4 days</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>5 days</td>
<td>7</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>386</td>
<td>80%</td>
</tr>
</tbody>
</table>

DK 0 0%
Missing/Blank 0 0%
Do not commute 96 20%

Total 482 100%

#### Q4e - Number of WEEKDAYS last week you... WALKED OR BICYCLED (entire trip)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>382</td>
<td>79%</td>
</tr>
<tr>
<td>1 day</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>2 days</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>3 days</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>4 days</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>5 days</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>386</td>
<td>80%</td>
</tr>
</tbody>
</table>

DK 0 0%
Missing/Blank 0 0%
Do not commute 96 20%

Total 482 100%

#### Q4f - Number of WEEKDAYS last week you... TELECOMMUTED or WORKED AT HOME

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>363</td>
<td>75%</td>
</tr>
<tr>
<td>1 day</td>
<td>15</td>
<td>3%</td>
</tr>
<tr>
<td>2 days</td>
<td>5</td>
<td>1%</td>
</tr>
<tr>
<td>3 days</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>4 days</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>5 days</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>386</td>
<td>80%</td>
</tr>
</tbody>
</table>

DK 0 0%
Missing/Blank 0 0%
Do not commute 96 20%

Total 482 100%
### Q4g - Number of Weekdays last week you... Had a compressed work schedule day off

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>375</td>
<td>78%</td>
</tr>
<tr>
<td>1 day</td>
<td>10</td>
<td>2%</td>
</tr>
<tr>
<td>2 days</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>3 days</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>4 days</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>5 days</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Valid Subtotal: 386 (80% Valid Perc)

DK: 0 (0% Valid Perc)
Missing/Blank: 0 (0% Valid Perc)
Do not commute: 96 (20% Valid Perc)

Total: 482 (100%)

- 97% CWS day off 0 days/wk
- 3% CWS day off 1-2 days/wk
- 0% CWS day off 3+ days/wk

### Q4h - Number of Weekdays last week you... Were absent from work

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>368</td>
<td>76%</td>
</tr>
<tr>
<td>1 day</td>
<td>9</td>
<td>2%</td>
</tr>
<tr>
<td>2 days</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>3 days</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>4 days</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>5 days</td>
<td>4</td>
<td>1%</td>
</tr>
</tbody>
</table>

Valid Subtotal: 386 (80% Valid Perc)

DK: 0 (0% Valid Perc)
Missing/Blank: 0 (0% Valid Perc)
Do not commute: 96 (20% Valid Perc)

Total: 482 (100%)

DK: 0 (0% Valid Perc)
Missing/Blank: 0 (0% Valid Perc)
Do not commute: 96 (20% Valid Perc)

Total: 482 (100%)
### Fairfax/Vienna Metro TDM - Resident Survey

#### Q5  If you take a bus or train from the Vienna Metrorail station to go to work or school, how do you get to the station?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive myself and park</td>
<td>12</td>
<td>7%</td>
</tr>
<tr>
<td>Take a bus</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Carpool and park</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>Dropped off (kiss &amp; ride)</td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>Walk</td>
<td>141</td>
<td>88%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>161</td>
<td>100%</td>
</tr>
</tbody>
</table>

- **7%** Drive and park
- **88%** Walk to station

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don’t ever take bus/train</td>
<td>208</td>
<td>43%</td>
</tr>
<tr>
<td>Take bus/train from other location</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>DK</td>
<td>10</td>
<td>2%</td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Do not commute</td>
<td>96</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>482</td>
<td>100%</td>
</tr>
</tbody>
</table>

- **43%** Don’t ever take bus/train

**Note:** Ave distance slightly less than 16.5 regional average (2004 SOC survey)

#### Q6a  About how many miles is it from your home to your usual work/school location?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
<th>CumulPerc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 miles</td>
<td>41</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>5 - 9.9 miles</td>
<td>70</td>
<td>19%</td>
<td>30%</td>
</tr>
<tr>
<td>10 - 14.9 miles</td>
<td>83</td>
<td>22%</td>
<td>52%</td>
</tr>
<tr>
<td>15 - 19.9 miles</td>
<td>112</td>
<td>30%</td>
<td>82%</td>
</tr>
<tr>
<td>20 - 29.9 miles</td>
<td>56</td>
<td>15%</td>
<td>97%</td>
</tr>
<tr>
<td>30 or more miles</td>
<td>11</td>
<td>3%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>373</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

- **82%** travel less than 20 mi. to work

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK</td>
<td>12</td>
<td>2%</td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Do not commute</td>
<td>96</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>482</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Average distance** 13.1 miles
Fairfax/Vienna Metro TDM - Resident Survey

Q6a  How many minutes does it typically take you to travel from home to this location?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
<th>CumulPerc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 15 min.</td>
<td>41</td>
<td>9%</td>
<td>11%</td>
</tr>
<tr>
<td>15 - 29 min.</td>
<td>98</td>
<td>20%</td>
<td>26%</td>
</tr>
<tr>
<td>30 - 44 min.</td>
<td>104</td>
<td>22%</td>
<td>28%</td>
</tr>
<tr>
<td>45 - 59 min.</td>
<td>95</td>
<td>20%</td>
<td>25%</td>
</tr>
<tr>
<td>60 - 89 min.</td>
<td>37</td>
<td>8%</td>
<td>10%</td>
</tr>
<tr>
<td>90 or more min.</td>
<td>3</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>378</strong></td>
<td><strong>79%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

| DK           | 7       | 1%         |           |
| Missing/Blank| 1       | 0%         |           |
| Do not commute | 96     | 20%        |           |
| **Total**    | 482     | 100%       |           |

Average time 35 minutes

34 minutes average 2000 Census

Q6b  At what time do you usually arrive at work/school?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 midnight - 5:59 am</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>6 am - 6:59 am</td>
<td>21</td>
<td>4%</td>
</tr>
<tr>
<td>7 am - 7:29 am</td>
<td>41</td>
<td>9%</td>
</tr>
<tr>
<td>7:30 am - 7:59 am</td>
<td>41</td>
<td>9%</td>
</tr>
<tr>
<td>8 am - 8:29 am</td>
<td>70</td>
<td>15%</td>
</tr>
<tr>
<td>8:30 am - 8:59 am</td>
<td>63</td>
<td>13%</td>
</tr>
<tr>
<td>9 am - 9:29 am</td>
<td>73</td>
<td>15%</td>
</tr>
<tr>
<td>9:30 am - 9:59 am</td>
<td>24</td>
<td>5%</td>
</tr>
<tr>
<td>10 am - 5:59 pm</td>
<td>43</td>
<td>9%</td>
</tr>
<tr>
<td>6 pm - 11:59 pm</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>377</strong></td>
<td><strong>78%</strong></td>
</tr>
</tbody>
</table>

| DK           | 4       | 1%         |           |
| Missing/Blank| 5       | 1%         |           |
| Do not commute | 96     | 20%        |           |
| **Total**    | 482     | 100%       |           |

17% arrive before 7:30am
46% arrive btw 7:30-8:59am
18% arrive 9am or later
### Fairfax/Vienna Metro TDM - Resident Survey

**Q6a/Q6b** At what time do you usually leave for work/school?

<table>
<thead>
<tr>
<th>Time</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 midnight - 5:59 am</td>
<td>14</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>6 am - 6:59 am</td>
<td>68</td>
<td>14%</td>
<td>18%</td>
</tr>
<tr>
<td>7 am - 7:29 am</td>
<td>54</td>
<td>11%</td>
<td>14%</td>
</tr>
<tr>
<td>7:30 am - 7:59 am</td>
<td>66</td>
<td>14%</td>
<td>18%</td>
</tr>
<tr>
<td>8 am - 8:29 am</td>
<td>67</td>
<td>14%</td>
<td>18%</td>
</tr>
<tr>
<td>8:30 am - 8:59 am</td>
<td>54</td>
<td>11%</td>
<td>14%</td>
</tr>
<tr>
<td>9 am - 9:29 am</td>
<td>18</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>9:30 am - 9:59 am</td>
<td>12</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>10 am - 5:59 pm</td>
<td>21</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>6 pm - 11:59 pm</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>374</td>
<td>78%</td>
<td>99%</td>
</tr>
</tbody>
</table>

DK 0 0%
Missing/Blank 12 2%
Do not commute 96 20%

Total 482 100%

**36%** leave home before 7:30am
**50%** leave home btw 7:30-8:59am
**14%** leave home 9am or later

### Q6d In what zip code is your work/school location? (Grouped into Counties/States)

**District of Columbia**

- Frequency: 120
- Percent: 25%
- Valid Perc: 35%

**Virginia Counties**

- Alexandria: 8 2% 2%
- Arlington: 37 8% 11%
- Culpepper: 2 0% 1%
- Fairfax: 139 29% 41%
- Loudoun: 13 3% 4%
- Prince William: 1 0% 0%

**Total Virginia**

- Frequency: 200
- Percent: 41%
- Valid Perc: 59%

**Maryland Counties**

- Baltimore: 1 0% 0%
- Montgomery: 17 4% 5%
- Prince George's: 2 0% 1%

**Total Maryland**

- Frequency: 20
- Percent: 4%
- Valid Perc: 6%

**Other**

- Frequency: 1
- Percent: 0%
- Valid Perc: 0%

**Valid Subtotal**

- Frequency: 341
- Percent: 71%
- Valid Perc: 100%

DK 0 0%
Missing/Blank 45 9%
Do not commute 96 20%

Total 482 100%
Q7 Is free parking available at or near your work/school?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>162</td>
<td>34%</td>
</tr>
<tr>
<td>Yes</td>
<td>205</td>
<td>43%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>367</td>
<td>76%</td>
</tr>
</tbody>
</table>

56% Have free parking at work

Q8 Does your employer/school offer you free or discounted transit passes (e.g., Metrocheck) or offer to pay or reimburse part of your commute expenses, other than for parking?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>201</td>
<td>42%</td>
</tr>
<tr>
<td>Yes</td>
<td>158</td>
<td>33%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>359</td>
<td>74%</td>
</tr>
</tbody>
</table>

44% Have access to discount transit pass or other commute cost reimbursement

Q9 Would commute services encourage you to use (type of transportation) for your trip to work or school?

Q9 - Summary of Incentive Value of Commute Services - Commuters NOT using alt mode now

<table>
<thead>
<tr>
<th>Would Service Encourage Use of Mode?</th>
<th>% Non-User</th>
<th>% Yes</th>
<th>% Maybe</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP/VP formation assistance</td>
<td>CP/VP</td>
<td>10%</td>
<td>18%</td>
<td>72%</td>
</tr>
<tr>
<td>Bus/train information</td>
<td>Bus/train</td>
<td>18%</td>
<td>15%</td>
<td>76%</td>
</tr>
<tr>
<td>$100 subsidy for vanpool</td>
<td>Vanpool</td>
<td>14%</td>
<td>16%</td>
<td>70%</td>
</tr>
<tr>
<td>$100 subsidy for bus/train</td>
<td>Bus/train</td>
<td>17%</td>
<td>18%</td>
<td>64%</td>
</tr>
<tr>
<td>Secure bike lockers at work</td>
<td>Bicycle</td>
<td>10%</td>
<td>10%</td>
<td>81%</td>
</tr>
<tr>
<td>Showers at work for bikers</td>
<td>Bicycle</td>
<td>10%</td>
<td>10%</td>
<td>79%</td>
</tr>
<tr>
<td>More Metrorail station parking</td>
<td>Bus/train</td>
<td>16%</td>
<td>14%</td>
<td>70%</td>
</tr>
<tr>
<td>Safe walk path to Metro station</td>
<td>Bus/train</td>
<td>30%</td>
<td>13%</td>
<td>56%</td>
</tr>
<tr>
<td>Guaranteed Ride home</td>
<td>All Non-DA</td>
<td>19%</td>
<td>19%</td>
<td>62%</td>
</tr>
<tr>
<td>Convenience shop at Metrorail sta</td>
<td>Bus/train</td>
<td>17%</td>
<td>15%</td>
<td>69%</td>
</tr>
<tr>
<td>Shuttle to Metrorail station</td>
<td>Bus/train</td>
<td>22%</td>
<td>14%</td>
<td>65%</td>
</tr>
<tr>
<td>Bus/train sta &lt;10 min from work</td>
<td>Bus/train</td>
<td>29%</td>
<td>13%</td>
<td>58%</td>
</tr>
</tbody>
</table>
### Fairfax/Vienna Metro TDM - Resident Survey

**Q9 (cont) Would commute services encourage you to use (type of transportation)?**

#### Q9a - Assistance to form carpool or vanpool

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>32</td>
<td>7%</td>
</tr>
<tr>
<td>Maybe</td>
<td>54</td>
<td>11%</td>
</tr>
<tr>
<td>No</td>
<td>222</td>
<td>46%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>308</strong></td>
<td><strong>64%</strong></td>
</tr>
</tbody>
</table>

- Use mode now | 35 | 7%
- DK | 0 | 0%
- Missing/Blank | 43 | 9%
- Do not commute | 96 | 20%
- **Total** | 482 | 100%

- **28%** "yes" or "maybe"

#### Q9b - Route/schedule information for bus or train

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>17</td>
<td>4%</td>
</tr>
<tr>
<td>Maybe</td>
<td>29</td>
<td>6%</td>
</tr>
<tr>
<td>No</td>
<td>143</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>189</strong></td>
<td><strong>39%</strong></td>
</tr>
</tbody>
</table>

- Use mode now | 169 | 35%
- DK | 0 | 0%
- Missing/Blank | 28 | 6%
- Do not commute | 96 | 20%
- **Total** | 482 | 100%

- **24%** "yes" or "maybe"

#### Q9c - $100 monthly subsidy for vanpools

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>47</td>
<td>10%</td>
</tr>
<tr>
<td>Maybe</td>
<td>52</td>
<td>11%</td>
</tr>
<tr>
<td>No</td>
<td>227</td>
<td>47%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>326</strong></td>
<td><strong>68%</strong></td>
</tr>
</tbody>
</table>

- Use mode now | 2 | 0%
- DK | 0 | 0%
- Missing/Blank | 58 | 12%
- Do not commute | 96 | 20%
- **Total** | 482 | 100%

- **30%** "yes" or "maybe"
### Fairfax/Vienna Metro TDM - Resident Survey

**Q9 (cont) Would commute services encourage you to use (type of transportation)?**

#### Q9d - $100 monthly subsidy for bus or train

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>34</td>
<td>7%</td>
<td>17%</td>
</tr>
<tr>
<td>Maybe</td>
<td>36</td>
<td>7%</td>
<td>18%</td>
</tr>
<tr>
<td>No</td>
<td>125</td>
<td>26%</td>
<td>64%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>195</strong></td>
<td><strong>40%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Use mode now</td>
<td>167</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td>DK</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>24</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Do not commute</td>
<td>96</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>482</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

36% “yes” or “maybe”

#### 9e - Secure locker, storage at work for bicycle

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>30</td>
<td>6%</td>
<td>10%</td>
</tr>
<tr>
<td>Maybe</td>
<td>30</td>
<td>6%</td>
<td>10%</td>
</tr>
<tr>
<td>No</td>
<td>255</td>
<td>53%</td>
<td>81%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>315</strong></td>
<td><strong>65%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Use mode now</td>
<td>10</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>DK</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>61</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>Do not commute</td>
<td>96</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>482</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

19% “yes” or “maybe”

#### 9f - Personal showers at work for employees who bicycle

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>33</td>
<td>7%</td>
<td>10%</td>
</tr>
<tr>
<td>Maybe</td>
<td>33</td>
<td>7%</td>
<td>10%</td>
</tr>
<tr>
<td>No</td>
<td>249</td>
<td>52%</td>
<td>79%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>315</strong></td>
<td><strong>65%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Use mode now</td>
<td>8</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>DK</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>63</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>Do not commute</td>
<td>96</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>482</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

21% “yes” or “maybe”
Fairfax/Vienna Metro TDM - Resident Survey

Q9 (cont) Would commute services encourage you to use (type of transportation)?

9g - More parking at Metrorail stations for train or bus riders

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>33</td>
<td>7%</td>
</tr>
<tr>
<td>Maybe</td>
<td>29</td>
<td>6%</td>
</tr>
<tr>
<td>No</td>
<td>144</td>
<td>30%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>206</td>
<td>43%</td>
</tr>
</tbody>
</table>

- Use mode now: 131 (27%)
- DK: 0 (0%)
- Missing/Blank: 49 (10%)
- Do not commute: 96 (20%)
- Total: 482 (100%)

9h - Safe walking route/path to Metrorail station for train, bus riders

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>63</td>
<td>13%</td>
</tr>
<tr>
<td>Maybe</td>
<td>28</td>
<td>6%</td>
</tr>
<tr>
<td>No</td>
<td>118</td>
<td>24%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>209</td>
<td>43%</td>
</tr>
</tbody>
</table>

- Use mode now: 144 (30%)
- DK: 0 (0%)
- Missing/Blank: 33 (7%)
- Do not commute: 96 (20%)
- Total: 482 (100%)

9i - Guaranteed Ride Home for carpool, vanpool, bus, or train

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>35</td>
<td>7%</td>
</tr>
<tr>
<td>Maybe</td>
<td>34</td>
<td>7%</td>
</tr>
<tr>
<td>No</td>
<td>114</td>
<td>24%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>183</td>
<td>38%</td>
</tr>
</tbody>
</table>

- Use mode now: 179 (37%)
- DK: 0 (0%)
- Missing/Blank: 24 (5%)
- Do not commute: 96 (20%)
- Total: 482 (100%)

30% "yes" or "maybe"

44% "yes" or "maybe"

38% "yes" or "maybe"
Fairfax/Vienna Metro TDM - Resident Survey

Q9 (cont) Would commute services encourage you to use (type of transportation)?

9j - Convenience shopping near Metrorail station for train, bus riders

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>33</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17%</td>
</tr>
<tr>
<td>Maybe</td>
<td>29</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15%</td>
</tr>
<tr>
<td>No</td>
<td>137</td>
<td>28%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>69%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>199</td>
<td>41%</td>
</tr>
</tbody>
</table>

Use mode now 161 33%
DK 0 0%
Missing/Blank 26 5%
Do not commute 96 20%
Total 482 100%

9k - Shuttle bus to bus stop or train station

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>48</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22%</td>
</tr>
<tr>
<td>Maybe</td>
<td>30</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14%</td>
</tr>
<tr>
<td>No</td>
<td>144</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>65%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>222</td>
<td>46%</td>
</tr>
</tbody>
</table>

Use mode now 121 25%
DK 0 0%
Missing/Blank 43 9%
Do not commute 96 20%
Total 482 100%

9l - Bus stop or train station less than 10 minutes walk from work

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>56</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29%</td>
</tr>
<tr>
<td>Maybe</td>
<td>24</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13%</td>
</tr>
<tr>
<td>No</td>
<td>111</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>58%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>191</td>
<td>40%</td>
</tr>
</tbody>
</table>

Use mode now 174 36%
DK 0 0%
Missing/Blank 21 4%
Do not commute 96 20%
Total 482 100%
**Fairfax/Vienna Metro TDM - Resident Survey**

**Q10a** How long does it (or would it) take you to walk from your work or school to the nearest rail station?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 min.</td>
<td>98</td>
<td>20%</td>
</tr>
<tr>
<td>5 - 10 min.</td>
<td>105</td>
<td>22%</td>
</tr>
<tr>
<td>11 - 20 min.</td>
<td>54</td>
<td>11%</td>
</tr>
<tr>
<td>More than 20 min.</td>
<td>97</td>
<td>20%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>354</td>
<td>73%</td>
</tr>
</tbody>
</table>

DK 22 5%
Missing/Blank 10 2%
Do not commute 96 20%
Total 482 100%

56% 10 minutes or less to rail station

**Q10b** How long does it (or would it) take you to walk from your work or school to the nearest bus stop?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 min.</td>
<td>170</td>
<td>35%</td>
</tr>
<tr>
<td>5 - 10 min.</td>
<td>59</td>
<td>12%</td>
</tr>
<tr>
<td>11 - 20 min.</td>
<td>19</td>
<td>4%</td>
</tr>
<tr>
<td>More than 20 min.</td>
<td>11</td>
<td>2%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>259</td>
<td>54%</td>
</tr>
</tbody>
</table>

DK 66 14%
Missing/Blank 61 13%
Do not commute 96 20%
Total 482 100%

88% 10 minutes or less to bus stop

**Q11** In the PAST TWO WEEKDAYS, about how many trips did you make from your home to another location for a purpose OTHER THAN travel to work or school?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>104</td>
<td>22%</td>
</tr>
<tr>
<td>1 to 2</td>
<td>160</td>
<td>33%</td>
</tr>
<tr>
<td>3 to 5</td>
<td>124</td>
<td>26%</td>
</tr>
<tr>
<td>6 to 9</td>
<td>55</td>
<td>11%</td>
</tr>
<tr>
<td>10 or more</td>
<td>33</td>
<td>7%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>476</td>
<td>99%</td>
</tr>
</tbody>
</table>

DK 6 1%
Missing/Blank 0 0%
Total 482 100%

78% made 1 or more non-work trips in past two days

**Average trips**

3.2 trips/person
Q12  Non-work trips during peak a.m. period (6 am - 9 am)?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>378</td>
<td>78%</td>
</tr>
<tr>
<td>1 to 2</td>
<td>44</td>
<td>9%</td>
</tr>
<tr>
<td>3 to 5</td>
<td>30</td>
<td>6%</td>
</tr>
<tr>
<td>6 to 9</td>
<td>15</td>
<td>3%</td>
</tr>
<tr>
<td>10 or more</td>
<td>8</td>
<td>2%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>475</td>
<td>99%</td>
</tr>
</tbody>
</table>

DK 7 1%
Missing/Blank 0 0%
Total 482 100%

Average trips 0.8 trips/person

Q12a - Summary of Commute Mode Split for Peak Period Non-Work Trips (trips made in two days)

<table>
<thead>
<tr>
<th>Total Resp</th>
<th>Mode Users</th>
<th>Ave Trips Per 2 Day</th>
<th>Total Trips</th>
<th>Percent Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive alone</td>
<td>475</td>
<td>75</td>
<td>0.5</td>
<td>255</td>
</tr>
<tr>
<td>Carpool/vanpool</td>
<td>475</td>
<td>34</td>
<td>0.2</td>
<td>101</td>
</tr>
<tr>
<td>Train/bus</td>
<td>475</td>
<td>7</td>
<td>0.0</td>
<td>16</td>
</tr>
<tr>
<td>Walk/Bicycle</td>
<td>475</td>
<td>4</td>
<td>0.0</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>475</td>
<td>8</td>
<td>0.8</td>
<td>380</td>
</tr>
</tbody>
</table>

2.0  Average non-work trips made PER WEEK by each respondent

20% made 1 or more non-work trips during peak period in past two days
### Q13 In what neighborhood do you live?

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acadia</td>
<td>13</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Barkley</td>
<td>4</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Blake Tree Manor</td>
<td>8</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Blakeview</td>
<td>4</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Cedar Grove</td>
<td>6</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Circle Towers</td>
<td>22</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Circle Woods</td>
<td>54</td>
<td>11%</td>
<td>12%</td>
</tr>
<tr>
<td>Country Creek</td>
<td>98</td>
<td>20%</td>
<td>21%</td>
</tr>
<tr>
<td>Cyrandall Valley North</td>
<td>6</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Fairfax</td>
<td>4</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Fairfax Circle</td>
<td>12</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Hunters Branch</td>
<td>32</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>L &amp; M</td>
<td>5</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Linden Square</td>
<td>15</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Lindenbrook Square</td>
<td>5</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Mantua</td>
<td>33</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Marquis</td>
<td>13</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Oakton Crest</td>
<td>4</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Poplar Terrace</td>
<td>8</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Regents Park</td>
<td>45</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>Vienna</td>
<td>12</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Vienna Station</td>
<td>16</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Virginia Center</td>
<td>25</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Other</td>
<td>21</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>465</td>
<td>92%</td>
<td>95%</td>
</tr>
<tr>
<td><strong>DK</strong></td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Missing/Blank</strong></td>
<td>17</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>482</td>
<td>96%</td>
<td></td>
</tr>
</tbody>
</table>

### Q13 Neighborhood locations - grouped by location relative to Metrorail station

<table>
<thead>
<tr>
<th>Distance from Metrorail Station</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 1/4 mile</td>
<td>109</td>
<td>23%</td>
<td>24%</td>
</tr>
<tr>
<td>1/4 mile - 1/2 mile</td>
<td>286</td>
<td>59%</td>
<td>62%</td>
</tr>
<tr>
<td>More than 1/2 mile</td>
<td>64</td>
<td>13%</td>
<td>14%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>459</td>
<td>95%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>DK</strong></td>
<td>5</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td><strong>Missing/Blank</strong></td>
<td>18</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>482</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
Fairfax/Vienna Metro TDM - Resident Survey

Q14  How many persons live in your home?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>77</td>
<td>16%</td>
</tr>
<tr>
<td>2</td>
<td>230</td>
<td>48%</td>
</tr>
<tr>
<td>3 to 4</td>
<td>142</td>
<td>29%</td>
</tr>
<tr>
<td>5 to 6</td>
<td>29</td>
<td>6%</td>
</tr>
<tr>
<td>7 or more</td>
<td>2</td>
<td>0%</td>
</tr>
</tbody>
</table>

Valid Subtotal: 480 (100%)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>264</td>
<td>55%</td>
</tr>
<tr>
<td>1</td>
<td>61</td>
<td>13%</td>
</tr>
<tr>
<td>2</td>
<td>49</td>
<td>10%</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>2%</td>
</tr>
<tr>
<td>4 or more</td>
<td>2</td>
<td>0%</td>
</tr>
</tbody>
</table>

Valid Subtotal: 388 (80%)

Q14b  How many of these household members are under the age of 16?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>264</td>
<td>55%</td>
</tr>
<tr>
<td>1</td>
<td>61</td>
<td>13%</td>
</tr>
<tr>
<td>2</td>
<td>49</td>
<td>10%</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>2%</td>
</tr>
<tr>
<td>4 or more</td>
<td>2</td>
<td>0%</td>
</tr>
</tbody>
</table>

Valid Subtotal: 388 (80%)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11</td>
<td>2%</td>
</tr>
<tr>
<td>1</td>
<td>166</td>
<td>34%</td>
</tr>
<tr>
<td>2 to 4</td>
<td>302</td>
<td>63%</td>
</tr>
<tr>
<td>5 or more</td>
<td>3</td>
<td>1%</td>
</tr>
</tbody>
</table>

Valid Subtotal: 482 (100%)

Percent HH members under 16:
Survey: 19%  Census: 17%

Q15  How many motor vehicles (cars, trucks, SUVs, motorcycles) are owned or leased by members of your household?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11</td>
<td>2%</td>
</tr>
<tr>
<td>1</td>
<td>166</td>
<td>34%</td>
</tr>
<tr>
<td>2 to 4</td>
<td>302</td>
<td>63%</td>
</tr>
<tr>
<td>5 or more</td>
<td>3</td>
<td>1%</td>
</tr>
</tbody>
</table>

Valid Subtotal: 482 (100%)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11</td>
<td>2%</td>
</tr>
<tr>
<td>1</td>
<td>166</td>
<td>34%</td>
</tr>
<tr>
<td>2</td>
<td>112</td>
<td>23%</td>
</tr>
<tr>
<td>5 or more</td>
<td>3</td>
<td>1%</td>
</tr>
</tbody>
</table>

Valid Subtotal: 512 (100%)
**Fairfax/Vienna Metro TDM - Resident Survey**

**Q16 Which of the following categories includes your age?**

<table>
<thead>
<tr>
<th>Age Category</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 24</td>
<td>15</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>25 - 34</td>
<td>124</td>
<td>26%</td>
<td>26%</td>
</tr>
<tr>
<td>35 - 44</td>
<td>100</td>
<td>21%</td>
<td>21%</td>
</tr>
<tr>
<td>45 - 54</td>
<td>93</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>55 - 64</td>
<td>90</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>65 or older</td>
<td>57</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>479</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**2000 Census**

<table>
<thead>
<tr>
<th>Age Category</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 24</td>
<td>10%</td>
</tr>
<tr>
<td>25 - 44</td>
<td>52%</td>
</tr>
<tr>
<td>45 - 64</td>
<td>31%</td>
</tr>
<tr>
<td>65+</td>
<td>8%</td>
</tr>
</tbody>
</table>

**Valid Subtotal**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>47%</td>
</tr>
<tr>
<td>25-44</td>
<td>38%</td>
</tr>
<tr>
<td>45-64</td>
<td>31%</td>
</tr>
</tbody>
</table>

**Total**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
Fairfax/Vienna Metro TDM - Resident Survey

Selected CrossTabulations

Travel to Work/School Location by Age Group

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 34</td>
<td>91%</td>
<td>9%</td>
<td>100%</td>
</tr>
<tr>
<td>35 - 44</td>
<td>93%</td>
<td>7%</td>
<td>100%</td>
</tr>
<tr>
<td>45 - 54</td>
<td>92%</td>
<td>8%</td>
<td>100%</td>
</tr>
<tr>
<td>55 - 64</td>
<td>69%</td>
<td>31%</td>
<td>100%</td>
</tr>
<tr>
<td>65+</td>
<td>30%</td>
<td>70%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Primary Commute Mode by County of Work Location

<table>
<thead>
<tr>
<th>County</th>
<th>DA</th>
<th>Metrorail</th>
<th>CP/VP</th>
<th>Bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>6%</td>
<td>76%</td>
<td>55%</td>
<td>38%</td>
</tr>
<tr>
<td>Alexandria</td>
<td>4%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Arlington</td>
<td>9%</td>
<td>14%</td>
<td>10%</td>
<td>13%</td>
</tr>
<tr>
<td>Fairfax</td>
<td>65%</td>
<td>6%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>Loudoun</td>
<td>6%</td>
<td>1%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>Montgomery</td>
<td>6%</td>
<td>2%</td>
<td>5%</td>
<td>25%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

71% of DA commuters work in Fairfax or Loudoun Counties
90% of Metrorail commuters work in DC or Arlington County

Primary Commute Mode by Distance to Vienna Metro Station

<table>
<thead>
<tr>
<th>Distance</th>
<th>DA</th>
<th>Metrorail</th>
<th>CP/VP</th>
<th>Bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1/4 mile</td>
<td>22%</td>
<td>31%</td>
<td>20%</td>
<td>56%</td>
</tr>
<tr>
<td>1/4 mile - 1/2 mile</td>
<td>64%</td>
<td>55%</td>
<td>72%</td>
<td>44%</td>
</tr>
<tr>
<td>More than 1/2 mile</td>
<td>13%</td>
<td>11%</td>
<td>8%</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

22% of DA commuters live within 1/4 mi of Vienna Metro station
31% of Metrorail commuters live within 1/4 mi of Vienna Metro station

Primary Commute Mode by Travel Distance

<table>
<thead>
<tr>
<th>Distance</th>
<th>DA</th>
<th>Metrorail</th>
<th>CP/VP</th>
<th>Bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10 miles</td>
<td>42%</td>
<td>12%</td>
<td>20%</td>
<td>27%</td>
</tr>
<tr>
<td>10 - 19.9 miles</td>
<td>44%</td>
<td>67%</td>
<td>52%</td>
<td>36%</td>
</tr>
<tr>
<td>20 - 29.9 miles</td>
<td>11%</td>
<td>18%</td>
<td>28%</td>
<td>36%</td>
</tr>
<tr>
<td>30 or more miles</td>
<td>4%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

86% of DA commuters traveled fewer than 20 miles
85% of Metrorail commuters traveled between 10 and 29.9 miles
# Fairfax/Vienna Metro TDM - Resident Survey

## Primary Commute Mode by Commute Time

<table>
<thead>
<tr>
<th></th>
<th>DA</th>
<th>Metrorail</th>
<th>CP/VP</th>
<th>Bus</th>
<th>All Non-DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 15 min.</td>
<td>200</td>
<td>133</td>
<td>25</td>
<td>11</td>
<td>169</td>
</tr>
<tr>
<td>15 - 29 min.</td>
<td>15%</td>
<td>6%</td>
<td>8%</td>
<td>0%</td>
<td>6%</td>
</tr>
<tr>
<td>30 - 44 min.</td>
<td>40%</td>
<td>4%</td>
<td>24%</td>
<td>27%</td>
<td>8%</td>
</tr>
<tr>
<td>45 - 59 min.</td>
<td>28%</td>
<td>29%</td>
<td>32%</td>
<td>18%</td>
<td>28%</td>
</tr>
<tr>
<td>60 or more min.</td>
<td>14%</td>
<td>44%</td>
<td>24%</td>
<td>18%</td>
<td>39%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

- 68% of DA commuters traveled between 15 and 44 minutes
- 72% of Metrorail commuters traveled between 30 and 59 minutes

## Primary Commute Mode by Work Arrival Time

<table>
<thead>
<tr>
<th></th>
<th>DA</th>
<th>Metrorail</th>
<th>CP/VP</th>
<th>Bus</th>
<th>All Non-DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>12M - 5:59 am</td>
<td>197</td>
<td>134</td>
<td>25</td>
<td>11</td>
<td>170</td>
</tr>
<tr>
<td>6 am - 6:59 am</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>7 am - 7:59 am</td>
<td>21%</td>
<td>19%</td>
<td>44%</td>
<td>27%</td>
<td>24%</td>
</tr>
<tr>
<td>8 am - 8:59 am</td>
<td>36%</td>
<td>40%</td>
<td>20%</td>
<td>18%</td>
<td>36%</td>
</tr>
<tr>
<td>9 am - 9:59 am</td>
<td>24%</td>
<td>25%</td>
<td>28%</td>
<td>36%</td>
<td>26%</td>
</tr>
<tr>
<td>10 am - 5:59 pm</td>
<td>13%</td>
<td>10%</td>
<td>8%</td>
<td>18%</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

## Primary Commute Mode by Home Departure Time

<table>
<thead>
<tr>
<th></th>
<th>DA</th>
<th>Metrorail</th>
<th>CP/VP</th>
<th>Bus</th>
<th>All Non-DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>12M - 5:59 am</td>
<td>197</td>
<td>132</td>
<td>25</td>
<td>11</td>
<td>168</td>
</tr>
<tr>
<td>6 am - 6:59 am</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>7 am - 7:59 am</td>
<td>18%</td>
<td>17%</td>
<td>24%</td>
<td>27%</td>
<td>18%</td>
</tr>
<tr>
<td>8 am - 8:59 am</td>
<td>30%</td>
<td>39%</td>
<td>32%</td>
<td>18%</td>
<td>36%</td>
</tr>
<tr>
<td>9 am - 9:59 am</td>
<td>33%</td>
<td>31%</td>
<td>28%</td>
<td>27%</td>
<td>30%</td>
</tr>
<tr>
<td>10 am - 5:59 pm</td>
<td>9%</td>
<td>7%</td>
<td>4%</td>
<td>18%</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

- 30% of DA commuters leave home between 7 am and 7:59 am
- 39% of Metrorail commuters leave home between 7 am and 7:59 am
### Fairfax/Vienna Metro TDM - Resident Survey

#### Primary Commute Mode by Free Parking Available

<table>
<thead>
<tr>
<th></th>
<th>DA</th>
<th>Metrorail</th>
<th>CP/VP</th>
<th>Bus</th>
<th>All Non-DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=</td>
<td>161</td>
<td>195</td>
<td>127</td>
<td>25</td>
<td>44%</td>
</tr>
<tr>
<td>No</td>
<td>16%</td>
<td>87%</td>
<td>40%</td>
<td>44%</td>
<td>78%</td>
</tr>
<tr>
<td>Yes</td>
<td>84%</td>
<td>13%</td>
<td>60%</td>
<td>56%</td>
<td>22%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

84% of DA commuters have free parking at their work location
13% of Metrorail commuters have free parking at their work location

#### Primary Commute Mode by Employer Offers Financial Incentive

<table>
<thead>
<tr>
<th></th>
<th>DA</th>
<th>Metrorail</th>
<th>CP/VP</th>
<th>Bus</th>
<th>All Non-DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=</td>
<td>167</td>
<td>183</td>
<td>132</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>No</td>
<td>73%</td>
<td>37%</td>
<td>32%</td>
<td>40%</td>
<td>37%</td>
</tr>
<tr>
<td>Yes</td>
<td>27%</td>
<td>63%</td>
<td>68%</td>
<td>60%</td>
<td>63%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

27% of DA commuters are offered commute financial incentives by their employers
63% of Metrorail commuters are offered commute financial incentives by their employers

#### Primary Commute Mode by Time to Walk from Work to Metrorail Station

<table>
<thead>
<tr>
<th></th>
<th>DA</th>
<th>Metrorail</th>
<th>CP/VP</th>
<th>Bus</th>
<th>All Non-DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=</td>
<td>168</td>
<td>177</td>
<td>133</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>Less than 5 min.</td>
<td>12%</td>
<td>46%</td>
<td>32%</td>
<td>40%</td>
<td>43%</td>
</tr>
<tr>
<td>5 - 10 min.</td>
<td>22%</td>
<td>39%</td>
<td>24%</td>
<td>50%</td>
<td>38%</td>
</tr>
<tr>
<td>11 - 20 min.</td>
<td>16%</td>
<td>12%</td>
<td>32%</td>
<td>0%</td>
<td>14%</td>
</tr>
<tr>
<td>More than 20 min</td>
<td>49%</td>
<td>3%</td>
<td>12%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

34% of DA commuters work within 10 walk of a Metrorail station
85% of Metrorail commuters work within 10 walk of a Metrorail station

#### Primary Commute Mode by Age

<table>
<thead>
<tr>
<th></th>
<th>DA</th>
<th>Metrorail</th>
<th>CP/VP</th>
<th>Bus</th>
<th>All Non-DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=</td>
<td>171</td>
<td>203</td>
<td>134</td>
<td>26</td>
<td>11</td>
</tr>
<tr>
<td>18 - 24</td>
<td>5%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>25 - 34</td>
<td>26%</td>
<td>36%</td>
<td>27%</td>
<td>36%</td>
<td>35%</td>
</tr>
<tr>
<td>35 - 44</td>
<td>25%</td>
<td>25%</td>
<td>19%</td>
<td>9%</td>
<td>23%</td>
</tr>
<tr>
<td>45 - 54</td>
<td>23%</td>
<td>19%</td>
<td>42%</td>
<td>9%</td>
<td>22%</td>
</tr>
<tr>
<td>55 - 64</td>
<td>17%</td>
<td>13%</td>
<td>12%</td>
<td>36%</td>
<td>15%</td>
</tr>
<tr>
<td>65 or older</td>
<td>4%</td>
<td>4%</td>
<td>0%</td>
<td>9%</td>
<td>4%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Fairfax/Vienna Metro TDM - Resident Survey

Free Parking Available by Work Location State

<table>
<thead>
<tr>
<th></th>
<th>VA</th>
<th>DC</th>
<th>MD</th>
<th>All Non-DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=</td>
<td>191</td>
<td>116</td>
<td>20</td>
<td>136</td>
</tr>
<tr>
<td>No</td>
<td>23%</td>
<td>85%</td>
<td>15%</td>
<td>75%</td>
</tr>
<tr>
<td>Yes</td>
<td>77%</td>
<td>15%</td>
<td>85%</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

77% of VA commuters have free parking at their work location
15% of DC commuters have free parking at their work location

Employer Offers Financial Incentive by Work Location State

<table>
<thead>
<tr>
<th></th>
<th>VA</th>
<th>DC</th>
<th>MD</th>
<th>All Non-DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=</td>
<td>183</td>
<td>118</td>
<td>19</td>
<td>137</td>
</tr>
<tr>
<td>No</td>
<td>72%</td>
<td>35%</td>
<td>63%</td>
<td>39%</td>
</tr>
<tr>
<td>Yes</td>
<td>28%</td>
<td>65%</td>
<td>37%</td>
<td>61%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

28% of VA commuters are offered commute financial incentives by their employers
65% of DC commuters are offered commute financial incentives by their employers
Fairfax/Vienna Metro TDM Study - Employee Survey

Final Results - June 9, 2005

Approximate Sample Frame 1,500
Total Sample Size 148
Response rate 10% Note: This survey sample does NOT constitute a statistically "random" sample.

Drive alone commuters 123

Q1 Which of the following best describes your assigned work or school schedule?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 35 hours per week</td>
<td>7</td>
<td>5%</td>
</tr>
<tr>
<td>5 days/week, 35+ hours per week</td>
<td>138</td>
<td>93%</td>
</tr>
<tr>
<td>9/80 compressed schedule</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>4/40 compressed schedule</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>3/36 compressed schedule</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>147</td>
<td>99%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>148</td>
<td>100%</td>
</tr>
</tbody>
</table>

Q2 Do you work a flexible schedule or flex-time, in which you choose the times you start and stop work, as long as you work a required number of hours in a day or week?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>43</td>
<td>29%</td>
</tr>
<tr>
<td>Yes</td>
<td>105</td>
<td>71%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>148</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

| DK         | 0       | 0%         |
| Missing/Blank| 0     | 0%         |
| **Total**              | 148     | 100%       |
Fairfax/Vienna Metro TDM Study - Employee Survey

Q3a  At what time do you ususally arrive at work?

<table>
<thead>
<tr>
<th>Time</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 midnight - 5:59 am</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>6 am - 6:59 am</td>
<td>12</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>7 am - 7:29 am</td>
<td>6</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>7:30 am - 7:59 am</td>
<td>17</td>
<td>11%</td>
<td>12%</td>
</tr>
<tr>
<td>8 am - 8:29 am</td>
<td>22</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>8:30 am - 8:59 am</td>
<td>22</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>9 am - 9:29 am</td>
<td>34</td>
<td>23%</td>
<td>23%</td>
</tr>
<tr>
<td>9:30 am - 9:59 am</td>
<td>24</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td>10 am - 5:59 pm</td>
<td>10</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>6 pm - 11:59 pm</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>147</td>
<td>99%</td>
<td>100%</td>
</tr>
</tbody>
</table>

DK 0 0%
Missing/Blank 1 1%

Total 148 100%

24% arrive before 8 am
53% arrive btw 8am - 9:29am
23% arrive 9:30am or later

Q3b  At what time do you usually leave work?

<table>
<thead>
<tr>
<th>Time</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>10am-3:59pm</td>
<td>10</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>4pm-4:29pm</td>
<td>11</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>4:30pm-4:59pm</td>
<td>12</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>5pm-5:29pm</td>
<td>23</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td>5:30pm-5:59pm</td>
<td>22</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>6pm-6:29pm</td>
<td>33</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>6:30pm-6:59pm</td>
<td>17</td>
<td>11%</td>
<td>12%</td>
</tr>
<tr>
<td>7pm-7:59pm</td>
<td>18</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td>8pm-5:59am</td>
<td>1</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>6am-9:59am</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>147</td>
<td>99%</td>
<td>100%</td>
</tr>
</tbody>
</table>

DK 0 0%
Missing/Blank 1 1%

Total 148 100%

22% leave work before 5 pm
65% leave work btw 5pm-6:59pm
13% leave work after 7 pm
### Q4a About how many miles is it from your home to your usual work location?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
<th>CumulPerc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 miles</td>
<td>16</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>5 - 9.9 miles</td>
<td>30</td>
<td>20%</td>
<td>31%</td>
</tr>
<tr>
<td>10 - 14.9 miles</td>
<td>34</td>
<td>23%</td>
<td>54%</td>
</tr>
<tr>
<td>15 - 19.9 miles</td>
<td>29</td>
<td>20%</td>
<td>74%</td>
</tr>
<tr>
<td>20 - 29.9 miles</td>
<td>23</td>
<td>16%</td>
<td>90%</td>
</tr>
<tr>
<td>30 or more miles</td>
<td>15</td>
<td>10%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>147</strong></td>
<td><strong>99%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Note: Ave distance slightly shorter than the 16.4 regional average commute distance (State of the Commute survey - 2004)

### Q4b How many minutes does it typically take you to travel from home to this location?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
<th>CumulPerc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 15 min.</td>
<td>12</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>15 - 29 min.</td>
<td>48</td>
<td>32%</td>
<td>41%</td>
</tr>
<tr>
<td>30 - 44 min.</td>
<td>34</td>
<td>23%</td>
<td>64%</td>
</tr>
<tr>
<td>45 - 59 min.</td>
<td>25</td>
<td>17%</td>
<td>82%</td>
</tr>
<tr>
<td>60 - 89 min.</td>
<td>20</td>
<td>14%</td>
<td>95%</td>
</tr>
<tr>
<td>90 or more min.</td>
<td>7</td>
<td>5%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>146</strong></td>
<td><strong>99%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Note: Ave commute time slightly longer than the 34 minute regional average commute distance (State of the Commute survey - 2004)

### Q5 - Summary of Commute Mode Split and Average Days Using Each Mode

<table>
<thead>
<tr>
<th>Mode Users</th>
<th>Ave Days Per Week</th>
<th>Total Wkly Round-Trip</th>
<th>Percent Wlk Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive alone</td>
<td>123</td>
<td>4.2</td>
<td>513</td>
</tr>
<tr>
<td>Carpool/vanpool</td>
<td>4</td>
<td>1.8</td>
<td>7</td>
</tr>
<tr>
<td>Metrorail/train</td>
<td>34</td>
<td>3.7</td>
<td>127</td>
</tr>
<tr>
<td>Bus</td>
<td>3</td>
<td>2.0</td>
<td>6</td>
</tr>
<tr>
<td>Walk/Bicycle</td>
<td>5</td>
<td>3.2</td>
<td>16</td>
</tr>
<tr>
<td>Telecommute</td>
<td>20</td>
<td>1.7</td>
<td>34</td>
</tr>
<tr>
<td><strong>Total Users</strong></td>
<td><strong>148</strong></td>
<td><strong>703</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
**Fairfax/Vienna Metro TDM Study - Employee Survey**

**Q5a - Number of WEEKDAYS last week you... DROVE ALONE (or rode in taxi)**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>23</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td>1 day</td>
<td>4</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>2 days</td>
<td>11</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td>3 days</td>
<td>20</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>4 days</td>
<td>13</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>5 days</td>
<td>75</td>
<td>51%</td>
<td>51%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>146</strong></td>
<td><strong>99%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Q5b - Number of WEEKDAYS last week you... DROVE OR RODE WITH OTHERS (carpool/vanpool)**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>143</td>
<td>97%</td>
<td>97%</td>
</tr>
<tr>
<td>1 day</td>
<td>3</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>2 days</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>3 days</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>4 days</td>
<td>1</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>5 days</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>147</strong></td>
<td><strong>99%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Q5c - Number of WEEKDAYS last week you... TOOK METRORAIL OR OTHER TRAIN**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>112</td>
<td>77%</td>
<td>77%</td>
</tr>
<tr>
<td>1 day</td>
<td>4</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>2 days</td>
<td>6</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>3 days</td>
<td>4</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>4 days</td>
<td>1</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>5 days</td>
<td>19</td>
<td>13%</td>
<td>13%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>146</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

- **84% DA 1+ days/wk**
- **74% DA 3+ days/wk**
- **3% Used CP/VP 1+ days/wk**
- **1% Used CP/VP 3+ days/wk**
- **23% Used Metrorail 1+ days/wk**
- **16% Used Metrorail 3+ days/wk**

- **Total** 146 100%
### Q5d - Number of WEEKDAYS last week you... TOOK METROBUS OR OTHER BUS

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>144</td>
<td>97%</td>
<td>98%</td>
</tr>
<tr>
<td>1 day</td>
<td>2</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>2 days</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>3 days</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>4 days</td>
<td>1</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>5 days</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>147</td>
<td>99%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Valid Subtotal: 2% Used Bus 1+ days/wk, 1% Used Bus 3+ days/wk

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>1</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

### Q5e - Number of WEEKDAYS last week you... WALKED OR BICYCLED (entire trip)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>142</td>
<td>96%</td>
<td>97%</td>
</tr>
<tr>
<td>1 day</td>
<td>1</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>2 days</td>
<td>1</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>3 days</td>
<td>1</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>4 days</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>5 days</td>
<td>2</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>147</td>
<td>99%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Valid Subtotal: 3% Used Bike/walk 1+ days/wk, 2% Used Bike/walk 3+ days/wk

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>1</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

### Q5f - Number of WEEKDAYS last week you... TELECOMMUTED or WORKED AT HOME

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>127</td>
<td>86%</td>
<td>86%</td>
</tr>
<tr>
<td>1 day</td>
<td>13</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>2 days</td>
<td>3</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>3 days</td>
<td>2</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>4 days</td>
<td>1</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>5 days</td>
<td>1</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>147</td>
<td>99%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Valid Subtotal: 14% Telecommed 1+ day/wk, 3% Telecommed 3+ day/wk

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>1</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
Q5g - Number of WEEKDAYS last week you WERE ABSENT FROM WORK

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>139</td>
<td>94%</td>
</tr>
<tr>
<td>1 day</td>
<td>4</td>
<td>3%</td>
</tr>
<tr>
<td>2 days</td>
<td>3</td>
<td>2%</td>
</tr>
<tr>
<td>3 days</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>4 days</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>5 days</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>147</td>
<td>99%</td>
</tr>
</tbody>
</table>

| DK        | 0 | 0% |
| Missing/Blank | 1 | 1% |
| **Total** | 148 | 100% |

Q6 In the PAST TWO WORK DAYS (Mon-Fri), about how many trips did you make during your work day for purposes OTHER THAN travel to work?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>73</td>
<td>49%</td>
</tr>
<tr>
<td>1 to 2</td>
<td>52</td>
<td>35%</td>
</tr>
<tr>
<td>3 to 5</td>
<td>20</td>
<td>14%</td>
</tr>
<tr>
<td>6 to 9</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>10 or more</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>148</td>
<td>100%</td>
</tr>
</tbody>
</table>

| DK        | 0 | 0% |
| Missing/Blank | 0 | 0% |
| **Total** | 148 | 100% |

Average trips: 1.2 trips/person

51% made 1 or more trips during past two days

Q6a - Summary of Mode Split for Mid-day Non-Commute Trips

<table>
<thead>
<tr>
<th>Total Resp</th>
<th>Mode Users</th>
<th>Ave Trips Per 2 Day*</th>
<th>Total Trips</th>
<th>Percent Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive alone</td>
<td>148</td>
<td>58</td>
<td>0.8</td>
<td>123</td>
</tr>
<tr>
<td>Carpool/vanpool</td>
<td>148</td>
<td>10</td>
<td>0.1</td>
<td>16</td>
</tr>
<tr>
<td>Train/bus</td>
<td>148</td>
<td>16</td>
<td>0.2</td>
<td>30</td>
</tr>
<tr>
<td>Walk/Bicycle</td>
<td>148</td>
<td>5</td>
<td>0.1</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>148</td>
<td></td>
<td>1.2</td>
<td>177</td>
</tr>
</tbody>
</table>

* Average non-commute trips made during work day in two days by each respondent
### Q7 On days that you drive to work, even if you only drive occasionally, where do you park?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-site</td>
<td>126</td>
<td>85%</td>
</tr>
<tr>
<td>Off-site</td>
<td>4</td>
<td>3%</td>
</tr>
<tr>
<td>On the street</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>132</td>
<td>89%</td>
</tr>
<tr>
<td>DK</td>
<td>16</td>
<td>11%</td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Never drive to work</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>100%</td>
</tr>
</tbody>
</table>

69% of employees pay a fee to park

### 7a How much do you pay to park (per month)?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0 (Free parking)</td>
<td>40</td>
<td>27%</td>
</tr>
<tr>
<td>$1 - $24</td>
<td>83</td>
<td>56%</td>
</tr>
<tr>
<td>$25 - $49</td>
<td>3</td>
<td>2%</td>
</tr>
<tr>
<td>$50 - $74</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>$75 - $99</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>$100 or more</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>128</td>
<td>86%</td>
</tr>
<tr>
<td>DK</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>5</td>
<td>3%</td>
</tr>
<tr>
<td>Never drive to work</td>
<td>15</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>100%</td>
</tr>
</tbody>
</table>

Ave park fee $13 per month

### Q8 Does your employer offer you free or discounted transit passes (e.g., Metrochek) or offer to pay or reimburse part of your commute expenses, other than for parking?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>No, DK</td>
<td>16</td>
<td>11%</td>
</tr>
<tr>
<td>Yes</td>
<td>121</td>
<td>82%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>137</td>
<td>93%</td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>11</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>100%</td>
</tr>
</tbody>
</table>
Fairfax/Vienna Metro TDM Study - Employee Survey

8a How much does your employer offer to pay per month?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1 - $30</td>
<td>18</td>
<td>12%</td>
</tr>
<tr>
<td>$31 - $60</td>
<td>50</td>
<td>34%</td>
</tr>
<tr>
<td>$61 - $99</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>$100 or more</td>
<td>8</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>78</strong></td>
<td><strong>53%</strong></td>
</tr>
</tbody>
</table>

DK 0 0%

Missing/Blank 54 36%

No payment/reimbursement 16 11%

**Total** 148 100%

Q9 Would commute services encourage you to use (type of transportation) for your trip to work or school?

**Q9 - Summary of Incentive Value of Commute Services - Commuters NOT using alt mode now**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Non-User Base</th>
<th>% Yes</th>
<th>% Maybe</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP/VP formation assistance</td>
<td>CP/VP</td>
<td>130</td>
<td>7%</td>
<td>21%</td>
</tr>
<tr>
<td>Bus/train information</td>
<td>Bus/train</td>
<td>100</td>
<td>10%</td>
<td>15%</td>
</tr>
<tr>
<td>$100 subsidy for vanpool</td>
<td>Vanpool</td>
<td>130</td>
<td>13%</td>
<td>21%</td>
</tr>
<tr>
<td>$100 subsidy for bus/train</td>
<td>Bus/train</td>
<td>102</td>
<td>27%</td>
<td>17%</td>
</tr>
<tr>
<td>Secure bike lockers at work</td>
<td>Bicycle</td>
<td>114</td>
<td>13%</td>
<td>12%</td>
</tr>
<tr>
<td>Showers at work for bikers</td>
<td>Bicycle</td>
<td>109</td>
<td>15%</td>
<td>12%</td>
</tr>
<tr>
<td>More Metrorail station parking</td>
<td>Bus/train</td>
<td>96</td>
<td>19%</td>
<td>16%</td>
</tr>
<tr>
<td>Safe walk path from Metro station</td>
<td>Bus/train</td>
<td>93</td>
<td>17%</td>
<td>12%</td>
</tr>
<tr>
<td>Guaranteed Ride home</td>
<td>All alt mode</td>
<td>105</td>
<td>18%</td>
<td>26%</td>
</tr>
<tr>
<td>Convenience shop at Metrorail sta</td>
<td>Bus/train</td>
<td>99</td>
<td>21%</td>
<td>12%</td>
</tr>
<tr>
<td>Shuttle to Metrorail station</td>
<td>Bus/train</td>
<td>85</td>
<td>25%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Q9a - Assistance to form carpool or vanpool

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>9</td>
<td>6%</td>
</tr>
<tr>
<td>Maybe</td>
<td>27</td>
<td>18%</td>
</tr>
<tr>
<td>No</td>
<td>94</td>
<td>64%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>130</strong></td>
<td><strong>88%</strong></td>
</tr>
</tbody>
</table>

Use mode now 1 1%

DK 0 0%

Missing/Blank 17 11%

**Total** 148 100%
Q9b - Route/schedule information for **bus or train**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>10</td>
<td>7%</td>
</tr>
<tr>
<td>Maybe</td>
<td>15</td>
<td>10%</td>
</tr>
<tr>
<td>No</td>
<td>75</td>
<td>51%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>100</td>
<td>68%</td>
</tr>
</tbody>
</table>

- **Use mode now** | 37 | 25% |
- **DK** | 0 | 0% |
- **Missing/Blank** | 11 | 7% |
- **Total** | 148 | 100% |

**Q9c - $100 monthly subsidy for vanpools**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>17</td>
<td>11%</td>
</tr>
<tr>
<td>Maybe</td>
<td>27</td>
<td>18%</td>
</tr>
<tr>
<td>No</td>
<td>86</td>
<td>58%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>130</td>
<td>88%</td>
</tr>
</tbody>
</table>

- **Use mode now** | 0 | 0% |
- **DK** | 0 | 0% |
- **Missing/Blank** | 18 | 12% |
- **Total** | 148 | 100% |

**Q9d - $100 monthly subsidy for bus or train**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>28</td>
<td>19%</td>
</tr>
<tr>
<td>Maybe</td>
<td>17</td>
<td>11%</td>
</tr>
<tr>
<td>No</td>
<td>57</td>
<td>39%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>102</td>
<td>69%</td>
</tr>
</tbody>
</table>

- **Use mode now** | 33 | 22% |
- **DK** | 0 | 0% |
- **Missing/Blank** | 13 | 9% |
- **Total** | 148 | 100% |
### Fairfax/Vienna Metro TDM Study - Employee Survey

#### Q9 (cont) Would commute services encourage you to use (type of transportation)?

**9e - Secure locker, storage at work for bicycle**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>15</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maybe</td>
<td>14</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>85</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>114</td>
<td>77%</td>
</tr>
</tbody>
</table>

Use mode now: 13 | 9%
DK: 0 | 0%
Missing/Blank: 21 | 14%
Total: 148 | 100%

25% "yes" or "maybe"

**9f - Personal showers at work for employees who bicycle**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>16</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maybe</td>
<td>13</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>80</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>109</td>
<td>74%</td>
</tr>
</tbody>
</table>

Use mode now: 17 | 11%
DK: 0 | 0%
Missing/Blank: 22 | 15%
Total: 148 | 100%

27% "yes" or "maybe"

**9g - More parking at home-area Metrorail stations for train or bus riders**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>18</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maybe</td>
<td>15</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>63</td>
<td>43%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>96</td>
<td>65%</td>
</tr>
</tbody>
</table>

Use mode now: 28 | 19%
DK: 0 | 0%
Missing/Blank: 24 | 16%
Total: 148 | 100%

34% "yes" or "maybe"
**Fairfax/Vienna Metro TDM Study - Employee Survey**

**Q9 (cont) Would commute services encourage you to use (type of transportation)?**

### 9h - Safe walking route/path from Metrorail station for train, bus riders

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>16</td>
<td>11%</td>
</tr>
<tr>
<td>Maybe</td>
<td>11</td>
<td>7%</td>
</tr>
<tr>
<td>No</td>
<td>66</td>
<td>44%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>93</td>
<td>62%</td>
</tr>
</tbody>
</table>

Use mode now: 34 (23%)
DK: 0 (0%)
Missing/Blank: 24 (16%)
**Total**: 151 (100%)

29% **"yes" or "maybe"**

### 9i - Guaranteed Ride Home for carpool, vanpool, bus, or train

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>19</td>
<td>13%</td>
</tr>
<tr>
<td>Maybe</td>
<td>27</td>
<td>18%</td>
</tr>
<tr>
<td>No</td>
<td>59</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>105</td>
<td>71%</td>
</tr>
</tbody>
</table>

Use mode now: 33 (22%)
DK: 0 (0%)
Missing/Blank: 10 (7%)
**Total**: 148 (100%)

44% **"yes" or "maybe"**

### 9j - Convenience shopping near Metrorail station for train, bus riders

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>21</td>
<td>14%</td>
</tr>
<tr>
<td>Maybe</td>
<td>12</td>
<td>8%</td>
</tr>
<tr>
<td>No</td>
<td>66</td>
<td>45%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>99</td>
<td>67%</td>
</tr>
</tbody>
</table>

Use mode now: 33 (22%)
DK: 0 (0%)
Missing/Blank: 16 (11%)
**Total**: 148 (100%)

33% **"yes" or "maybe"**
Fairfax/Vienna Metro TDM Study - Employee Survey

Q9 (cont) Would commute services encourage you to use (type of transportation)?

9k - Shuttle bus to bus stop or train station

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>21</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25%</td>
</tr>
<tr>
<td>Maybe</td>
<td>12</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14%</td>
</tr>
<tr>
<td>No</td>
<td>52</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>61%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>85</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

39% "yes" or "maybe"

Use mode now 49 33%
DK 0 0%
Missing/Blank 14 9%
Total 148 100%

Q10 What is your zip code at home?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>District of Columbia</td>
<td>15</td>
<td>10%</td>
</tr>
<tr>
<td>Virginia Counties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alexandria</td>
<td>9</td>
<td>6%</td>
</tr>
<tr>
<td>Arlington</td>
<td>22</td>
<td>15%</td>
</tr>
<tr>
<td>Fairfax</td>
<td>72</td>
<td>49%</td>
</tr>
<tr>
<td>Prince William</td>
<td>4</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>4%</td>
</tr>
<tr>
<td>Total Virginia</td>
<td>113</td>
<td>76%</td>
</tr>
<tr>
<td>Maryland Counties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Montgomery</td>
<td>16</td>
<td>11%</td>
</tr>
<tr>
<td>Prince George's</td>
<td>4</td>
<td>3%</td>
</tr>
<tr>
<td>Total Maryland</td>
<td>20</td>
<td>14%</td>
</tr>
<tr>
<td>Valid Subtotal</td>
<td>148</td>
<td>100%</td>
</tr>
</tbody>
</table>

10% Live in DC
76% Live in VA
14% Live in MD

DK 0 0%
Missing/Blank 0 0%
Total 148 100%
### Fairfax/Vienna Metro TDM Study - Employee Survey

**Q11** How many motor vehicles (cars, trucks, SUVs, motorcycles) are owned or leased by members of your household?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>12</td>
<td>8%</td>
</tr>
<tr>
<td>1</td>
<td>48</td>
<td>32%</td>
</tr>
<tr>
<td>2</td>
<td>55</td>
<td>37%</td>
</tr>
<tr>
<td>3 to 4</td>
<td>31</td>
<td>21%</td>
</tr>
<tr>
<td>5 or more</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>148</strong></td>
<td><strong>100%</strong></td>
</tr>
<tr>
<td>DK</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>148</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Q12** Which of the following categories includes your age?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 24</td>
<td>19</td>
<td>13%</td>
</tr>
<tr>
<td>25 - 34</td>
<td>41</td>
<td>28%</td>
</tr>
<tr>
<td>35 - 44</td>
<td>38</td>
<td>26%</td>
</tr>
<tr>
<td>45 - 54</td>
<td>27</td>
<td>18%</td>
</tr>
<tr>
<td>55 - 64</td>
<td>20</td>
<td>14%</td>
</tr>
<tr>
<td>65 or older</td>
<td>3</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>148</strong></td>
<td><strong>100%</strong></td>
</tr>
<tr>
<td>DK</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>148</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Q13** Which of the following categories best describes your occupation?

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Technician</td>
<td>4</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Executive/Managerial</td>
<td>25</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>Administrative support, Clerical</td>
<td>9</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Laborer</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Professional</td>
<td>106</td>
<td>72%</td>
<td>72%</td>
</tr>
<tr>
<td>Machine Operator, assembler</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Maintenance, facilities service</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Military</td>
<td>2</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Precision craft</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Retail, Hospitality service</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td><strong>147</strong></td>
<td><strong>99%</strong></td>
<td><strong>100%</strong></td>
</tr>
<tr>
<td>DK</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>1</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>148</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Fairfax/Vienna Metro TDM Study - Employee Survey

#### Q14 What is your MAIN racial or ethnic heritage

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>White, non-hispanic</td>
<td>113</td>
<td>76%</td>
<td>83%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>4</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Asian</td>
<td>7</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>African-American</td>
<td>8</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Valid Subtotal</strong></td>
<td>136</td>
<td>92%</td>
<td>100%</td>
</tr>
<tr>
<td>DK</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Missing/Blank</td>
<td>12</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>148</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2

Traffic Count Summary
This is the intersection at Hermosa Drive and Nutley Street.

**Average Vehicle Occupancy**

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>MORNING PEAK</th>
<th>EVENING PEAK</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>1.10</td>
<td>1.14</td>
</tr>
<tr>
<td>OUT</td>
<td>1.16</td>
<td>1.14</td>
</tr>
</tbody>
</table>

The Average Vehicle Occupancy (AVO) is the average number of passengers in vehicles leaving and entering this access point to this development during the entire AM and PM peak travel periods.

**Vehicle Occupancy**

Vehicle Occupancy counts were gathered manually during one mid-week day in May 2005. The counts represent AM and PM peak travel periods. AM peak travel period falls between 6:00 AM and 9:00 AM and PM peak travel period falls between 4:00 PM and 7:00 PM. What is displayed here is the number of passengers in vehicles leaving and entering this access point to this development during AM and PM peak travel periods.

**Vehicle Volumes by Period and Direction**

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.
This is the intersection of Regents Tower Street and Lee Highway.

### Average Vehicle Occupancy

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Morning Peak</th>
<th>Evening Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>IN 1.19</td>
<td>IN 1.15</td>
</tr>
<tr>
<td>OUT</td>
<td>OUT 1.07</td>
<td>OUT 1.17</td>
</tr>
</tbody>
</table>

The Average Vehicle Occupancy (AVO) is the average number of passengers in vehicles leaving and entering this access point to this development during the entire AM and PM peak travel periods.

### Vehicle Occupancy

Vehicle Occupancy counts were gathered manually during one mid-week day in May 2005. The counts represent AM and PM peak travel periods. AM peak travel period falls between 6:00 AM and 9:00 AM and PM peak travel period falls between 4:00 PM and 7:00 PM. What is displayed here is the number of passengers in vehicles leaving and entering this access point to this development during AM and PM peak travel periods.

### Vehicle Volumes by Period and Direction

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.

### Vehicle Volumes

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.
This is the driveway leading in and out of the ICF Parking Garage.

### Average Vehicle Occupancy

<table>
<thead>
<tr>
<th></th>
<th>MORNING PEAK</th>
<th>EVENING PEAK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IN</strong></td>
<td>1.21</td>
<td>1.33</td>
</tr>
<tr>
<td><strong>OUT</strong></td>
<td>1.09</td>
<td>1.12</td>
</tr>
</tbody>
</table>

The Average Vehicle Occupancy (AVO) is the average number of passengers in vehicles leaving and entering this access point to this development during the entire AM and PM peak travel periods.

### Vehicle Volumes

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.

### Vehicle Occupancy

Vehicle Occupancy counts were gathered manually during one mid-week day in May 2005. The counts represent AM and PM peak travel periods. AM peak travel period falls between 6:00 AM and 9:00 AM and PM peak travel period falls between 4:00 PM and 7:00 PM. What is displayed here is the number of passengers in vehicles leaving and entering this access point to this development during AM and PM peak travel periods.

### Vehicle Volumes by Period and Direction

<table>
<thead>
<tr>
<th></th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OUT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Person</td>
<td>31</td>
<td>149</td>
</tr>
<tr>
<td>2 Person</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>3 Person</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4+ Person</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>IN</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Person</td>
<td>91</td>
<td>28</td>
</tr>
<tr>
<td>2 Person</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>3-Person</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4+ Person</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
This is the intersection of Saint Regents Drive and Lee Highway.

### Vehicle Occupancy

Vehicle Occupancy counts were gathered manually during one mid-week day in May 2005. The counts represent AM and PM peak travel periods. AM peak travel period falls between 6:00 AM and 9:00 AM and PM peak travel period falls between 4:00 PM and 7:00 PM. What is displayed here is the number of passengers in vehicles leaving and entering this access point to this development during AM and PM peak travel periods.

### Vehicle Volumes by Period and Direction

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.

### Average Vehicle Occupancy

<table>
<thead>
<tr>
<th></th>
<th>MORNING PEAK</th>
<th>EVENING PEAK</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>1.31</td>
<td>1.04</td>
</tr>
<tr>
<td>OUT</td>
<td>1.00</td>
<td>1.17</td>
</tr>
</tbody>
</table>

The Average Vehicle Occupancy (AVO) is the average number of passengers in vehicles leaving and entering this access point to this development during the entire AM and PM peak travel periods.
This is the intersection of Circle Woods Drive at Lee Highway.

### Average Vehicle Occupancy

<table>
<thead>
<tr>
<th></th>
<th>MORNING PEAK</th>
<th>EVENING PEAK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IN</strong></td>
<td>1.71</td>
<td>1.32</td>
</tr>
<tr>
<td><strong>OUT</strong></td>
<td>1.25</td>
<td>1.35</td>
</tr>
</tbody>
</table>

The Average Vehicle Occupancy (AVO) is the average number of passengers in vehicles leaving and entering this access point to this development during the entire AM and PM peak travel periods.

### Vehicle Occupancy

Vehicle Occupancy counts were gathered manually during one mid-week day in May 2005. The counts represent AM and PM peak travel periods. AM peak travel period falls between 6:00 AM and 9:00 AM and PM peak travel period falls between 4:00 PM and 7:00 PM. What is displayed here is the number of passengers in vehicles leaving and entering this access point to this development during AM and PM peak travel periods.

### Vehicle Volumes by Period and Direction

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.

### Vehicle Volumes

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.
Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.
Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.
This is the intersection of Pemsby and Centerboro Court.

### Average Vehicle Occupancy

**MORNING PEAK**
- **IN**: 1.00
- **OUT**: 1.07

**EVENING PEAK**
- **IN**: 1.22
- **OUT**: 1.10

The Average Vehicle Occupancy (AVO) is the average number of passengers in vehicles leaving and entering this access point to this development during the entire AM and PM peak travel periods.

### Vehicle Occupancy

Vehicle Occupancy counts were gathered manually during one mid-week day in May 2005. The counts represent AM and PM peak travel periods. AM peak travel period falls between 6:00 AM and 9:00 AM and PM peak travel period falls between 4:00 PM and 7:00 PM. What is displayed here is the number of passengers in vehicles leaving and entering this access point to this development during AM and PM peak travel periods.

### Vehicle Volumes by Period and Direction

Vehicle Volumes by Period and Direction

### Vehicle Volumes

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.
Entrance to Marquis Condos

This is the entrance to Marquis Condos (North of and Parallel to Virginia Center Blvd at Centerboro Ct).

Average Vehicle Occupancy

<table>
<thead>
<tr>
<th></th>
<th>MORNING PEAK</th>
<th>EVENING PEAK</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>1.06</td>
<td>1.07</td>
</tr>
<tr>
<td>OUT</td>
<td>1.17</td>
<td>1.10</td>
</tr>
</tbody>
</table>

The Average Vehicle Occupancy (AVO) is the average number of passengers in vehicles leaving and entering this access point to this development during the entire AM and PM peak travel periods.

Vehicle Occupancy

Vehicle Occupancy counts were gathered manually during one mid-week day in May 2005. The counts represent AM and PM peak travel periods. AM peak travel period falls between 6:00 AM and 9:00 AM and PM peak travel period falls between 4:00 PM and 7:00 PM. What is displayed here is the number of passengers in vehicles leaving and entering this access point to this development during AM and PM peak travel periods.

Vehicle Volumes by Period and Direction

<table>
<thead>
<tr>
<th></th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Person</td>
<td>99</td>
<td>55</td>
</tr>
<tr>
<td>2 Person</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>3 Person</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4+ Person</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1 Person</td>
<td>49</td>
<td>106</td>
</tr>
<tr>
<td>2 Person</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>3-Person</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4+ Person</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Vehicle Volumes

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three-day period.

Number of Vehicles

0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00

0 20 40 60 80

In
Out
This is the entrance to Marquis Condos and Acadia Condos (West of and parallel to Virginia Center Blvd at Centerboro Ct).

### Average Vehicle Occupancy

**MORNING PEAK**

**EVENING PEAK**

<table>
<thead>
<tr>
<th></th>
<th>IN</th>
<th>OUT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IN</strong></td>
<td>1.29</td>
<td></td>
</tr>
<tr>
<td><strong>OUT</strong></td>
<td>1.21</td>
<td>1.32</td>
</tr>
</tbody>
</table>

The Average Vehicle Occupancy (AVO) is the average number of passengers in vehicles leaving and entering this access point to this development during the entire AM and PM peak travel periods.

#### Vehicle Occupancy

Vehicle Occupancy counts were gathered manually during one mid-week day in May 2005. The counts represent AM and PM peak travel periods. AM peak travel period falls between 6:00 AM and 9:00 AM and PM peak travel period falls between 4:00 PM and 7:00 PM. What is displayed here is the number of passengers in vehicles leaving and entering this access point to this development during AM and PM peak travel periods.

#### Vehicle Volumes by Period and Direction

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>1 Person</th>
<th>2 Person</th>
<th>3 Person</th>
<th>4+ Person</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AM Peak</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In</td>
<td>88</td>
<td>17</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Out</td>
<td>40</td>
<td>5</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>PM Peak</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In</td>
<td>51</td>
<td>18</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Out</td>
<td>83</td>
<td>13</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Vehicle Volumes

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.
Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three-day period.

Vehicle Occupancy

Vehicle Occupancy counts were gathered manually during one mid-week day in May 2005. The counts represent AM and PM peak travel periods. AM peak travel period falls between 6:00 AM and 9:00 AM and PM peak travel period falls between 4:00 PM and 7:00 PM. What is displayed here is the number of passengers in vehicles leaving and entering this access point to this development during AM and PM peak travel periods.

Vehicle Volumes by Period and Direction

Average Vehicle Occupancy

The Average Vehicle Occupancy (AVO) is the average number of passengers in vehicles leaving and entering this access point to this development during the entire AM and PM peak travel periods.

Vehicle Volumes
Curzon Court at Centerboro Court

This is the intersection of Curzon Court and Centerboro Court.

**Average Vehicle Occupancy**

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Morning Peak</th>
<th>Evening Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>1.08</td>
<td>1.21</td>
</tr>
<tr>
<td>OUT</td>
<td>1.41</td>
<td>1.26</td>
</tr>
</tbody>
</table>

The Average Vehicle Occupancy (AVO) is the average number of passengers in vehicles leaving and entering this access point to this development during the entire AM and PM peak travel periods.

**Vehicle Occupancy**

Vehicle Occupancy counts were gathered manually during one mid-week day in May 2005. The counts represent AM and PM peak travel periods. AM peak travel period falls between 6:00 AM and 9:00 AM and PM peak travel period falls between 4:00 PM and 7:00 PM. What is displayed here is the number of passengers in vehicles leaving and entering this access point to this development during AM and PM peak travel periods.

**Vehicle Volumes by Period and Direction**

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.
Vehicle Volumes

Vehicle Volumes were gathered from machine counts over a three-day, mid-week period during the month of May 2005. What is displayed here is an average of the vehicle counts captured at this intersection over a three day period.
Appendix 3

2000 Census Analysis
The following charts outline commute mode choice and demographic data for the Vienna Transit Station Area (approximately \( \frac{1}{2} \)-mile radius from the Vienna Metro Station, as defined by the Fairfax County Comprehensive Plan) alongside data for Fairfax County as a whole. Commute mode split information is also included for the area within a 3-mile radius of the Vienna Metro station. All data is from the 2000 Census, including data from the Census Transportation Planning Package (CTPP), which includes 2000 Census Journey to Work data. All data pertains only to residents living within the defined geographies.

All demographic charts provide data summaries regardless of commute mode (depicted as “all trips”), as well as the demographic breakdown specifically for each of three commute to work modes: single-occupant vehicle (SOV), 2 or more person carpools, and transit (which includes all transit modes – rail, bus, shuttle).

Key findings from the 2000 Census data analysis include:
- Transit mode share approximately three times higher within the Transit Station Area than the County as a whole.
- Higher individual income levels, across all modes, with the Transit Station Area. Particularly high income representation among Transit Station Area carpoolers. High-income representation for transit users:
  - 56.7% of Transit Station Area transit riders earn >$50,000 (47.8% County-wide).
- Greater representation of residents aged 25-44 within the Transit Station Area, tracking across modes.
- Race/ethnicity distribution distinct for carpooling only, in the Transit Station Area and County-wide. No significant race/ethnicity distinctions between the Transit Station Area and the County.
- Greater male representation in the Transit Station Area than County-wide across all modes except transit riders.
- Lower levels of vehicle ownership within the Transit Station Area, with the largest number of households owning 1 or fewer vehicles being transit riders (39.5% of transit riders with the Transit Station Area own <1 vehicle in their HH).
- Residents with the Transit Station Area (65.4%) and specifically transit riders within the Transit Station Area (75.3%) live in households with no children under age 18.
Commute Mode Split by Area

<table>
<thead>
<tr>
<th></th>
<th>Vienna Transit Station Area</th>
<th>3-Mile Radius of Vienna Station</th>
<th>Fairfax County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telework</td>
<td>2.8%</td>
<td>4.2%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Walk</td>
<td>0.3%</td>
<td>0.2%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Bike</td>
<td>0.3%</td>
<td>0.2%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Transit</td>
<td>20.7%</td>
<td>10.8%</td>
<td>7.1%</td>
</tr>
<tr>
<td>2+ Carpool</td>
<td>9.2%</td>
<td>11.4%</td>
<td>13.0%</td>
</tr>
<tr>
<td>SOV</td>
<td>66.0%</td>
<td>70.7%</td>
<td>73.2%</td>
</tr>
</tbody>
</table>
Income Distribution - Vienna Station Area & Fairfax County

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Station All Modes</th>
<th>County</th>
<th>Station SOV</th>
<th>County</th>
<th>Station 2+ Carpool</th>
<th>County</th>
<th>Station Transit</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td>$75,000 or more</td>
<td>24.8%</td>
<td>22.1%</td>
<td>23.4%</td>
<td>22.4%</td>
<td>33.8%</td>
<td>19.4%</td>
<td>27.0%</td>
<td>24.5%</td>
</tr>
<tr>
<td>$50,000 - $74,999</td>
<td>27.0%</td>
<td>20.0%</td>
<td>27.3%</td>
<td>20.5%</td>
<td>21.6%</td>
<td>18.5%</td>
<td>29.7%</td>
<td>23.3%</td>
</tr>
<tr>
<td>$30,000 - $49,999</td>
<td>23.9%</td>
<td>23.3%</td>
<td>23.9%</td>
<td>24.8%</td>
<td>21.3%</td>
<td>20.9%</td>
<td>25.3%</td>
<td>20.8%</td>
</tr>
<tr>
<td>$15,000 - $29,999</td>
<td>13.1%</td>
<td>18.3%</td>
<td>13.8%</td>
<td>18.1%</td>
<td>14.0%</td>
<td>20.8%</td>
<td>10.9%</td>
<td>16.4%</td>
</tr>
<tr>
<td>$0 - $14,999</td>
<td>11.3%</td>
<td>16.3%</td>
<td>11.6%</td>
<td>14.3%</td>
<td>9.4%</td>
<td>20.3%</td>
<td>7.2%</td>
<td>15.0%</td>
</tr>
</tbody>
</table>

* Data reflects individual income (not household income).
### Age Distribution - Vienna Station Area & Fairfax County

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Station All Modes</th>
<th>County All Modes</th>
<th>Station SOV</th>
<th>County SOV</th>
<th>Station 2+ Carpool</th>
<th>County 2+ Carpool</th>
<th>Station Transit</th>
<th>County Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>65+ Yrs</td>
<td>2.2%</td>
<td>2.6%</td>
<td>2.9%</td>
<td>2.5%</td>
<td>0.0%</td>
<td>1.9%</td>
<td>1.3%</td>
<td>1.8%</td>
</tr>
<tr>
<td>45 - 64 Yrs</td>
<td>30.4%</td>
<td>36.5%</td>
<td>29.7%</td>
<td>36.4%</td>
<td>37.4%</td>
<td>35.4%</td>
<td>30.4%</td>
<td>37.9%</td>
</tr>
<tr>
<td>25 - 44 Yrs</td>
<td>57.6%</td>
<td>50.6%</td>
<td>57.5%</td>
<td>51.5%</td>
<td>54.0%</td>
<td>49.2%</td>
<td>58.5%</td>
<td>50.9%</td>
</tr>
<tr>
<td>16 - 24 Yrs</td>
<td>9.9%</td>
<td>10.3%</td>
<td>9.8%</td>
<td>9.6%</td>
<td>8.6%</td>
<td>13.6%</td>
<td>9.7%</td>
<td>9.4%</td>
</tr>
</tbody>
</table>
Race / Ethnicity Distribution - Vienna Station Area & Fairfax County

<table>
<thead>
<tr>
<th></th>
<th>Station All Modes</th>
<th>County All Modes</th>
<th>Station SOV</th>
<th>County SOV</th>
<th>Station 2+ Carpool</th>
<th>County 2+ Carpool</th>
<th>Station Transit</th>
<th>County Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>4.4%</td>
<td>2.9%</td>
<td>3.1%</td>
<td>2.8%</td>
<td>14.2%</td>
<td>3.0%</td>
<td>4.0%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>7.4%</td>
<td>9.9%</td>
<td>6.8%</td>
<td>8.0%</td>
<td>9.7%</td>
<td>17.8%</td>
<td>7.7%</td>
<td>13.3%</td>
</tr>
<tr>
<td>Asian</td>
<td>17.0%</td>
<td>11.8%</td>
<td>17.0%</td>
<td>11.5%</td>
<td>17.2%</td>
<td>16.2%</td>
<td>15.4%</td>
<td>8.9%</td>
</tr>
<tr>
<td>African American</td>
<td>3.9%</td>
<td>7.9%</td>
<td>3.8%</td>
<td>7.6%</td>
<td>5.2%</td>
<td>8.0%</td>
<td>3.7%</td>
<td>12.4%</td>
</tr>
<tr>
<td>White</td>
<td>67.3%</td>
<td>67.5%</td>
<td>69.3%</td>
<td>70.0%</td>
<td>53.7%</td>
<td>55.0%</td>
<td>69.2%</td>
<td>62.9%</td>
</tr>
</tbody>
</table>
Gender Distribution - Vienna Station Area & Fairfax County

<table>
<thead>
<tr>
<th>Gender Distribution by Commute Mode</th>
<th>Station</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Modes</td>
<td>Male 56.3%</td>
<td>54.1%</td>
</tr>
<tr>
<td></td>
<td>Female 43.7%</td>
<td>45.9%</td>
</tr>
<tr>
<td>SOV</td>
<td>Male 58.4%</td>
<td>54.4%</td>
</tr>
<tr>
<td></td>
<td>Female 41.6%</td>
<td>45.6%</td>
</tr>
<tr>
<td>2+ Carpool</td>
<td>Male 57.6%</td>
<td>54.6%</td>
</tr>
<tr>
<td></td>
<td>Female 42.4%</td>
<td>45.4%</td>
</tr>
<tr>
<td>Transit</td>
<td>Male 50.8%</td>
<td>54.3%</td>
</tr>
<tr>
<td></td>
<td>Female 49.2%</td>
<td>45.7%</td>
</tr>
</tbody>
</table>
No of Vehicles per HH - Vienna Station Area & Fairfax County

<table>
<thead>
<tr>
<th></th>
<th>Station</th>
<th>County</th>
<th>Station</th>
<th>County</th>
<th>Station</th>
<th>County</th>
<th>Station</th>
<th>County</th>
<th>Station</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Vehicles</td>
<td>26.5%</td>
<td>30.0%</td>
<td>30.5%</td>
<td>31.8%</td>
<td>24.0%</td>
<td>27.6%</td>
<td>16.7%</td>
<td>17.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Vehicles</td>
<td>48.3%</td>
<td>48.3%</td>
<td>48.3%</td>
<td>49.1%</td>
<td>54.4%</td>
<td>48.0%</td>
<td>43.8%</td>
<td>43.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Vehicle</td>
<td>23.9%</td>
<td>19.3%</td>
<td>20.1%</td>
<td>17.7%</td>
<td>21.7%</td>
<td>21.4%</td>
<td>37.2%</td>
<td>30.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Vehicles</td>
<td>1.2%</td>
<td>2.3%</td>
<td>1.2%</td>
<td>1.5%</td>
<td>0.0%</td>
<td>3.0%</td>
<td>2.3%</td>
<td>8.2%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- **3 Vehicles**: All Modes, SOV, 2+ Carpool, Transit
- **2 Vehicles**: SOV, 2+ Carpool, Transit
- **1 Vehicle**: SOV, 2+ Carpool, Transit
- **0 Vehicles**: SOV, 2+ Carpool, Transit
Age of Youngest Child in HH - Vienna Station Area & Fairfax County

<table>
<thead>
<tr>
<th></th>
<th>Station</th>
<th>County</th>
<th>Station</th>
<th>County</th>
<th>Station</th>
<th>County</th>
<th>Station</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children age 16 - 18</td>
<td>2.8%</td>
<td>4.3%</td>
<td>2.8%</td>
<td>4.1%</td>
<td>2.9%</td>
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Appendix 4

Current TDM Programs, Opportunities, and Barriers
The following summary is intended to provide an overview of current transportation
demand management (TDM) programs currently offered by state, regional, and county
TDM providers. The services represent the foundation of TDM programs offered from
which the Fairlee / MetroWest TDM program recommendations will build upon.

**Metropolitan Washington TDM Services**

Commuter Connections was originally created in 1974 as the Commuter Club, providing
one of the first computerized carpool matching systems in the nation. The Commuter
Club network consisted of the Metropolitan Washington Council of Governments (COG),
General Services Administration (GSA), and the Greater Washington Board of Trade.
COG provided the direct ridematching services to the public. This service was and still
is provided free to anyone who requests ridematching information. In the 1980’s, the
local government agencies of City of Alexandria, Fairfax County, Montgomery County,
Prince William County, and the Northern Virginia Transportation Commission joined the
network. The Commuter Club network members used COG's ridematching software
and shared one regional database for ridematching. It was in the mid-1980’s that the
network changed its name to the RideFinders Network.

By 1994 the network had grown in membership to include all Washington D.C. area
local governments, a few federal agencies, several Transportation Management
Associations, and government agencies from the Baltimore area, southern Maryland,
and northern Virginia.

In 1996 and 1997, the services provided by the RideFinders Network had grown beyond
just carpool/vanpool matching to include transit route and schedule information, a
regional Guaranteed Ride Home program, bicycle to work information, park-and-ride lot
and HOV lane information, telecommute/telework program assistance, InfoExpress
commuter information kiosks, commuter information services through our Internet site,
and employer services. It was in 1996 that the network changed its name to Commuter
Connections.
Funding for Commuter Connections is provided to the Metropolitan Washington Council of Governments by the U.S. Department of Transportation, District of Columbia Department of Transportation, Maryland Department of Transportation, and Virginia Department of Transportation. Many of the local Commuter Connections members receive grant funding directly from their respective state government.

**Fairfax County TDM Services**

**Employer Outreach**
Fairfax County has an **Employer Services Program** that helps businesses and employees find transportation solutions. The program exists not only to make their company more successful, but to improve the economic vitality and quality of life for the entire region. They have an Employer Services Specialist who works on-site with employers to help them realize bottom-line benefits of commute alternatives.

The **Employer Services Program** provides the following services to employers **free of charge**:

- Development of tax-free commute benefit programs ([Metrochek](http://www.commuterconnections.com/metrochek.htm), [Metrochek Match](http://www.commuterconnections.com/metrochekmatch.htm))
- On-site transportation assessments
- Confidential employee commute surveys
- Mapping of employee residence patterns
- Computerized [ridematching](http://www.commuterconnections.com/ridematching.htm)
- Corporate relocation assistance
- On-site rideshare promotions and displays
- Assistance in implementing alternative commute programs and incentives
- Coordination with nearby companies to establish commuter programs
- Training an on-site Employee Transportation Coordinator (ETC)
- Development of incentive programs
- Program follow-up and evaluation
- Transit schedules, route maps and [park-and-ride](http://www.commuterconnections.com/parkandride.htm)
- New employee commute options information
- Assessment of parking options
- Development of a [telework](http://www.commuterconnections.com/telework.htm) program

Offering these services at the County level, the Fairfax County TDM program mirrors the regional Commuter Connections’ TDM programs. However, Commuter Connections does offer some regional services that are not offered at County level (as these are implemented more efficiently at the regional level):
• Guaranteed Ride Home (GRH)
• Ozone Action Days
• Bike to Work Day

Guaranteed Ride Home provides commuters who regularly carpool, vanpool, bike, walk or take transit to work with a reliable ride home when one of life’s unexpected emergencies arises. Commuters are able to use GRH to get home for unexpected personal emergencies and unscheduled overtime up to FOUR times per year. The GRH ride home by taxi, rental car, bus or train is free!

Commuter Connections will reimburse costs associated with the use of transit during an authorized GRH trip. They send a GRH Transit Reimbursement Voucher in the mail shortly after a GRH trip. The commuter completes and returns the Voucher to Commuter Connections within thirty days to receive their reimbursement.

The Fairfax County Employer Services Program provides employers with personal assistance with the following:

• Surveying employees to determine transit needs and preferences
• Helping with carpool and vanpool formations
• Providing up-to-date information on local bus schedules
• Helping implement Metrochek program

Fairfax County markets the typical employer benefits of promoting commute alternatives to their employees including:

• Improved employee productivity
• Improved morale
• Easier recruitment and retention
• Reduced parking and office space needs and costs
• Easier access and traffic flow at work site
• Reduced absenteeism and late arrivals
• Public recognition as a good corporate citizen

Commuter Outreach

The RideSources Program is operated by the Fairfax County Department of Transportation. The RideSources program provides commuters with free ridesharing information, including ridematching assistance to form or join carpools or vanpools. Commuters can call or mail in a RideSources application, and will be entered into a regional database which will match them with neighbors who share similar work schedules and travel patterns. This regional database is the Commuter Connections’ system.
Fairfax County markets the typical employee benefits of promoting commute alternatives to their employees including:

- Reduced commuting time and expenses/Access to HOV lanes
- Reduced wear-and-tear on personal vehicles
- Less stress
- More productive time while riding to and from work
- Flexible work schedules

They also try to appeal to the people who want to be good citizens and promote the Community Benefits of commute alternatives including:

- Easier travel on streets and highways
- Increased economic vitality
- Economic development benefits
- Cleaner air
- Improved overall quality of life

Fairfax County also offers a reduced personal-property tax rate for 12-15 passenger vans.

Residential Outreach

The Fairfax County Community Residential Program (CRP) partners with residential developments, multi-family complexes and associations to promote use of alternative modes of transportation including public transit. CRP is dedicated to encouraging people who live, work or commute through Fairfax County to use mass transit, carpools, vanpools, walking, biking or teleworking instead of driving alone.

Community Residential Services staff works with developers, property managers, and association leaders to create simple and effective Community Transportation Programs. Currently there are over 600 area residential communities and businesses in the partnership. The following services are provided to CRP members free of charge:

- **Assessment** – During the initial meeting staff completes a needs assessment to determine which transportation programs will be most beneficial to their community and establishes a Community Residential Transportation Coordinator (CRTC).
- **Residential Transportation Survey** – CRP staff survey residents’ to assess their transportation patterns and needs.
- **Plan & Implementation** – Staff works with the CRTC to design and facilitate the implementation of a Community Transportation Program.
• **Information Dissemination** – Staff serve as a regional transportation information resource by providing and distributing information to multi-family complexes and associations that request materials.

• **On-Going Support** – Staff offers on-going support by providing follow-up surveys, marketing, and technical support to Commuter Transportation Programs.

CRP compliments Fairfax County’s employer and commuter outreach efforts by reaching commuters where they live and increasing their knowledge of transit and transportation options available in their community.

Community Residential Transportation Coordinators are asked to assist with the residential program by doing the following:

• Serving as a liaison to CRP staff and disseminates transportation information to residents.

• Conducting at least one promotional effort that encourages commuter programs.

• Developing an incentive for residents to use different transportation methods.

Fairfax County and CRP recognize partners that implement a Community Transportation Program with either Bronze, Silver, Gold or Platinum levels depending on the level of assistance they provide their residents. Incentives are available for Platinum Level participants.

**Fairfax County HOV Lanes**
HOV, or High Occupancy Vehicle lanes are available to ridesharers on Interstate 66 and on Interstates 95 and 395 in Fairfax County. Vehicles must have a minimum number of occupants to travel on these lanes during peak commuting hours.

**Fairfax County Current Transit Services**
MetroRail (Orange Line and Blue Line) and Metrobus
Fairfax Connector Bus – Intra County Transit Service
CUE – City of Fairfax Transit
VRE – Regional Rail Service (Alexandria, Burke, Lorton, and Springfield)
FASTRAN – Para-Transit Services
TAGS Bus Service - The TAGS bus is a shuttle service, operated by Metro, that circulates in Springfield's business district.
Fairfax County Park and Rides

Rideshares may choose to use one of the Park & Ride lots listed in this brochure to meet carpools and vanpools, or you may choose to meet fellow ride-sharers at home or other locations.

Register for the Guaranteed Ride Home (GRH) Program by calling 1-800-745-RIDE, and we'll pay for your taxi ride home if an emergency arises on a day that you ride-share.
Fairfax County Vanpool Providers

Fairfax County Department of Transportation RideSources works in tandem with Commuter Connections to help commuters find riders with whom they can vanpool. In addition to many private individuals operating vanpools in Fairfax County and the Metropolitan Washington Region there are several third-party vanpool providers which include:

- VPSI Commuter Vanpools
- ABS Vans-Metro
- Access Transportation Services

Fairfax County TDM Organizations

DATA
The Dulles Area Transportation Association (DATA) is a Transportation Management Association (TMA) that identifies transportation needs; advocates steps to meet those needs; and provides a forum for members and other concerned parties to be informed of opportunities and participate in timely actions that will bring about a more effective transportation system.

DATA's Area of Operations encompasses an approximately 150-square mile area bounded by the Potomac River on the north, Hunter Mill Rd. on the east, by the Route 15 corridor on the west, and the Rt. 66 corridor on the south.

LINK
LINK provides information on alternative transportation methods you may use to get to and from Reston and Herndon.

TAGS
The Transportation Association of Greater Springfield (TAGS) is a non-profit, public-private transportation management association that plays a key role in the transportation improvement plan for the rapidly growing Greater Springfield area.

TYTRAN
The TYTRAN Commuter Program is a voluntary program that provides opportunities for member employees to participate in a variety of ridesharing activities designed to increase employee awareness of transit and transportation options into and around the Tysons Corner area.

Current Commuter program elements include carpool and vanpool matchlist generation; provision of transit schedules and itineraries; general alternative transportation
Virginia Commonwealth Wide TDM Services
There are a number of Virginia funded TDM programs operated through Commuter Connections including:

- TeleworkVA
- The Virginia Vanpool Assistance Program

Telework!VA
Telework!Va offers employers up to $35,000.00 to start or expand a formal telework program.

Telework!Va is a public / private partnership serving Northern Virginia businesses. Companies can receive as much as $3,500 per employee (for up to ten employees) to establish a telecommuting link, lease home office equipment or pay for office space at a convenient telework center.

It is a pilot program administered by the Commonwealth of Virginia Department of Rail and Public Transportation (DRPT) through the Metropolitan Washington Council of Governments (MWCOG).

The Telework!Va Program is limited to reimbursement of lease costs and consultant/technical assistance expenses. It reimburses a variable percentage of the lease expense for equipment; telework center space; technical assistance for setting up programs and installing equipment; and provides training for teleworkers and supervisors. No purchases are eligible for reimbursement.

Business applications to participate in the Telework!Va pilot program are now being accepted for review by DRPT and MWCOG. Applicants must demonstrate their willingness to start a long-term program, invest in the planning and staff resources required to sustain a program and commit to an implementation schedule with appropriate milestones of two (2) years or less. Priority is given to new program starts although existing program expansion requests may be considered on a case-by-case basis. Employers are required to sign a contract with the Metropolitan Washington Council of Governments (MWCOG) on behalf of the Virginia Department of Rail and Public Transportation.

The Virginia Vanpool Assistance Program
The Virginia Vanpool Assistance Program, sponsored by the Virginia Department of Rail and Public Transportation, provides temporary funding for vanpools having trouble filling all of their seats. There are two different programs: the VanStart Program, which funds empty seats during the critical start up phase of new vanpools; and the VanSave
Program, which is for existing vanpools that are experiencing problems in their passenger levels due to the loss of riders.

Anyone operating a vanpool that serves residents of the Commonwealth of Virginia can apply for assistance. The vanpool must be a non-profit organization and have a seating capacity of no less than six and no more than fourteen (excluding the driver.) The vanpool operator must certify that the van has PV plates and is appropriately insured under a Commercial Auto Policy or Vanpool Policy and registered with the local jurisdiction’s rideshare agency.

The VanStart Program and the VanSave Program have some differences in their eligibility requirements.

Under the VanStart Program, the owner/operator must register the vanpool and apply for assistance within the first three months of operation with the local jurisdiction’s rideshare agency. At least 50% of the passenger capacity must be full.

Under the VanSave Program, the vanpool must have been in operation for a minimum of six months and may not have received any state assistance funds in the past 12 months. At least 25% of the paying passenger capacity must have been empty for more than 30 days at time of application.

The amount of funding is based on the average cost per seat of the vanpool and the average cost per seat of similar vanpools traveling the same distance.
Fairlee / MetroWest – TDM Opportunities & Barriers Assessment

The following section highlights opportunities and barriers to successful TDM program implementation at Fairlee / MetroWest. The analysis considers opportunities and barriers that are part of existing conditions within the Vienna Transit Station Area. Opportunities are best understood as elements which aid and facilitate successful TDM applications (things to build upon for success), and barriers can be considered as hurdles to the potential success of TDM measures, if not sufficiently addressed or mitigated with other strategies or recommendations.

Opportunities

Opportunity #1: Existing Mass Transit Network
The Vienna-Fairfax-GMU Metro station offers rail and/or bus transit services to just many of the major activity centers within the Washington region. In addition to Metro’s Orange line to Downtown DC, the CUE Gold and Green lines provide bus service to major destination in the City of Fairfax, the Fairfax Connector provides bus service to the rest of Fairfax County, including the targeted location of Tysons Corner, and OmniRide provides express bus service on the HOV lanes of I-66.

Due to the extremely high frequency of service, Metro Rail timetables for peak hours (weekdays 5-9:30 a.m. and 3-7 p.m.) are not available or needed. Headways on the MetroRail Orange line are 12 minutes for midday service (9:30 am – 2:30 pm). These headways provide convenient service without the need for a schedule.

The Vienna Metro Station is at the western end of the Orange Line. This location provides residents of this area with access to the all other station locations within region. The Orange Line connects with the Blue Line in Rosslyn to go to the Pentagon, Airport and Alexandria. It connects with the Red Line at Metro Center to go to points as far northwest as Rockville and Shady Grove and points as far Northeast as Wheaton and Glenmont as well as to critical connections to Amtrak at Union Station. The Orange Line also has a connection with Yellow and Green Lines at Gallery Place–Chinatown to go to points as far northeast as Greenbelt and as far southeast as Branch Ave in Prince Georges County as well as south as far as Huntington in Fairfax County.

According to analysis of 2000 US Census Journey to Work data, the highest density of trip destinations (work locations) for people living within a 3-mile radius of the Vienna Fairfax Metro Station are all in close proximity to the Orange Line Stations, with notable concentrations of employment locations along Metro Rail station locations in Arlington County and in Downtown DC. These work destinations can all be access with a no-transfer trip from the Vienna Fairfax Metro Station. A map of employment locations for residents living within a 3-mile radius of the Vienna station is shown below. The darker the area, the higher the concentration of employment locations.
Opportunity #2: HOV Lanes on I-66
There are High Occupancy Vehicle (HOV) Lanes on I-66 for two or more people from Route 234 in Manassas past the Capital Beltway (I-495) to the Theodore Roosevelt Bridge. Outside of the Beltway one lane (the far-left lane) is reserved Monday through Friday for HOV eastbound in the morning (5:30 am to 9:30 am) and westbound in the afternoon (3:00 pm to 7:00 pm). Inside the Beltway, both lanes are reserved Monday through Friday for HOV eastbound in the morning (6:30 a.m. to 9:00 a.m.) and westbound in the afternoon (4:00 p.m. to 6:30 p.m.).

“The I-66 HOV lanes carried a total of 20,940 people in 9,825 vehicles in 2002 between 6:30 and 9:30 a.m. from Virginia to the core areas. Comparably, the Orange line of the MetroRail carried 24,600 people from Virginia to the core areas of Arlington and DC and beyond.” Avoiding congestion and saving time are two top incentives for using the HOV lanes. Users of the Northern Virginia HOV lanes save a substantial amount of time over the same trip in the conventional lanes. Travel times from the fall of 2003 along I-66 from Route 234 to 23rd & Constitution were 63 minutes in HOV lanes versus 94 minutes.
in non-HOV lanes. (“Second Report of the High-Occupancy Vehicle Enforcement Task Force” by Dennis Morrison VDOT and Captain Mike Counts Virginia Department of State Police, January 4, 2005.)

Opportunity #3: Neighborhood Retail
The Pan Am Shopping Center is just over ½ mile from the Vienna Metro Station, however, much of the proposed development site that is closer to Lee Highway is less than ½ mile from this shopping center, where there is currently a grocery store, café, fast food, and other neighborhood retail. This is a reasonable and realistic walking distance for people to run many of their quick and short daily errands that are normally completed by car in areas where land uses are more segregated and further apart.

Opportunity #4: Existing Bicycle and Pedestrian Trail Networks & Infrastructure
The bike and pedestrian trails surrounding the Vienna Transit Station Area already provide the potential for residents to connect with other destinations in the area by bicycle or walking. Connecting the Vienna Transit Station Area with trails in neighboring East Blake Lane Park opens up bike and pedestrian connections to area destinations that include: Downtown and Historic Old Town Fairfax and George Mason University, as well as a number of area parks including Lake Accotink, Thaiss Memorial, Draper, Kutner, Daniels Run, Van Dyck, and Providence Parks.

Additionally, there are currently bike racks and bike lockers at the Vienna Fairfax Station that enable biking to transit.

Opportunity #6: FlexCar Fleet at Vienna-Fairfax Metro Station
Currently there are a number of FlexCar shared cars available for use at the Vienna Metro Station. A personal Flexcar membership costs only $40 a year. Rates are $7-$10 per hour and $35 - $90 per day. These rates include full insurance, gas, maintenance, cleaning, parking and 24-hour emergency service. FlexCar and ZipCar are the two major shared cars companies operating in the U.S., and Washington, DC, is currently the only market served by both companies. The fact that these companies already operate in the area offered an opportunity for building on current shared car experience and market awareness.

Barriers

Barrier #1: Infrequent Headways on Local Bus Services
Although there is bus service from Vienna Metro Station connecting to most major destinations in Fairfax County, service frequencies are relatively low, reducing user convenience and increasing total travel times. Examples include:

- Local Metro bus service on routes 2B & 2G have hourly headways during off-peak and only 30 minute headways during peak.
• Local Fairfax County Connector bus service on routes 402 & 403 is not available during off-peak hours and only available at 35 minute headways during peak hours.
• Local CUE bus service on Green & Gold routes have only 30-35 minute headways all day long on weekdays.

The nature of the local bus service reduces the viability of transit use for larger market segments traveling between the Vienna Transit Station Area and points not along the Metro Rail system. As the 2000 Census map on page 11 illustrates, a moderate number of residents within the 3-mile radius of the transit station area travel to work at points north within Fairfax County, such as Tysons Corner, Reston, and Herndon.

Barrier #2: HOV Lanes on I-66 nearing capacity
Several factors contribute to I-66 HOV lanes nearing capacity levels during peak periods, including an increase in ridesharing, an increase in usage by low-emission vehicles, and lane violations by ineligible users. This combination of non-HOV use of the HOV lanes during peak hours has increased demand on those lanes and impacted the time savings realized by use of these Lanes on I-66.

Barrier #3: MetroRail Orange Line faces capacity limitations during peak periods
MetroRail transit users currently experience challenges with railcar crowding during peak periods, in particular related to boarding Orange Line trains from Downtown DC in the peak of the afternoon peak hour to return to the Vienna station. Peak hour train crowding challenges can degrade the transit user experience, and increase overall travel times. The Metro Capacity Improvement Plan (CIP) is designed to address capacity issues and meet customer demand throughout the system. Enhancements primarily include an increase in the number of 8-car trains by FY 2006, as well as additional enhancements in future years.

Barrier #4: Poor pedestrian / bicycle connectivity between Vienna Transit Station Area and surrounding neighborhoods and neighborhood retail
Many of the neighborhoods that surround the Vienna Transit Station Area are within walking distance of the Metro Station but do not have safe pedestrian access to it. Some examples are those neighborhoods east of Nutley Road that need to cross several lanes of traffic to get to the station. Other examples are those neighborhoods east of Blake Road who do not have pedestrian access from the side of their development closest to the Metro Station. If they were to enjoy a safe walk on a sidewalk or path to the Metro Station they would have a circuitous walk that was much further than ½ mile.

The Pan Am Shopping Center (At the southeast corner of Nutley Road and Lee Highway) has a grocery store, café, fast food, and other neighborhood retail and is within walking distance of most of the proposed development site, but is not friendly to pedestrians. Employees at ICF Consulting that are less than ¼ mile from the
restaurants in Pan Am Shopping Center often drive because they don’t feel safe crossing Lee Highway.

The extensive network of regional bike trails is not currently well connected to the Vienna Metro Station. The current network of bicycle routes will go underutilized if they cannot be accessed by travelers looking to connect to the Transit Station Area.
Appendix 5

TOD Peer Research

This appendix includes TOD / Development Case Studies, including:

- Pleasant Hill, Contra Costa County, CA (San Francisco)
- Redmond Ridge PUD, King County, WA
- Lloyd District, Portland, OR
- Metropolitan Place, Renton WA

Also included is a summary table highlighting demographic and commute to work mode share percentages for four areas:

- Vienna Transit Station Area (MetroRail) vs. Fairfax County
- Roslyn-Ballston Corridor (MetroRail) vs. Arlington County
- San Francisco: Pleasant Hill (BART) vs. City of Walnut Creek
- San Francisco: South Alameda County (4 BART Stations) vs. the South Alameda Counties of Hayward, Union City, and Fremont
Pleasant Hill  
Contra Costa County, CA (S.Fran.)

Transit: Heavy Rail & Bus  
7 regular-service & 3 express bus routes

TOD Characteristics  
The Pleasant Hill station area currently consists of four residential buildings and one retail site. The residential site ranges from high-intensity market rate condos to affordable apartment housing. Each site is located within ¼ mile of the transit station, with pedestrian connectivity considered fair to good. Parking ratios range from 1 space per unit to 1.9 spaces per unit among the four sites. Densities in the surrounding areas are relatively low (about 9 residents and about 5 employees per acre). The area today has significant surface park-n-ride parking capacity. The area is currently undergoing a second phase of planning and development, which promises to improve the station's connections to the surrounding community by structuring park-and-ride facilities to make room for a walkable mixed-use development. Depending on market conditions and public approvals, the pending development will add between 290,000-456,000 square feet of office space and either 274 or 446 apartments and for-sale townhouses to the station area. It will also add a child care facility and about 42,000 square feet of ground floor retail and restaurants. At completion, the additional redevelopment is expected to cost approximately $235 million, including $40 million of public money. (CA Department of Transportation, 2005)

Mobility Programs  
Pleasant Hill is not served by a site-specific TDM program. TDM services for the area are provided by Contra Costa County and by the regional metropolitan planning organization (MTC). A recent survey of residents found that about 60% of residents worked for employers that allowed them flexible arrival / departure times, and 20% provided some form of transit subsidy assistance.

Results  
Data from recent surveys of residents at all four residential locations found that nearly 45% of residents utilize transit for the commute to work, and about 49% drive alone to work. For non-work trips, surveys show about 71% of trips completed by single-occupant vehicle, yet higher levels of “trip chaining” for these trips (25% of non-work trips were linked to other trip purposes, versus only 15% of work trips linked to other trip purposes). Higher levels of SOV use for non-work trips are likely associated with poor availability of nearby retail services.

**Redmond Ridge PUD**
**King County, WA**

**Transit: Bus** (minimal service, 1 route / 4 trips)

Redmond Ridge is a Planned Urban Development in the unincorporated area of King County, WA, outside of the region’s Urban Growth Boundary (UGB). At full build out, it will include approximately 8,200 residents, 450 retail jobs and 3,700 office employees, in a predominantly rural environment.

**Transit Oriented Development Characteristics**
The site is designed with walking trails, community centers, retail, schools, recreation, et al. The concept is a self-contained island of suburban life within a rural setting. With the challenges of a tight UGB and only limited housing coming on line in the region, this community is functioning as a bedroom community to Cities west including Redmond, Bellevue and Seattle.

Access to the site is via local roads with very limited capacity. The majority of the trip connecting the site with the surrounding jurisdictions is via 2 lane roadways. The overall site contains multiple Park and Pool facilities to encourage carpooling. During design, communications infrastructure (telephone and cable television) were sized to include broadband internet access and allow for wireless connectivity. Homes within the site are wired with internal network connections in most rooms to provide for ease of internet accessibility.

**Mobility Programs**
The site is subject to a County-administered Transportation Management Plan (TMP), which requires the implementation of various travel choice programs and services. The community has elected to join a local Transportation Management Association (TMA) to assist with implementation and monitoring of their TMP. Some of their programs and services include, incorporating transportation into new resident orientations and owner’s association meetings, providing trained transportation coordinators via telephone or email, conducting promotional events and campaigns to increase awareness of travel choices, subsidizing first month transit, coordinating and promoting new program demonstrations and a transit feeder shuttle service.

**Results**
The Redmond Ridge project, even with virtually no transit service available, has achieved a drive alone rate of 70% for peak hour travel (Greater Redmond TMA, 2004). This has been made possible by a spreading of travel times, increases in both carpool and vanpool travel, as well as a growing number of home-based workers. Furthermore, transportation has been inserted as an element of the community’s evolving culture.

GRTMA (July, 2004), Transportation Management Program and Transit Service Plan 2004 Annual Program Review
Lloyd District
Portland, Oregon

Transit: LRT and Bus

Portland’s Lloyd District is bounded by NE Broadway Boulevard on the north, NE 15th Avenue on the east, I-84 on the south and I-5 on the west. Lloyd District is across the Willamette River from the Portland Central Business District, and is home to the Oregon Convention Center and adjacent to the Portland Trailblazers Rose Garden arena.

TOD Characteristics
The Lloyd District is comprised of approximately 650 businesses and 17,000 employees with 2020 employment growth forecasts of 34,000 employees. Residential is evolving with condominium towers throughout the district, though is at a lesser rate than employment. The district has evolved from a retail mall and commercial district with average transit service to a TOD through the inclusion of fixed guideway transit, pedestrian supportive infrastructure, and parking policies, coupled with aggressive planning and partnership programs.

Mobility Programs
The District has a Partnership Plan, which specifically highlights the need for travel choice programs in concert with parking management. Due in large part to the economic drivers of the district and the pre-TOD existence of the Lloyd District Transportation Management Association (LDTMA), this TOD and district has more focused TDM programs and policies than other Portland-area TODs.

Parking availability is limited at growth and actively managed by LDTMA in exchange for managing other travel choice outreach programs. All commercial and commuter parking is fee-based, with residents participating in a residential parking program. Many employers in the district participate in regional transit subsidy program.

Results
According to LDTMA’s Annual Report 2005, driving alone represents only 41.1% of all commute trips, bus/light rail representing an equally strong 40.8% of commute trips, and Carpool, Bike, Walk, Telecommute and Compressed Work Week making up the remaining 18.1%.

Metropolitan Place
Renton, WA

Transit: Bus (10 bus bays / local and regional service)

The Renton TOD, Metropolitan Place, is located across the street from the Renton Transit Center in the downtown of Renton, WA within a suburban community south of Seattle, WA.

TOD Characteristics
Metropolitan Place, includes 4,000 square feet of ground-level retail space and 90 apartments above a two-story garage with 240 parking stalls. 150 of the stalls are dedicated to Park & Ride uses during the day, with the remaining available for shared parking amongst the commercial and residential uses. Residential parking was built at 1 stall per unit. Parking around the site is fee based with nominal charges (maximum of $6.00 per day).

King County Metro, the local transit agency, collaterally invested in pedestrian amenities and gathering places at the newly expanded transit center across the street. These investments included a plaza, fountain and other street furniture. Coffee/espresso service and bike lockers are supplemental features adding to the pedestrian and bicycle environment.

Mobility Programs
No site-specific TDM programs were initiated beyond the TDM programs provided regional by King County Metro. When the project opened, FlexCar provided shared-car vehicles on site.

Results
Residential occupancy is high, and one third of residents use transit, which local staff notes is approximately three times the transit mode share of similar, suburban multi-family residential projects in the area (FHWA, 2004). Site managers have measured residential parking stall usage at .6 stalls per apartment unit, suggesting a degree of self-selection to reside at a TOD location and reduce auto ownership requirements. The FlexCar program no longer operates at the site, due to low usage levels. Areas experts note that shared-car programs regionally have been less successful when connected to bus transit station areas (as opposed to rail transit station areas).
### DEMOGRAPHIC & COMMUTE MODE SHARE CHART

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<th>Vienna Transit Station Area (MetroRail)</th>
<th>Roslyn-Ballston Corridor (MetroRail)</th>
<th>San Francisco: Pleasant Hill (BART)</th>
<th>San Francisco: South Alameda County (4 BART Stations)</th>
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<td>Fairfax County</td>
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<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56.3%</td>
<td>54.1%</td>
<td>43.2%</td>
<td>46.2%</td>
</tr>
<tr>
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<td>43.7%</td>
<td>45.9%</td>
<td>56.8%</td>
<td>53.3%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65+</td>
<td>2.2%</td>
<td>2.6%</td>
<td>17.1%</td>
<td>35.6%</td>
</tr>
<tr>
<td>45-64</td>
<td>30.4%</td>
<td>36.5%</td>
<td>28.8%</td>
<td>29.3%</td>
</tr>
<tr>
<td>25-44</td>
<td>57.8%</td>
<td>50.6%</td>
<td>54.1%</td>
<td>16.0%</td>
</tr>
<tr>
<td>16-24</td>
<td>9.9%</td>
<td>10.3%</td>
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<td></td>
</tr>
<tr>
<td><strong>Race / Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>3.9%</td>
<td>7.9%</td>
<td>2.4%</td>
<td>1.1%</td>
</tr>
<tr>
<td>White</td>
<td>67.3%</td>
<td>67.5%</td>
<td>71.8%</td>
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</tr>
<tr>
<td>Asian</td>
<td>17.0%</td>
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<td>13.7%</td>
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</tr>
<tr>
<td>Other</td>
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<td>2.9%</td>
<td>8.1%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Hispanic Origin</td>
<td>7.4%</td>
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<td>4.0%</td>
<td>6.0%</td>
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<tr>
<td><strong>Income</strong></td>
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<td>$75,000+</td>
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<td>20.0%</td>
<td>26.9%</td>
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</tr>
<tr>
<td>$30,000 - 49,999</td>
<td>23.9%</td>
<td>23.3%</td>
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</tr>
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<td>$15,000 - 29,999</td>
<td>13.1%</td>
<td>18.3%</td>
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</tr>
<tr>
<td>$14,999 or less</td>
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<td>16.3%</td>
<td>8.4%</td>
<td>7.5%</td>
</tr>
<tr>
<td><strong>Vehicle per Household</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Vehicles</td>
<td>26.5%</td>
<td>30.0%</td>
<td>6.0%</td>
<td></td>
</tr>
<tr>
<td>2 Vehicles</td>
<td>48.3%</td>
<td>48.3%</td>
<td>21.0%</td>
<td></td>
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<tr>
<td>1 Vehicle</td>
<td>23.9%</td>
<td>19.3%</td>
<td>56.0%</td>
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</tr>
<tr>
<td>0 Vehicles</td>
<td>1.2%</td>
<td>2.6%</td>
<td>17.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Vehicles per Household</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.11</td>
<td>1.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ratio of Drivers to Vehicles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1 driver / vehicle</td>
<td>24.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 driver / vehicle</td>
<td>64.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;1 driver / vehicle</td>
<td>12.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Primary Commute Mode</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drove Alone</td>
<td>66.0%</td>
<td>73.2%</td>
<td>41.7%</td>
<td>54.9%</td>
</tr>
<tr>
<td>2+ Carpool</td>
<td>9.2%</td>
<td>13.0%</td>
<td>8.2%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Transit</td>
<td>20.7%</td>
<td>7.1%</td>
<td>38.0%</td>
<td>23.3%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>0.3%</td>
<td>0.1%</td>
<td>1.2%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Walk</td>
<td>0.3%</td>
<td>1.4%</td>
<td>8.0%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Telework</td>
<td>2.8%</td>
<td>4.1%</td>
<td>1.9%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

* Age categories for CA examples: Over 50, 36-50, 18-35, Under 18
** Fairfield income based on Individual Income. CA examples based on Household income (categories $100k+, $60-100k, $30-60k, 15-30k, <$15k)

Sources:
- Vienna / Fairfax, UrbanTrans, Census 2000 Data, 2005
- R-B / Arlington, Leach, Reconnecting America Presentation, 2003
- CA Examples, "Travel Characteristics of TOD in California," 2004
Appendix 6

Community Involvement

This appendix includes the following Community Involvement summaries:

- Providence District Land Use Seminar Overview
- Vienna Township Meeting Overview
- Online Open House Overview
- Open House Overview
Providence District Land Use Seminar Overview

Providence District Land Use Seminar #1 was held May 2, 2005 from 7:30 to 9:00 p.m. The meeting was held at the Fairhill Elementary School located at 3001 Chichester Lane, Fairfax. Over 100 residents were in attendance, not including staff or consultants.

Meeting Notification and Format
This Fairfax County sponsored event was coordinated and promoted through the offices of Providence District Supervisor Smyth’s office to give Providence District residents the opportunity to learn more about land use issues. The Fairlee-Metro West TDM Development project process was one of four topics that were presented at the seminar. The format of these presentations was part informational and part discussion, with time available for questions on each topic. More than half the attendees used one of the two break-out sessions to ask as more specific questions about and provide suggestions for the TDM Development project process.

Land Use Seminar Comment Summary
Meeting participants provided comments verbally and were recorded by the consultant team. The following is a summary of all comments received.

Existing Conditions Comments

- The intersection of Nutley Road and Lee Highway is dangerous for pedestrians.
- Can Metro handle the new riders that will be generated by this project?
- Why doesn’t this project take into consideration off peak travel generated by the proposed TOD?
- Are a 47% reduction in peak period residential trips and 25% reduction in peak period employee trips achievable?
- Will you be able to provide empirical data with very precise strategies for achieving trip reduction goals?
- Sidewalks/pedestrian access in and around the Metro Site is inadequate.
Vienna Township Meeting Overview

The consultant team met with the Vienna Township Mayor, Council Members and staff on May 19, 2005 from 4:00 to 5:00 p.m. The meeting was held at the Vienna Town Hall at 127 Center Street South, Vienna.

Meeting Notification and Format

This meeting was called at the request of Town Council Member Laurie Genevro Cole, who had met the consulting team at the Providence District Land Use Seminar #1. The meeting was intended to provide Vienna Township elected officials and staff with an overview of the TDM Development project process as well as allow them to ask more specific questions about and provide suggestions for the TDM Development project process.

Vienna Township Comment Summary

Meeting participants provided comments verbally and were recorded by the consultant team. The following is a summary of all comments received.

**Existing Conditions Comments**

- Weekend trips are equal to that of peak hour rush.
- Many Metro riders park on Vienna Township residential streets and walk to the Metro station. Vienna Township issued street parking permits and followed up with ticketing to enforce it. This may be something Fairfax County wishes to do too.
- Other than during peak hours, there is no bus service to/from Vienna to the Metro Station.
- There needs to be better coordination between bus and MetroRail schedules.
- The biggest issue is capacity of the Orange Line back to Fairfax in the evening.
- Is the county travel survey being coordinated with the Fairlee-Metro West TDM Development project survey?
- Will there be household counts as part of the study?
- Can we get a list of areas surveyed, organized by HOA?
- Can we get a copy of the survey and survey results?
Online Open House Overview

The consultant team provided an ongoing opportunity for residents in the community to provide their input on the TDM project through the project website at [www.fairleemetrowest-tdm.com](http://www.fairleemetrowest-tdm.com). Comments were accepted on the website from May 6th through June 3rd.

Online Open House Notification and Format

The project web address ([www.fairleemetrowest-tdm.com](http://www.fairleemetrowest-tdm.com)) was promoted on every flyer distributed to HOAs to promote the resident survey as well as the open house. The web address was also promoted on over 7,400 surveys that the consultant team distributed to households in the survey area. The Online Open House was intended to provide a private and open ended forum with no timeframes to ask more specific questions about and provide suggestions for the TDM Development project process.

Online Open House Comment Summary

Online Open House participants provided written comments on the web page which were downloaded into a database and recorded by the consultant team. Each comment submitted was asked to record their zip code for reference purposes. The following is a summary of all comments received.

**Online Open House Comments**

<table>
<thead>
<tr>
<th>Comment</th>
<th>Home Zipcode Of Person Entering Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• There's already too much development -- and congestion -- around the metro in the form of outsized townhomes, condo complexes etc, and some single family luxury housing. Leave it alone now!</td>
<td>22031</td>
</tr>
<tr>
<td>• 1) Eliminate stop sign for pedestrian walkway South of Vienna Metro - this stop sign backs up car traffic significantly!!! I would estimate, on an average morning, removing this sign would cut 10 minutes off my and thousands of other commuters!</td>
<td>20120</td>
</tr>
<tr>
<td>• 2) Re-open the cut thru access to apartments / condos / ICF consulting to residents / workers. There used to be a card activated gate there. This would speed up the time that the ICF shuttle bus needs to shuttle workers to / from metro.</td>
<td></td>
</tr>
<tr>
<td>• Your survey fails to inquire about day care, or to/from work travel west of the Vienna Metro Stop. Taking the bus is much too time consuming to &amp; from, you have to wait in the rain or snow without cover, and you must cross streets with fast-approaching cars to get even get to the bus stop.</td>
<td>22033</td>
</tr>
</tbody>
</table>
| • 1) Bicycle access across I-66 and through the Town of Vienna can be improved.  
  • 2) At present, Nutley St. is too dangerous to ride over I-66...traffic entering and exiting I-66 is heedless of other vehicles, much less bicycles. It would be helpful if a separate bicycle lane could be developed on Virginia Center Drive, Vaden Rd. and Saintsbury Rd, | 22182                                   |
which would permit bicyclists to get over I-66 at lower risk. And if Vaden is going to be accepting heavier traffic as a result of Fairlee, a dedicated bicycle lane will be essential if you want people to get out of their cars and bike instead.

- 3) Similarly, the Fairfax Connector Trail should be completed from Fairfax City to the W&OD, which will offer additional transportation capacity on top of car, bus, and rail. My understanding is that the Town of Vienna blocked signage of the trail through the town because residents were concerned about bicycle traffic. Now that the same people are tearing their hair out over the potential for massively increased car traffic due to Fairlee, maybe they’ll look more kindly on bicycles as an alternative to some of those cars? Or is the Town’s strategy to build a wall around itself?

- 4) What will happen to the Trail in Nottaway Park as a result of the recently-announced expansion of Park facilities?”

| Add a beltway/loop metro line and/or bus. | 20817 |
| Online survey says answers would be confidential AND that one is enrolled for chance at $400 gift card. But the only way to get latter is to make former impossible because you have to give your name to get the gift chance. What's up? | n/a |
| Any new development should have its own exit to/from I-66 to discourage new traffic in the residential areas. | 22180 |
| I work there occasionally and think this new development is great. I would love to see a more walkable area - right now it combines residential, business, and shopping but it’s very car-oriented. Some people from our office actually drive across the street to have lunch. I would like to see an area more conducive to walking and maybe some stores useful to commuters (coffee shops, dry cleaning) near the Metro station. Also, everybody should get Metrochek. | 20008 |
| More development would cause more traffic congestion. Already too much congestion around Nutley Street/Lee Highway/Vienna Metro area. | 20850 |
| 1) It takes 5 minutes to walk from my front door to the platform of the Vienna Metro Station. Yet I never take metro to work because of the inconvenience. I freelance and my two main clients are in Silver Spring and McLean. It would take about an hour to take metro to Silver Spring, when it takes about 45 minutes to drive. Also, I can park for $30/ month, which is much less than the approx. $7/ day metro fare. (Has anyone ever considered a metro line connecting Fairfax to Montgomery without taking us into DC? I would take it in a heartbeat! It certainly would alleviate traffic on the beltway.) 2) There is no metro station in McLean, so I have to drive - nine miles takes 30 minutes. Public transportation just doesn’t work for me. 3) Until recently, my roommate worked downtown. For years he took metro, but it became too crowded so he started to drive. Between 6:30 and 9:30 AM during the work week, EVERY SEAT is taken | 22031 |
before the train leaves Vienna - the beginning of the line. The trains quickly become overcrowded, which slows them down. There is NO WAY the metro system can accommodate all of the people the planned MetroWest community is going to bring in. It is already overcrowded.

- 4) And you are naive to think that everyone who moves into MetroWest is going to take the metro instead of drive simply because you wish it to be. Even though there is a grocery store within walking distance, you can't walk there because the traffic is too bad. Crossing the Nutley/Lee Highway intersection is dangerous. The cars don't stop at the light. (And the police never ticket them, even when it happens right in front of them). They speed up when a pedestrian is in the crosswalk. It is scary. If you add more pedestrians to the equation, people are going to start getting killed. This is never going to be a pedestrian friendly community because the surrounding roads are just too big.

- 5) Please don't force your plan on us because it is nice in theory. It honestly won't work.

---

**Safer cross walks in the immediate area of the Vienna metro station.**

**Hi, I took your survey and the part that interested me the most was the section on what would most likely make me use the metro. A subsidy would be great but the biggest draw for me would be to have a free covered bicycle port where I board the metro for work. I don't want it to rain on my bike while I'm at work, so I don't bike to the metro. I'll pay retail metro rides if I can get a free sheltered place to put my bike. Improved bicycle infrastructure isn't an option in your survey.**

**1) Take the Metro Train out to the Fairfax Government Center or better yet to the Gainesville area. People will move to the places the trains are easy to get to.**

**2) Or put a "Rush Hour only" exit off of 66 to the Prosperity Ave. This four lane road is under used in the mornings. This would allow for people riding the Dunn Loring metro easier access AND those people wishing to get to 29 and 50 a better exit then the Vienna Exit, which is over loaded with cars which are not even going to the Vienna metro. "**

**Please bring metro from Vienna out to Dulles corridor!**

**Never a set schedule. You need schedule @ train stops. You never know when train is arriving or leaving. You need to better monitor single drives of HOV**

**Justin, I told you I would not be able to answer how many miles it was to my work location and you said you would reword that question. I answered 1000 miles because I could not submit the survey with a blank field. I'm irked. Julia Hutchins**

**This only deals with rush hour/work travel, but the traffic is at least as**
congested at the weekends, does this not need to be taken into account to get an accurate picture???

- I’m 100% in favor of Metro West.
- I do use the Metro when its going where I’m going like the theatre, ball games, etc in DC
- Wish metro went cross-county

Open House Overview

The Fairlee-Metro West TDM Development Project Open House was held June 1, 2005 from 7:00 to 9:00 p.m. The meeting was held at the Marshall Road Elementary School located at 730 Marshall Road, Fairfax. Thirty one meeting participants signed in, not including staff or consultants.

Meeting Notification
Fairfax County staff for Providence District Supervisor Smyth provided the consultant team with list of more than 70 contacts at Homeowners Association and Civic Organizations with an interest in the Vienna Metro Study area. A meeting flyer was developed and distributed via email to approximately 50 HOA contacts in the study area with an email address. It was also placed on the project website. The consultant team followed up by phone with as many of them as possible to make sure they received the email. Follow up phone calls were also placed to approximately 15 HOA contacts that did not have email addresses.

Meeting Format
Meeting attendees were encouraged to arrive anytime between 7:00 and 9:00 p.m. An introduction to the meeting was held at approximately 7:30 by Kevin Luten, UrbanTrans Consultants. Mr. Luten also provided concluding comments at 8:45 and
answered remaining questions.

A sign in table was set up at the entrance to the open house and each meeting attendee was provided with a project overview handout (see below) and a general comment form. Three stations, described below, were set up around the room. Members of the Advisory Team were present at each station to answer questions about the project.

---

**Fairlee-Metro West**

**Transportation Demand Management (TDM) Development Project**

**Project Overview Handout**

**Study Process**

The goal of the project is to reduce traffic congestion throughout the Vienna Metro Station Area using Transportation Demand Management (TDM) measures. TDM can best be described as policies and strategies that maximize the use of the supply of transportation infrastructure.

To accomplish this, four primary tasks are being conducted:

1) Determining the existing peak hour commuting/travel patterns and how many people drive alone or do not drive alone within the Vienna Metro Station Area. The study process included:
   a. Predicting traffic volumes generated by the proposed development through the Institute for Transportation Engineers (ITE) and Fairfax County Trip Generation Models
   b. Sampling how many vehicles come in and out of neighborhoods surrounding the Vienna Metro Station and how many people are in those vehicles.
   c. Surveying residents and employees in the study area to assess their attitudes and opinions about travel choices and compare them to trends observed through travel behavior in census analysis.
2) Investigating “best practices” throughout the region and across the country
3) Identifying opportunities and barriers to successful TDM strategy implementation.
4) Meeting with and receiving input from a number of neighborhood groups in the study area.

Upon completion of the study, specific TDM, including TDM friendly site design and parking strategies will be developed to help achieve peak hour drive alone trip reductions for both the residential and office portions of the Vienna Station Area. The study will also include ongoing TDM evaluation strategies to ensure that the success of the aforementioned strategies can be measured.

**Timeline**

The study began in April 2005 and will be completed by the end of June 2005.

**Next Steps**

We will take your comments and incorporate them into a final report that will be presented to the Project Advisory Committee in mid-June. Information presented tonight and the draft report will be available at www.fairleemetrowest-tdm.com.
Station 1: Existing Conditions
The first station included numerous display boards and project team members answered questions and wrote down comments. The display boards included:
- Map with Traffic Count Locations
- Traffic Count Results
- Key Employer and Residential Survey Results
- Census Information

Station 2: Existing TDM Programs
Fairfax County staffed the second station and provided information on regional and local TDM programs.

Station 3: TDM Opportunities and Barriers
The third station included a general map of the station area and information on TDM opportunities and barriers. Project team members provided attendees with post it notes in two colors: one color representing opportunities and the other representing barriers. Meeting attendees were asked to identify 1) specific locations of TDM opportunities and barriers on the map and 2) general TDM opportunities and barriers, regardless of location.

Display boards included:
- General TDM Overview
- TOD and TDM Success Factors
- Map of Station Area
- Example TDM Opportunities and Barriers

Open House Comment Summary
Meeting participants provided comments both directly at the stations and on comment forms. The following is a summary of all comments received.

Existing Conditions Comments
- Vienna line/border includes Marshall Road School (comment was provided on traffic count map).
- Are there site specific TOD/TDM programs in Fairfax County?
- Need to show potential benefit of TDM. What can TDM do to reduce trips? How much is possible/reasonable?
- Pedestrian safety at Virginia Center Boulevard.
- The junction of I-66 and the Beltway is a major bottleneck. The traffic on I-66 East is often backed up at all hours and even weekends.
- Vienna Metro is not well connected by bus to other destinations. How will this be improved?
- Lack of sidewalks.
- Unsafe pedestrian crossing at Metro (Virginia Center Boulevard).
• Orange Line is crowded. Trains stops constantly to wait for train ahead.
• Bus Service: Inadequate coverage (geographic and time), buses always late.
• Lack of bicycle trail connections.
• Surprised by amount of information disseminated at this preliminary meeting.

**Current TDM Program Comments**

• Hard to tell from the display boards how programs are working in residential areas, and how they would work here.

**Opportunities and Barriers Comments**

**Opportunities:**

• Enhance bike connection between station and the town of Vienna and the W & OD path.
  o Can use Virginia Center Boulevard for bike path to southwest Vienna then use residential streets to reach town commercial area and trail.
• Direct traffic on Vaden/Country Creek that is looking for Nutley through appropriate directional signage. Discourage traffic from searching for Nutley through Vaden north of Country Creek/UCB.
• Vienna Station may not always be a terminus. Extension of line will reduce traffic.
• Demographics in Fairfax County lend support for this type of housing. There is a shortage.
• Current residents will gain opportunities to walk and bike to a pleasant area and services.
• Improve bike and pedestrian connections to Pan Am. A pedestrian crossing at Vaden Extension at Lee Highway and new sidewalk on south side of Lee would help.
• Need left turn phase for eastbound Country Creek at Vaden. Poor sight distance.

**Barriers:**

• Employment places not on transit line.
• I-66 at/above capacity in both directions.
• Poor bus service to local areas from station. Not just frequency, but very limited routes. Can’t get to Town of Vienna commercial area.
• New road (Vaden Drive extended) and the widening of Saintsbury Drive will greatly impede the access for Circle Woods and all the neighborhoods south and west of the metro station to the station.
• Poor pedestrian connectivity at Virginia Center.
• Poor connectivity along Vaden Drive from pedestrians coming from the north.
• Vehicular traffic on Virginia Center is moving too fast to allow safe pedestrian crossing.
• Sidewalk gap on north side of Virginia Center Boulevard between north east Metro lot entrance and Barrenhurst.
• Parking at Sweeny surface lot is removed.
• Please consider that:
  o Vienna Metro Station is at the end of the line.
  o Highway I-66 is just as close as the Metro so the proximity of I-66 makes it more attractive to use.
  o Developer may not require homeowners to continue TDMs.
What is the tolerance of Metro users for crowding? At what point are current (or potential) Metro users driven away by crowding? A recent speaker on the proposed Silver Line stated that the number of trains serving the Orange Line will be cut by more than half (from 20 to 8 or 9, in a given time period) to create tunnel capacity for Silver Line trains into DC. How will this affect Metro use by Metro West and other Orange Line users?

**Meeting Comments**
- Informative as to what TDM is and what options area, not informative about the impacts of TDM. Would be helpful to give a realistic assessment of what TDM would do under the best of circumstances. Start from existing mode shares and revise upward or downward depending on TDM measures. The meeting was not informative in terms of potential impact on the neighborhoods, positive or negative.
- Too much presentation and too little time to see the materials. Where can we get copies?

**Additional Comments**
- At station 1, it is unfortunate that only a.m. non-work trips were identified. Staff said numbers for p.m. were available, and they were much higher than in a.m.
- Need to measure non rush hour traffic and weekends. Need community meeting to present final report. Need to measure pedestrian traffic and improve safety/connectivity.
- Need to have a community meeting following dissemination of final report.
Appendix 7

MetroWest Vehicle Trip Reduction Analysis
Using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 7th version, Land Use categories and rates, base trip generation for the site were established.

Based on these calculations, the AM Peak Hour was determined to be the largest peak for the Office land use, and the PM Peak Hour was determined to be the peak for the Residential land uses.
### Base Trips

<table>
<thead>
<tr>
<th>Trips-</th>
<th>Residential Peak (PM) Trips-</th>
</tr>
</thead>
<tbody>
<tr>
<td>In</td>
<td>Out</td>
</tr>
<tr>
<td>398</td>
<td>54</td>
</tr>
<tr>
<td>565</td>
<td>339</td>
</tr>
</tbody>
</table>

Peak Hour trips carried forward from ITE Trip Generation

Original ITE Calculations assumed general High Rise Condominiums for the majority of land uses within the Residential Categories. In fact, as a demand management measure, 368 of these units will be developed as Age-Restricted residences (55 years old and older). To account for this change in use, ITE rates were re-calculated for one segment of the Residential land Uses.

### TABLE 2.1

<table>
<thead>
<tr>
<th>Land Use Modification DU Rate</th>
<th>Office Peak (AM) Trips-In</th>
<th>Trips-Out</th>
<th>Residential Peak (PM) Trips-In</th>
<th>Trips-Out</th>
<th>% Dist</th>
<th>% Dist</th>
<th>Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>(232) High Rise Condo / Townhouse 848</td>
<td>0.38</td>
<td>62%</td>
<td>200</td>
<td>38%</td>
<td>122</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trip Modification for 368 - 55+ (age restricted) units</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(232) High Rise Condo / Townhouse 480</td>
<td>0.38</td>
<td>62%</td>
<td>113</td>
<td>38%</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(250) Retirement Community 368</td>
<td>0.27</td>
<td>62%</td>
<td>62</td>
<td>38%</td>
<td>38</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Trip Generation Modification -25 -15

Calculated by splitting out the age restricted units and then subtracting the new trip generation from the base trip generation. 200-(113+62)=25 less trips in and 122-(69+38)=15 less trips out

Our research, including Transportation Research Board work and ITE, point to the fact that mixed-use developments have trips that will be taken that are internal to the site. In fact, ITE suggests that these trips could be as much as 24% of all trips. Using the research (Cervero et al 2004; Edwards 2003; Hedges 2005; ITE 2004; Nelson et al 2000; US DOT nd), our understanding of potential internal synergies, and a very conservative approach, we calculated the number of trips that will be taken with both internal origins and destinations. Furthermore, our modification Factors are varied by In's and Out's based on Residential and Office origins only. Specific rates were developed through research results (cited above) and blended with professional judgment per accepted ITE practice.

### TABLE 2.2

| Origin Destination Factor Trips Factor Trips Factor Trips Factor Trips |
|----------------------|----------------|----------------|----------------|----------------|
| Residence Retail 1.0% 4 10.0% 5 |
| Office Retail       1.0% 4 10.0% 5 |

Availability of resources (grocer, restaurant, convenience retail/service, banking, recreation/exercise, mail/copy services) within the site.

565 trips x 7.5% = 42 fewer trips in and 339 trips out x 15% = 51 fewer trips

398 trips x 1% = 4 fewer trips in and 54 trips out x 10% = 5 fewer trips

565 trips x 4% = 23 fewer trips in and 339 trips out x 10% = 34 fewer trips

398 trips x 1% = 4 fewer trips in and 54 trips out x 5% = 3 fewer trips

565 trips x 2% = 11 fewer trips in and 339 trips out x 5% = 17 fewer trips

398 trips x 1% = 4 fewer trips in and 54 trips out x 10% = 5 fewer trips

### TABLE 2.3

| Origin Destination Factor Trips Factor Trips Factor Trips Factor Trips |
|----------------------|----------------|----------------|----------------|----------------|
| Residence External 1.0% 4 5.0% 3 |
| Office External 1.0% 4 5.0% 3 |
| External Residence 2.0% 11 5.0% 17 |

### TABLE 2.4

| Origin Destination Factor Trips Factor Trips Factor Trips Factor Trips |
|----------------------|----------------|----------------|----------------|----------------|
| Residence Office 1.0% 4 10.0% 5 |
| Office Office 1.0% 4 10.0% 5 |

### TABLE 2.5

| Total Trip Generation Modification from Design, Diversity and Intensity of Uses |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Office Peak (AM) Trips-In     | Trips-Out                      | Residential Peak (PM) Trips-In | Trips-Out                      |
| -12                           | -13                           | -101                          | -117                          |
Step 3-Residential Modifiers

<table>
<thead>
<tr>
<th>Base Trips</th>
<th>In</th>
<th>Out</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>565</td>
<td>339</td>
<td>904</td>
</tr>
</tbody>
</table>

The next step in the process was to identify the trip reductions related to further specifics of the TOD such availability of transit and moreover reductions affiliated with Travel Choice programs and services (TDM). Using national research (Cervero et al 2004; Chisholm 2002; ITE 2004; Kuzmyak et al 2005; USDOT nd; Vaca et al 2003) and local survey results (Claritas 2005; LDA 2005), produced ranges of reductions even greater than identified below (Cervero found that TOD’s relative proximity to transit with good pedestrian amenities can increase transit usage by up to 30% and local survey results found that 35% of residents within 1/2 mile use transit for commuting). In all cases, we opted for the most conservative approach in order to not overstate planned trip reductions. Furthermore, potential trips by carpool were identified and minimize by an occupancy of 2.25 people per vehicle (not providing for a 1 reduced trip to 1 person ratio). In all cases, trips are not eliminated, just taken in modes other than pure auto trips.

### Residential Single Occupancy Vehicle Modifications for TOD Characteristics

<table>
<thead>
<tr>
<th>TABLE 3.1</th>
<th>Potential range of supplemental reductions</th>
<th>Factor Used</th>
<th>Auto Occupancy</th>
<th>In</th>
<th>Out</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit Proximity*</td>
<td>10%-20%</td>
<td>10%</td>
<td>0</td>
<td>-57</td>
<td>-34</td>
<td>-91</td>
</tr>
<tr>
<td>Onsite Transportation Programs</td>
<td>5%-10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpool</td>
<td>2%</td>
<td>2.25</td>
<td>-5</td>
<td>-3</td>
<td>-8</td>
<td></td>
</tr>
<tr>
<td>Other Non-SOV</td>
<td>3%</td>
<td>0</td>
<td>-17</td>
<td>-10</td>
<td>-27</td>
<td></td>
</tr>
<tr>
<td>Active Parking Management</td>
<td>5%-30%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpool</td>
<td>3%</td>
<td>2.25</td>
<td>-8</td>
<td>-5</td>
<td>-13</td>
<td></td>
</tr>
<tr>
<td>Other Non-SOV</td>
<td>7%</td>
<td>0</td>
<td>-40</td>
<td>-24</td>
<td>-64</td>
<td></td>
</tr>
<tr>
<td>Residents that Live and Work within the site (5%-8% of Population)</td>
<td>5%-8%</td>
<td>5%</td>
<td>0</td>
<td>-32</td>
<td>-5</td>
<td>-37</td>
</tr>
</tbody>
</table>

Note: These trips were NOT accounted for in Step 4 Trip Generation Modifiers

3652 Residents 16+ x 5% (live/work within site (non-telecommute)) X 20% who would travel in the PM Peak Hour distributed 87% In / 13% out

* Transit Proximity is mix of factors. Most important are the pedestrian environment and amenities combined with the close distance from Residences/Offices to Transist (almost all are contained within a 1/4 mile radius). As found in all research references these factors are attributable to TOD’s, though somewhat difficult to isolate to just one singular factor. Furthermore, the Onsite Transportation programs are more effective because of the physical characteristics (you can market and educate with better results because of the higher quality facilities).

Overall Trip Reductions affiliated with transit travel mode are 18.5% (10% Transit Proximity + 3% Onsite Programs + 7% Active Parking Management less 1.5% for Telework and Bike/Pedestrian Trip Reductions).

<table>
<thead>
<tr>
<th>Reduction in PM Peak Hour Trip Generation based on TOD Characteristics</th>
<th>In</th>
<th>Out</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-159</td>
<td>-81</td>
<td>-240</td>
</tr>
</tbody>
</table>
Establishing the Number of Commute Trips

Initially, the projected population needs to be established for the site's Residential land uses. This was established through a series of steps based on US Census, current Demographics, and national studies of Transit Oriented Developments.

US Census - Correlates to ITE National Standards

ITE trip generation is based on a combination of real world experiences throughout the country. These experiences are combined to produce expected results at a national level. As such these ITE calculations can readily be correlated with US Census data, which takes individual data and identifies local through national demographic detail.

<table>
<thead>
<tr>
<th>US Census 2000 Data</th>
<th>Vienna</th>
<th>Fairfax County</th>
<th>VA</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population</td>
<td>14453</td>
<td>969749</td>
<td>7078515</td>
<td></td>
</tr>
<tr>
<td>Workers 16 and over</td>
<td>7696</td>
<td>527,464</td>
<td>281421906</td>
<td></td>
</tr>
<tr>
<td>Population per square mile</td>
<td>3253.8</td>
<td>2454.78</td>
<td>178.78</td>
<td>79.56</td>
</tr>
<tr>
<td><strong>HOUSING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total units</td>
<td>5445</td>
<td>2904192</td>
<td>115904641</td>
<td></td>
</tr>
<tr>
<td>Rental occupied</td>
<td>13.40%</td>
<td>28.30%</td>
<td>29.70%</td>
<td>30.80%</td>
</tr>
<tr>
<td>Owner occupied</td>
<td>84.60%</td>
<td>69.20%</td>
<td>63.30%</td>
<td>60.20%</td>
</tr>
<tr>
<td>Other (not) occupied</td>
<td>2.00%</td>
<td>2.50%</td>
<td>7.00%</td>
<td>9.00%</td>
</tr>
<tr>
<td>Household Size-Rental</td>
<td>2.69</td>
<td>2.59</td>
<td>2.33</td>
<td>2.36</td>
</tr>
<tr>
<td>Household Size-Owner</td>
<td>2.73</td>
<td>2.8</td>
<td>2.63</td>
<td>2.71</td>
</tr>
<tr>
<td><strong>COMMUTING TIME</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average travel time to work (minutes)</td>
<td>28</td>
<td>31</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>Average travel time to work using public transportation</td>
<td>49</td>
<td>50</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td>Average travel time to work using other transportation</td>
<td>25</td>
<td>29</td>
<td>26</td>
<td>24</td>
</tr>
</tbody>
</table>

Sources: U.S. Census Bureau

These data were then used to establish an estimated number of occupied units. Census data shows very high occupancy rates with only 2% of units not occupied.

<table>
<thead>
<tr>
<th></th>
<th>Ttl DU</th>
<th># DU Occupied</th>
<th># DU from Rental Stock</th>
<th># DU from Ownership Stock</th>
<th>Ttl Residences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwelling Units-Rental</td>
<td>900</td>
<td>882</td>
<td>882</td>
<td>72</td>
<td>954</td>
</tr>
<tr>
<td>Dwelling Units-Ownership</td>
<td>1470</td>
<td>1441</td>
<td>0</td>
<td>1369</td>
<td>1369</td>
</tr>
</tbody>
</table>

After assuming 5% of the townhouse units will not be owner occupied, the total number of occupied units is calculated to be:

2,323 Units
2005 Demographic data was obtained from Claritas, Inc., a market research corporation. Using the current occupants per household data for all residences within the transit station area (1/2 mile radius), the projected number of residents was established. Furthermore, the Claritas data also provided an number of residents that are sixteen years old or older, which correlates to potential drivers and workforce. This number versus the total population established a rate of 79.75% of all residents will fall within the category of sixteen years old or older.

**TABLE 3.2**

<table>
<thead>
<tr>
<th>Category</th>
<th>Dist</th>
<th>Relative Dist</th>
<th>% of HH</th>
<th># of HH</th>
<th># of Residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>16+</td>
<td>1</td>
<td>56.6%</td>
<td>0.35</td>
<td>19.8%</td>
<td>461</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.65</td>
<td>36.7%</td>
<td>853</td>
<td>1,706</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>35.5%</td>
<td>0.61</td>
<td>21.8%</td>
<td>505</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0.39</td>
<td>13.7%</td>
<td>319</td>
<td>1,276</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>8.0%</td>
<td>0.64</td>
<td>5.1%</td>
<td>119</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>0.20</td>
<td>1.6%</td>
<td>36</td>
<td>216</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>0.16</td>
<td>1.3%</td>
<td>30</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100.0%</td>
<td></td>
<td>2,323</td>
<td>5,979</td>
</tr>
</tbody>
</table>

Using these general data, it is calculated that 4,768 residents will be in the category of sixteen years old or older.

**Using national and local research to calibrate household size for specifics of TOD's**

Using both the national research and the survey conducted of local residents, is established that TOD’s tend to have a household size that is smaller and has fewer children. To ensure the most conservative approach, however, we chose to use the higher percentage of residents that are sixteen or older rather than the range of 53%-62% that found in our research. This conservative approach will translate into a higher potential number of trips for calculation purposes.

**TABLE 3.3**

<table>
<thead>
<tr>
<th>Category</th>
<th>Dist</th>
<th>Relative Dist</th>
<th>% of HH</th>
<th># of HH</th>
<th># of Residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>16+</td>
<td>1</td>
<td>0.40</td>
<td>33.3%</td>
<td>773</td>
<td>773</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>83.20%</td>
<td>0.60</td>
<td>49.9%</td>
<td>1,160</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.55</td>
<td>7.6%</td>
<td>176</td>
<td>528</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>13.80%</td>
<td>0.45</td>
<td>6.2%</td>
<td>144</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>0.60</td>
<td>1.8%</td>
<td>42</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>0.25</td>
<td>0.8%</td>
<td>17</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>3.00%</td>
<td>0.15</td>
<td>0.5%</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100.0%</td>
<td></td>
<td>2,322</td>
<td>4,579</td>
</tr>
</tbody>
</table>

Ultimately, these calculations found that our number of occupied households will translate into 3,652 residents sixteen or older.
After identifying the residential trip reductions related to further specifics of the TOD (and identified with Step 4), these factors then needed to be applied to the Office land uses. Our research suggested that these programs could 25% to 100% more effective than residential based programs due to similar commute patterns and employee culture issues. This is further validated by our own experiences throughout the country managing these types of programs. Even with these facts, we opted for the more conservative factors applied to the Residential land uses. All other logic and formula remained the same as in Step 3.

Modify Office SOV Travel Distribution for TOD Characteristics

<table>
<thead>
<tr>
<th>Characteristics or Programs</th>
<th>Potential range of supplemental reductions</th>
<th>Factor Used</th>
<th>Auto Occupancy</th>
<th>In</th>
<th>Out</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit Proximity</td>
<td>10%-20%</td>
<td>10%</td>
<td>0</td>
<td>-40</td>
<td>-5</td>
<td>-45</td>
</tr>
<tr>
<td>Onsite Transportation Programs</td>
<td>5%-10%</td>
<td>2%</td>
<td>2.25</td>
<td>-4</td>
<td>0</td>
<td>-4</td>
</tr>
<tr>
<td>Carpool</td>
<td></td>
<td></td>
<td></td>
<td>398 trips x 2% / 2.25 people = 4 fewer trips in and (54 trips out x 2%) / 2.25 people = 0 fewer trips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Non-SOV</td>
<td>3%</td>
<td>0</td>
<td>-12</td>
<td>-2</td>
<td>-14</td>
<td></td>
</tr>
<tr>
<td>Active Parking Management</td>
<td>5%-30%</td>
<td>3%</td>
<td>2.25</td>
<td>-5</td>
<td>-1</td>
<td>-6</td>
</tr>
<tr>
<td>Carpool</td>
<td></td>
<td></td>
<td></td>
<td>398 trips x 3% / 2.25 people = 5 fewer trips in and (54 trips out x 3%) / 2.25 people = 1 fewer trips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Non-SOV</td>
<td>7%</td>
<td>0</td>
<td>-28</td>
<td>-4</td>
<td>-32</td>
<td></td>
</tr>
<tr>
<td>Residents that Live and Work within the site (5%-8% of Population)</td>
<td>5%-8%</td>
<td>5%</td>
<td>0</td>
<td>-26</td>
<td>-0.8</td>
<td>-27</td>
</tr>
</tbody>
</table>

Note: These trips were NOT accounted for in Step 4 Trip Generation Modifiers

<table>
<thead>
<tr>
<th>Residential Peak (PM)</th>
<th>In</th>
<th>Out</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Trips</td>
<td>398</td>
<td>54</td>
<td>452</td>
</tr>
</tbody>
</table>

3652 Residents 16+ x 5% (live/work within site (non-telecommute)) X 15% who would travel in the AM Peak Hour distributed 97% In / 3% out

* Transit Proximity is mix of factors. Most important are the pedestrian environment and amenities combined with the close distance from Residences/Offices to Tranist (almost all are contained within a 1/4 mile radius). As found in all research references these factors are attributable to TOD's, though somewhat difficult to isolate to just one singular factor. Furthermore, the Onsite Transportation programs are more effective because of the physical characteristics (you can market and educate with better results because of the higher quality facilities). When factored with Onsite Transportation Programs and Active Parking Managament, contributions from TOD / TDM Characteristics total approximately 18.5%.
Number Of employees 1500 (5 employees per 1,000 sq ft for 300,000 sq ft)

Table 5.1

<table>
<thead>
<tr>
<th>Claritas Data-Travel Distribution</th>
<th>Base Travel Distribution</th>
<th>Step 6 Travel Distribution</th>
<th>Auto Occupancy</th>
<th>Auto Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOV</td>
<td>71.14%</td>
<td>46.14%</td>
<td>1</td>
<td>692</td>
</tr>
<tr>
<td>CP</td>
<td>11.23%</td>
<td>5.0%</td>
<td>2.25</td>
<td>108</td>
</tr>
<tr>
<td>Transit (bus/ferry/rail)</td>
<td>10.53%</td>
<td>18.5%</td>
<td>435</td>
<td></td>
</tr>
<tr>
<td>Bike/Walk</td>
<td>2.03%</td>
<td>1.0%</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Telecommute</td>
<td>4.48%</td>
<td>0.5%</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0.59%</td>
<td>0.59%</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td></td>
<td></td>
<td>800</td>
</tr>
</tbody>
</table>

Using the Claritas data and the trip reductions calculated in Step 4, only 800 Auto Trips would be generated by 1500 employees at the site.

Table 5.2

<table>
<thead>
<tr>
<th>Employee Survey-Travel Distribution</th>
<th>Base Travel Distribution</th>
<th>Step 6 Travel Distribution</th>
<th>Auto Occupancy</th>
<th>Auto Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOV</td>
<td>73%</td>
<td>48.00%</td>
<td>1</td>
<td>720</td>
</tr>
<tr>
<td>CP</td>
<td>1%</td>
<td>5.0%</td>
<td>2.25</td>
<td>40</td>
</tr>
<tr>
<td>Transit (bus/ferry/rail)</td>
<td>19%</td>
<td>18.5%</td>
<td>563</td>
<td></td>
</tr>
<tr>
<td>Bike/Walk</td>
<td>2%</td>
<td>1.0%</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Telecommute</td>
<td>5%</td>
<td>0.5%</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>0.00%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>760</td>
</tr>
</tbody>
</table>

Using the Area Employee Survey data (collected with the project) and the trip reductions calculated in Step 4, only 760 Auto Trips would be generated by 1500 employees at the site.

As we moved to validate trip generation through an established model, we chose to use the higher trip generation numbers of the Claritas data to balance against the greatest potential trip generation situation.

Using an Average Vehicle Ridership Model produced by the Center for Urban Transportation Research, we found that at a normal site, with the inclusion of a subsidy, nominal parking charges, a guaranteed ride home, access to a marketed ridematching system, and knowledge of compressed work weeks, the number of vehicles calculated is comparable to our conservative calculations

<table>
<thead>
<tr>
<th>Vehicles per 100 Ee’s</th>
<th>Auto Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without Programs</td>
<td>83.7</td>
</tr>
<tr>
<td>With Programs</td>
<td>56.3</td>
</tr>
</tbody>
</table>

We also found that this difference of 44.5 trips equated to 3% of our employee population. As such we added back trips related to this model.

It is important to note that this model DOES NOT account for any of the benefits related to TOD, and as such is an overly conservative modeling estimate. Even with this note, we felt it important to continue with our conservative approach to programmatic trip reductions.
<table>
<thead>
<tr>
<th></th>
<th>AM Peak Hour - Office Uses</th>
<th>PM Peak Hour - Residential Uses</th>
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<tbody>
<tr>
<td></td>
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<td>Trips Generated Related to the Residential Peak Hour Per ITE Calculation</td>
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<td>Target Trip Generation Reduction as a % ITE Rates for Peak Hour Land Use</td>
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<td>Target Trip Generation Reduction</td>
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<tr>
<td>Target Peak Hour Trip Generation</td>
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<tr>
<td></td>
<td>(Trip Generation less Trip Reduction Targets)</td>
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<tr>
<td>Modifiers from Physical Attributes - Step 2</td>
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<tr>
<td></td>
<td>Internal Trips</td>
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<td></td>
<td>Linked Trips</td>
<td>-8</td>
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<td></td>
<td>Total Adjustments - Step 2</td>
<td>-12</td>
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<tr>
<td>Modifiers from TDM Attributes - Step 3 &amp; 4</td>
<td>Transit Proximity</td>
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<td></td>
<td>Onsite Transportation Programs</td>
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<td></td>
<td>Active Parking Management</td>
<td>-33</td>
</tr>
<tr>
<td></td>
<td>Residence to Office (5% of Population)</td>
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<tr>
<td></td>
<td>Total Adjustments - Steps 3 &amp; 4</td>
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<tr>
<td>Adjustments to Trip Generation - Steps 2-4</td>
<td>(Removes Trips from system)</td>
<td>-127</td>
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<tr>
<td>Adjustment of Trips based on CUTR Model - Step 5</td>
<td>(Adds Trips back into system)</td>
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<td>Net Adjusted Peak Hour Trip Generation</td>
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<tr>
<td></td>
<td>AM Peak Hour - Office Uses</td>
<td>PM Peak Hour - Residential Uses</td>
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<td>30</td>
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</table>
Figure 3: Trip Modification Summary
by Percentage of Peak Hour Trips Reduced

- Residence to Office: 4.1%, 3.9%
- Active Parking Management: 8.5%, 10.3%
- Onsite Transportation Programs: 3.9%, 10.1%
- Transit Proximity: 10.0%, 9.4%
- Linked Trips: 6.0%, 4.0%
- Internal Trips: 8.4%, 10.3%
- Age Restricted Residential: 4.1%, 4.4%

Office - AM Peak: 6.0%, 10.0%, 3.5%, 2.0%
Residential - PM Peak: 8.4%, 10.1%, 9.4%, 4.4%
APPENDIX 8: CLARITAS SITE REPORT, 2005
# Pop-Facts: Demographic Snapshot Report

**Trade Area: 9500 LAGERSFIELD CIR, VIENNA, VA  22181-6173,  Total**

<table>
<thead>
<tr>
<th>Description</th>
<th>0.00 - 0.25 Miles</th>
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<th>0.00 - 0.50 Miles</th>
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<td><strong>%</strong></td>
<td><strong>Radius</strong></td>
<td><strong>%</strong></td>
<td><strong>Radius</strong></td>
<td><strong>%</strong></td>
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<tr>
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<td>Growth 2000-2005</td>
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<td>18.27%</td>
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<tr>
<td>Growth 1990-2000</td>
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<td>41.31%</td>
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<tr>
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<td>0</td>
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<tr>
<td>Some Other Race Alone</td>
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<td>4.39</td>
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</table>
### Pop-Facts: Demographic Snapshot Report

**Trade Area:** 9500 LAGERSFIELD CIR, VIENNA, VA  22181-6173,  Total

<table>
<thead>
<tr>
<th>Description</th>
<th>0.00 - 0.25 Miles</th>
<th>0.25 - 0.50 Miles</th>
<th>0.00 - 0.50 Miles</th>
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<tbody>
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<td>%</td>
<td>Radius</td>
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<td><strong>2005 Est. Pop. Asian Alone Race by Category</strong>*</td>
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<tr>
<td>Chinese, except Taiwanese</td>
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<td>Filipino</td>
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<td>Hmong</td>
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<tr>
<td>Two or more Asian categories</td>
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<td>1.08</td>
<td>8</td>
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</tbody>
</table>

| **2005 Est. Population by Ancestry** |        |        |        |        |        |
|                                       |          |        |        |        |        |
| Pop, Arab                               | 1,211   | 3.22   | 3,386  | 3.25   | 4,597  | 3.26   |
| Pop, Czech                               | 39      | 0.41   | 110    | 0.47   | 150    | 0.46   |
| Pop, Danish                              | 5       | 0.00   | 16     | 0.00   | 21     | 0.00   |
| Pop, Dutch                               | 6       | 0.50   | 16     | 0.47   | 22     | 0.48   |
| Pop, English                             | 102     | 8.42   | 286    | 8.45   | 388    | 8.44   |
| Pop, French (except Basque)           | 20      | 1.65   | 46     | 1.36   | 66     | 1.44   |
| Pop, French Canadian                     | 9       | 0.74   | 27     | 0.80   | 36     | 0.78   |
| Pop, German                              | 111     | 9.17   | 314    | 9.27   | 426    | 9.27   |
| Pop, Greek                               | 10      | 0.83   | 27     | 0.80   | 37     | 0.80   |
| Pop, Hungarian                           | 8       | 0.66   | 17     | 0.50   | 25     | 0.54   |
| Pop, Irish                               | 84      | 6.94   | 240    | 7.09   | 323    | 7.03   |
| Pop, Italian                             | 75      | 6.19   | 197    | 5.82   | 272    | 5.92   |
| Pop, Lithuanian                          | 2       | 0.17   | 7      | 0.21   | 8      | 0.17   |
| Pop, United States or American          | 39      | 3.22   | 101    | 2.98   | 140    | 3.05   |
| Pop, Norwegian                           | 11      | 0.91   | 29     | 0.86   | 40     | 0.87   |
| Pop, Polish                              | 21      | 1.73   | 60     | 1.77   | 81     | 1.76   |
| Pop, Portuguese                          | 1       | 0.08   | 4      | 0.12   | 5      | 0.11   |
| Pop, Russian                             | 23      | 1.90   | 60     | 1.77   | 83     | 1.81   |
| Pop, Scottish                            | 15      | 1.24   | 37     | 1.09   | 52     | 1.13   |
| Pop, Scotch-Irish                        | 30      | 2.48   | 72     | 2.13   | 102    | 2.22   |
| Pop, Slovak                              | 5       | 0.41   | 15     | 0.44   | 20     | 0.44   |
| Pop, Subsaharan African                  | 13      | 1.07   | 35     | 1.03   | 48     | 1.04   |
| Pop, Swedish                             | 12      | 0.99   | 30     | 0.89   | 42     | 0.91   |
| Pop, Swiss                               | 3       | 0.25   | 6      | 0.18   | 9      | 0.20   |
| Pop, Ukrainian                           | 1       | 0.08   | 1      | 0.03   | 2      | 0.04   |
| Pop, Welsh                               | 8       | 0.66   | 15     | 0.44   | 23     | 0.50   |
| Pop, West Indian (exc Hisp groups)      | 2       | 0.17   | 11     | 0.32   | 13     | 0.28   |
### 2005 Est. Population by Ancestry

<table>
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<tr>
<th>Description</th>
<th>0.00 - 0.25 Miles</th>
<th>0.25 - 0.50 Miles</th>
<th>0.00 - 0.50 Miles</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1,727</td>
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<td>Pop, Ancestry Unclassified</td>
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### 2005 Est. Pop Age 5+ by Language Spoken At Home

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<tbody>
<tr>
<td>Speak Only English at Home</td>
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<td>2,091</td>
<td>2,875</td>
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<tr>
<td>Speak Asian/Pacific Islander Language at Home</td>
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<td>605</td>
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<tr>
<td>Speak IndoEuropean Language at Home</td>
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<td>384</td>
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<tr>
<td>Speak Spanish at Home</td>
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<td>198</td>
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<tr>
<td>Speak Other Language at Home</td>
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<td>211</td>
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### 2005 Est. Population by Sex

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<td>Male</td>
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<td>2,311</td>
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<td>Female</td>
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<td>Male/Female Ratio</td>
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### 2005 Est. Population by Age

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<tbody>
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<td>Age 0 - 4</td>
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<td>235</td>
<td>323</td>
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<tr>
<td>Age 5 - 9</td>
<td>89</td>
<td>240</td>
<td>329</td>
</tr>
<tr>
<td>Age 10 - 14</td>
<td>59</td>
<td>175</td>
<td>235</td>
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<tr>
<td>Age 15 - 17</td>
<td>34</td>
<td>95</td>
<td>129</td>
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<tr>
<td>Age 18 - 20</td>
<td>21</td>
<td>61</td>
<td>82</td>
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<tr>
<td>Age 21 - 24</td>
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<td>Age 25 - 34</td>
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<td>Age 35 - 44</td>
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<td>Age 45 - 49</td>
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<td>363</td>
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<td>Age 55 - 59</td>
<td>87</td>
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<td>327</td>
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<tr>
<td>Age 60 - 64</td>
<td>63</td>
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<td>Age 65 - 74</td>
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<td>Age 75 - 84</td>
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<td>Age 85 and over</td>
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### 2005 Est. Median Age

- Age 0 - 4: 38.20
- Age 50 - 54: 36.57

### 2005 Est. Average Age

- Age 0 - 4: 37.73
- Age 50 - 54: 36.60
### Pop-Facts: Demographic Snapshot Report

**Trade Area:** 9500 LAGERSFIELD CIR, VIENNA, VA  22181-6173,  Total

<table>
<thead>
<tr>
<th>Description</th>
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<tr>
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<td>%</td>
<td>%</td>
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<td>81</td>
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<td>Age 15 - 17</td>
<td>15</td>
<td>43</td>
<td>58 2.51</td>
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<td>Age 18 - 20</td>
<td>11</td>
<td>33</td>
<td>44 1.90</td>
</tr>
<tr>
<td>Age 21 - 24</td>
<td>22</td>
<td>64</td>
<td>86 3.72</td>
</tr>
<tr>
<td>Age 25 - 34</td>
<td>99</td>
<td>302</td>
<td>401 17.35</td>
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<tr>
<td>Age 35 - 44</td>
<td>124</td>
<td>333</td>
<td>456 19.73</td>
</tr>
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<td>Age 45 - 49</td>
<td>53</td>
<td>147</td>
<td>199 8.61</td>
</tr>
<tr>
<td>Age 50 - 54</td>
<td>47</td>
<td>122</td>
<td>169 7.31</td>
</tr>
<tr>
<td>Age 55 - 59</td>
<td>44</td>
<td>121</td>
<td>165 7.14</td>
</tr>
<tr>
<td>Age 60 - 64</td>
<td>32</td>
<td>88</td>
<td>120 5.19</td>
</tr>
<tr>
<td>Age 65 - 74</td>
<td>33</td>
<td>95</td>
<td>128 5.54</td>
</tr>
<tr>
<td>Age 75 - 84</td>
<td>7</td>
<td>22</td>
<td>29 1.25</td>
</tr>
<tr>
<td>Age 85 and over</td>
<td>1</td>
<td>4</td>
<td>5 0.22</td>
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</table>

**2005 Est. Median Age, Male**

38.00

**2005 Est. Average Age, Male**

36.51

**2005 Est. Female Population by Age**

<table>
<thead>
<tr>
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<th>0.00 - 0.50 Miles</th>
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</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td><strong>2005 Est. Female Population by Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 0 - 4</td>
<td>43</td>
<td>114</td>
<td>157 6.87</td>
</tr>
<tr>
<td>Age 5 - 9</td>
<td>42</td>
<td>112</td>
<td>154 6.74</td>
</tr>
<tr>
<td>Age 10 - 14</td>
<td>32</td>
<td>95</td>
<td>126 5.51</td>
</tr>
<tr>
<td>Age 15 - 17</td>
<td>19</td>
<td>52</td>
<td>71 3.11</td>
</tr>
<tr>
<td>Age 18 - 20</td>
<td>10</td>
<td>28</td>
<td>38 1.66</td>
</tr>
<tr>
<td>Age 21 - 24</td>
<td>22</td>
<td>57</td>
<td>79 3.46</td>
</tr>
<tr>
<td>Age 25 - 34</td>
<td>92</td>
<td>281</td>
<td>373 16.32</td>
</tr>
<tr>
<td>Age 35 - 44</td>
<td>125</td>
<td>338</td>
<td>463 20.25</td>
</tr>
<tr>
<td>Age 45 - 49</td>
<td>55</td>
<td>149</td>
<td>204 8.92</td>
</tr>
<tr>
<td>Age 50 - 54</td>
<td>53</td>
<td>141</td>
<td>194 8.49</td>
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<td>Age 55 - 59</td>
<td>43</td>
<td>118</td>
<td>161 7.04</td>
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<tr>
<td>Age 60 - 64</td>
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<td>85</td>
<td>116 5.07</td>
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<tr>
<td>Age 65 - 74</td>
<td>26</td>
<td>77</td>
<td>103 4.51</td>
</tr>
<tr>
<td>Age 75 - 84</td>
<td>9</td>
<td>31</td>
<td>40 1.75</td>
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<tr>
<td>Age 85 and over</td>
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<td>5</td>
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</table>

**2005 Est. Median Age, Female**

38.33

**2005 Est. Average Age, Female**

36.62
### 2005 Est. Population Age 15+ by Marital Status*

<table>
<thead>
<tr>
<th>Description</th>
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<th>0.00 - 0.50 Miles</th>
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<tbody>
<tr>
<td></td>
<td>Radius</td>
<td>%</td>
<td>Radius</td>
</tr>
<tr>
<td>Total, Never Married</td>
<td>975</td>
<td>30.46</td>
<td>2,736</td>
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<tr>
<td>Married, Spouse present</td>
<td>297</td>
<td>56.21</td>
<td>922</td>
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<tr>
<td>Married, Spouse absent</td>
<td>33</td>
<td>3.38</td>
<td>97</td>
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<tr>
<td>Widowed</td>
<td>28</td>
<td>2.87</td>
<td>66</td>
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<tr>
<td>Divorced</td>
<td>69</td>
<td>7.08</td>
<td>211</td>
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<tr>
<td>Males, Never Married</td>
<td>169</td>
<td>17.33</td>
<td>516</td>
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<tr>
<td>Previously Married</td>
<td>46</td>
<td>4.72</td>
<td>131</td>
</tr>
<tr>
<td>Previously Married</td>
<td>69</td>
<td>7.08</td>
<td>204</td>
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### 2005 Est. Pop. Age 25+ by Educational Attainment*

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<th>0.00 - 0.50 Miles</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Radius</td>
<td>%</td>
<td>Radius</td>
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<tr>
<td>Less than 9th grade</td>
<td>876</td>
<td>1.94</td>
<td>2,458</td>
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<tr>
<td>Some High School, no diploma</td>
<td>17</td>
<td>2.40</td>
<td>59</td>
</tr>
<tr>
<td>High School Graduate (or GED)</td>
<td>21</td>
<td>9.02</td>
<td>72</td>
</tr>
<tr>
<td>Some College, no degree</td>
<td>79</td>
<td>11.76</td>
<td>220</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>103</td>
<td>4.91</td>
<td>355</td>
</tr>
<tr>
<td>Bachelor's Degree</td>
<td>43</td>
<td>38.93</td>
<td>131</td>
</tr>
<tr>
<td>Master's Degree</td>
<td>341</td>
<td>23.86</td>
<td>522</td>
</tr>
<tr>
<td>Professional School Degree</td>
<td>209</td>
<td>4.45</td>
<td>104</td>
</tr>
<tr>
<td>Doctorate Degree</td>
<td>39</td>
<td>2.74</td>
<td>69</td>
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</table>

### Households

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>545</td>
<td>1,518</td>
<td>1,309</td>
<td>711</td>
</tr>
<tr>
<td>Growth 2005-2010</td>
<td>15.71%</td>
<td>15.97%</td>
<td>15.96%</td>
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<tr>
<td>Growth 2000-2005</td>
<td>19.54%</td>
<td>19.65%</td>
<td>19.56%</td>
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<tr>
<td>Growth 1990-2000</td>
<td>58.23%</td>
<td>53.87%</td>
<td>55.00%</td>
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### 2005 Est. Households by Household Type

<table>
<thead>
<tr>
<th>Household Type</th>
<th>2005 Estimate</th>
<th>2000 Census</th>
<th>1990 Census</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Households</td>
<td>325</td>
<td>880</td>
<td>1,205</td>
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<tr>
<td>Nonfamily Households</td>
<td>146</td>
<td>429</td>
<td>575</td>
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</table>

### 2005 Est. Group Quarters Population

<table>
<thead>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
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</table>

### 2005 Households by Ethnicity, Hispanic/Latino

<table>
<thead>
<tr>
<th>Ethnicity, Hispanic/Latino</th>
<th>2005 Estimate</th>
<th>2000 Census</th>
<th>1990 Census</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27</td>
<td>80</td>
<td>106</td>
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</tbody>
</table>
### Pop-Facts: Demographic Snapshot Report

**Prepared For:**  
**Project Code:**  
**Order #: 963526601**  
**Site: 01**  
**Trade Area:** 9500 LAGERSFIELD CIR, VIENNA, VA 22181-6173, Total

#### 2005 Est. Households by Household Income

<table>
<thead>
<tr>
<th>Description</th>
<th>0.00 - 0.25</th>
<th>0.25 - 0.50</th>
<th>0.00 - 0.50</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Radius</td>
<td>Radius</td>
<td>Radius</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>2005 Est. Households by Household Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income Less than $15,000</td>
<td>471</td>
<td>1,309</td>
<td>1,779</td>
</tr>
<tr>
<td>Income $15,000 - $24,999</td>
<td>5</td>
<td>1.06</td>
<td>20</td>
</tr>
<tr>
<td>Income $25,000 - $34,999</td>
<td>6</td>
<td>1.27</td>
<td>21</td>
</tr>
<tr>
<td>Income $35,000 - $49,999</td>
<td>9</td>
<td>1.91</td>
<td>29</td>
</tr>
<tr>
<td>Income $50,000 - $74,999</td>
<td>27</td>
<td>5.73</td>
<td>78</td>
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<tr>
<td>Income $75,000 - $99,999</td>
<td>72</td>
<td>15.29</td>
<td>229</td>
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<tr>
<td>Income $100,000 - $149,999</td>
<td>70</td>
<td>14.86</td>
<td>236</td>
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<tr>
<td>Income $150,000 - $249,999</td>
<td>142</td>
<td>30.15</td>
<td>373</td>
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<tr>
<td>Income $250,000 - $499,999</td>
<td>113</td>
<td>23.99</td>
<td>265</td>
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<tr>
<td>Income $500,000 and more</td>
<td>21</td>
<td>4.46</td>
<td>47</td>
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<tr>
<td>Income $100,000 and more</td>
<td>4</td>
<td>0.85</td>
<td>10</td>
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**2005 Est. Average Household Income**  
$131,202  
$121,678  
$124,197

**2005 Est. Median Household Income**  
$116,084  
$105,548  
$108,527

**2005 Est. Per Capita Income**  
$50,992  
$47,034  
$48,077

**2005 Est. Household Type, Presence Own Children**

<table>
<thead>
<tr>
<th>Description</th>
<th>0.00 - 0.25</th>
<th>0.25 - 0.50</th>
<th>0.00 - 0.50</th>
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<tbody>
<tr>
<td></td>
<td>Radius</td>
<td>Radius</td>
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</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>2005 Est. Household Type, Presence Own Children*</td>
<td>471</td>
<td>1,309</td>
<td>1,779</td>
</tr>
<tr>
<td>Single Male Householder</td>
<td>41</td>
<td>8.70</td>
<td>122</td>
</tr>
<tr>
<td>Single Female Householder</td>
<td>48</td>
<td>10.19</td>
<td>141</td>
</tr>
<tr>
<td>Married-Couple Family, own children</td>
<td>122</td>
<td>25.90</td>
<td>332</td>
</tr>
<tr>
<td>Married-Couple Family, no own children</td>
<td>157</td>
<td>33.33</td>
<td>414</td>
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<tr>
<td>Male Householder, own children</td>
<td>4</td>
<td>0.85</td>
<td>13</td>
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<tr>
<td>Male Householder, no own children</td>
<td>11</td>
<td>2.34</td>
<td>36</td>
</tr>
<tr>
<td>Female Householder, own children</td>
<td>15</td>
<td>3.18</td>
<td>43</td>
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<tr>
<td>Female Householder, no own children</td>
<td>14</td>
<td>2.97</td>
<td>42</td>
</tr>
<tr>
<td>Nonfamily, Male Householder</td>
<td>34</td>
<td>7.22</td>
<td>101</td>
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<tr>
<td>Nonfamily, Female Householder</td>
<td>22</td>
<td>4.67</td>
<td>64</td>
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**2005 Est. Households by Household Size**

<table>
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<th>0.25 - 0.50</th>
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<td>Radius</td>
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<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
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<tr>
<td>2005 Est. Households by Household Size*</td>
<td>471</td>
<td>1,309</td>
<td>1,779</td>
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<tr>
<td>1-person household</td>
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<td>18.90</td>
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<td>2-person household</td>
<td>177</td>
<td>37.58</td>
<td>476</td>
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<td>3-person household</td>
<td>104</td>
<td>22.08</td>
<td>283</td>
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<td>4-person household</td>
<td>66</td>
<td>14.01</td>
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<tr>
<td>5-person household</td>
<td>24</td>
<td>5.10</td>
<td>68</td>
</tr>
<tr>
<td>6-person household</td>
<td>6</td>
<td>1.27</td>
<td>22</td>
</tr>
<tr>
<td>7 or more person household</td>
<td>5</td>
<td>1.06</td>
<td>18</td>
</tr>
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</table>

**2005 Est. Average Household Size**  
2.57  
2.59  
2.58
### Pop-Facts: Demographic Snapshot Report

#### Prepared For: [Site: 01]
#### Project Code: [Order #: 963526601]
#### Trade Area: 9500 LAGERSFIELD CIR, VIENNA, VA 22181-6173, Total

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<th>0.00 - 0.50 Miles</th>
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<td>Radius</td>
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<tr>
<td>2005 Est. Households by Presence of People*</td>
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<td>Households with 1 or more People Age 18 or under:</td>
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<tr>
<td>Married-Couple Family</td>
<td>126</td>
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</tr>
<tr>
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<td>6</td>
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<td>17</td>
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<tr>
<td>Other Family, Female Householder</td>
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<td>3.61</td>
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<tr>
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<tr>
<td>Nonfamily, Female Householder</td>
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<td>0.00</td>
<td>1</td>
</tr>
<tr>
<td><strong>Households no People Age 18 or under:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Married-Couple Family</td>
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<td>Other Family, Male Householder</td>
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</tr>
<tr>
<td>Other Family, Female Householder</td>
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<td>2.76</td>
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<td>75</td>
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<td>14.86</td>
<td>204</td>
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<td>2005 Est. Households by Number of Vehicles*</td>
<td>471</td>
<td>1.06</td>
<td>15</td>
</tr>
<tr>
<td>No Vehicles</td>
<td>5</td>
<td>1.06</td>
<td>15</td>
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<tr>
<td>1 Vehicle</td>
<td>150</td>
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<td>2 Vehicles</td>
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<td>3 Vehicles</td>
<td>53</td>
<td>11.25</td>
<td>157</td>
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<tr>
<td>4 Vehicles</td>
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<td>3.82</td>
<td>73</td>
</tr>
<tr>
<td>5 or more Vehicles</td>
<td>4</td>
<td>0.85</td>
<td>17</td>
</tr>
<tr>
<td>2005 Est. Average Number of Vehicles*</td>
<td>1.89</td>
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<td>1.92</td>
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<td>Family Households</td>
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<tr>
<td>2010 Projection</td>
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<td>733</td>
</tr>
<tr>
<td>1990 Census</td>
<td>174</td>
<td></td>
<td>485</td>
</tr>
<tr>
<td>Growth 2005-2010</td>
<td>15.69%</td>
<td></td>
<td>16.14%</td>
</tr>
<tr>
<td>Growth 2000-2005</td>
<td>19.93%</td>
<td></td>
<td>20.05%</td>
</tr>
<tr>
<td>Growth 1990-2000</td>
<td>55.75%</td>
<td></td>
<td>51.13%</td>
</tr>
</tbody>
</table>
**Pop-Facts: Demographic Snapshot Report**

**Trade Area:** 9500 LAGERSFIELD CIR, VIENNA, VA  22181-6173,  Total

<table>
<thead>
<tr>
<th>Description</th>
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<th>0.00 - 0.50</th>
</tr>
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<tbody>
<tr>
<td>Description</td>
<td>Radius %</td>
<td>Radius %</td>
<td>Radius %</td>
</tr>
<tr>
<td><strong>2005 Est. Family Households by Household Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income Less than $15,000</td>
<td>325</td>
<td>880</td>
<td>1,205</td>
</tr>
<tr>
<td>Income $15,000 - $24,999</td>
<td>5</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Income $25,000 - $34,999</td>
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<td>Income $35,000 - $49,999</td>
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<td>Income $50,000 - $74,999</td>
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<td>Income $75,000 - $99,999</td>
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<td>177</td>
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<td>Income $100,000 - $149,999</td>
<td>93</td>
<td>228</td>
<td>321</td>
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<td>Income $150,000 - $249,999</td>
<td>84</td>
<td>187</td>
<td>271</td>
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<tr>
<td>Income $250,000 - $499,999</td>
<td>18</td>
<td>41</td>
<td>60</td>
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<tr>
<td>Income $500,000 and more</td>
<td>4</td>
<td>9</td>
<td>13</td>
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| **2005 Est. Average Family Household Income** | $139,084 | $127,168 | $130,381 |
| **2005 Est. Median Family Household Income** | $119,947 | $105,568 | $109,783 |

| **2005 Est. Families by Poverty Status** | | | |
| **Income At or Above Poverty Level:** | | | |
| Married-Couple Family, own children | 138 | 363 | 501 |
| Married-Couple Family, no own children | 142 | 382 | 524 |
| Male Householder, own children | 6 | 14 | 20 |
| Male Householder, no own children | 9 | 30 | 39 |
| Female Householder, own children | 13 | 33 | 46 |
| Female Householder, no own children | 16 | 52 | 69 |

| **Income Below Poverty Level:** | | | |
| Married-Couple Family, own children | 0 | 0 | 0 |
| Married-Couple Family, no own children | 0 | 0 | 0 |
| Male Householder, own children | 0 | 0 | 0 |
| Male Householder, no own children | 1 | 5 | 6 |
| Female Householder, own children | 0 | 0 | 0 |
| Female Householder, no own children | 0 | 0 | 0 |

| **2005 Est. Pop Age 16+ by Employment Status** | | | |
| **In Armed Forces** | 27 | 57 | 84 |
| Civilian - Employed | 738 | 2,117 | 2,855 |
| Civilian - Unemployed | 10 | 27 | 37 |
| Not in Labor Force | 188 | 503 | 691 |

---

**Prepared:** June 22, 2005

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Claritas Tech Support: 1 800 866 6511
# Pop-Facts: Demographic Snapshot Report

**Trade Area:** 9500 LAGERSFIELD CIR, VIENNA, VA  22181-6173, Total

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<td><strong>Radius</strong></td>
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<td>2,855</td>
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<td>For-Profit Private Workers</td>
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<td>1,407</td>
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<td>Non-Profit Private Workers</td>
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<td>Local Government Workers</td>
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<td>Self-Emp Workers</td>
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<td>58</td>
<td>78</td>
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<tr>
<td>Unpaid Family Workers</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td>738</td>
<td>2,117</td>
<td>2,855</td>
</tr>
<tr>
<td><strong>2005 Est. Civ Employed Pop 16+ by Occupation</strong>*</td>
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<td>2,855</td>
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<tr>
<td>Management, Business, and Financial Operations</td>
<td>241</td>
<td>620</td>
<td>861</td>
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<tr>
<td>Professional and Related Occupations</td>
<td>256</td>
<td>711</td>
<td>967</td>
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<tr>
<td>Service</td>
<td>49</td>
<td>163</td>
<td>212</td>
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<tr>
<td>Sales and Office</td>
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<td>483</td>
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<td>Construction, Extraction and Maintainance</td>
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<tr>
<td>Production, Transportation and Material Moving</td>
<td>16</td>
<td>61</td>
<td>77</td>
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<tr>
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<td>738</td>
<td>2,117</td>
<td>2,855</td>
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<tr>
<td><strong>2005 Est. Pop 16+ by Occupation Classification</strong>*</td>
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<td>2,117</td>
<td>2,855</td>
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<tr>
<td>Blue Collar</td>
<td>38</td>
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<tr>
<td>White Collar</td>
<td>651</td>
<td>1,814</td>
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<td>Service and Farm</td>
<td>49</td>
<td>163</td>
<td>212</td>
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<td>756</td>
<td>2,154</td>
<td>2,910</td>
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<td><strong>2005 Est. Workers Age 16+, Transportation To Work</strong>*</td>
<td>756</td>
<td>2,154</td>
<td>2,910</td>
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<tr>
<td>Drove Alone</td>
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<td>1,397</td>
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<td>Car Pooled</td>
<td>82</td>
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<td>Public Transportation</td>
<td>183</td>
<td>496</td>
<td>679</td>
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<td>Walked</td>
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<td>5</td>
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<td>Motorcycle</td>
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<td>Other Means</td>
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<td>Worked at Home</td>
<td>7</td>
<td>26</td>
<td>33</td>
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<td></td>
<td>749</td>
<td>2,129</td>
<td>2,878</td>
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<td><strong>2005 Est. Workers Age 16+ by Travel Time to Work</strong>*</td>
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<td>2,129</td>
<td>2,878</td>
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<tr>
<td>Less than 15 Minutes</td>
<td>49</td>
<td>146</td>
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<td>15 - 29 Minutes</td>
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<td>60 or more Minutes</td>
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<td>36.70</td>
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### Pop-Facts: Demographic Snapshot Report

**Trade Area:** 9500 LAGERSFIELD CIR, VIENNA, VA 22181-6173, Total

<table>
<thead>
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<td>%</td>
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<td><strong>2005 Est. Tenure of Occupied Housing Units</strong></td>
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<td>Owner Occupied</td>
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<td>Renter Occupied</td>
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<td>30.79</td>
<td>442</td>
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<td><strong>2005 Occ Housing Units, Avg Length of Residence</strong></td>
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<tr>
<td></td>
<td>8</td>
<td>8</td>
<td>8</td>
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<td><strong>2005 Est. All Owner-Occupied Housing Values</strong></td>
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<td>0.00</td>
<td>867</td>
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<td>Value $400,000 - $499,999</td>
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<td>18.46</td>
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<td>Value $500,000 - $749,999</td>
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<td>Value $750,000 - $999,999</td>
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<tr>
<td>Value $1,000,000 or more</td>
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<td>$337,618</td>
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<td>1,820</td>
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<td>1 Unit Attached</td>
<td>351</td>
<td>73.28</td>
<td>885</td>
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<td>1 Unit Detached</td>
<td>67</td>
<td>13.99</td>
<td>220</td>
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<td>2 Units</td>
<td>0</td>
<td>0.00</td>
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<tr>
<td>3 to 19 Units</td>
<td>27</td>
<td>5.64</td>
<td>92</td>
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<tr>
<td>20 to 49 Units</td>
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<td>3.97</td>
<td>80</td>
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<td>50 or More Units</td>
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<tr>
<td>Mobile Home or Trailer</td>
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<tr>
<td>Boat, RV, Van, etc.</td>
<td>0</td>
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### Pop-Facts: Demographic Snapshot Report

**Trade Area:** 9500 LAGERSFIELD CIR, VIENNA, VA  22181-6173,  Total

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<tr>
<td></td>
<td></td>
<td>%</td>
<td>%</td>
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<tr>
<td><strong>2005 Est. Housing Units by Year Structure Built</strong></td>
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<tr>
<td>Housing Unit Built 1999 to present</td>
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<td>20.25</td>
<td>1.341</td>
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<td>Housing Unit Built 1995 to 1998</td>
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<td>17.33</td>
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<td>Housing Unit Built 1990 to 1994</td>
<td>83</td>
<td>13.36</td>
<td>245</td>
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<td>Housing Unit Built 1980 to 1989</td>
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<td>24.01</td>
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<td>Housing Unit Built 1970 to 1979</td>
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<td>Housing Unit Built 1950 to 1959</td>
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<td>Housing Unit Built 1940 to 1949</td>
<td>20</td>
<td>1.25</td>
<td>24</td>
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<tr>
<td>Housing Unit Built 1939 or Earlier</td>
<td>6</td>
<td>0.84</td>
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</table>

| **2005 Est. Median Year Structure Built**        |                   |                   |                   |
|                                                   | 1990              | 1990              | 1990              |

*In contrast to Claritas Demographic Estimates, "smoothed" data items are Census 2000 tables made consistent with current year estimated and 5 year projected base counts.

**1939 will appear when at least half of the Housing Units in this reports area were built in 1939 or earlier."
## Appendix: Area Listing

### Area Name:

<table>
<thead>
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<th>Type</th>
<th>Radius</th>
<th>Reporting Detail: Aggregate</th>
<th>Reporting Level: Block Group</th>
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<tr>
<td>9500 LAGERSFIELD CIR</td>
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<td>-77.272174</td>
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<td>VIENNA, VA 22181-6173</td>
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### Area Name:

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## Appendix: Area Listing

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<th>Radius Definition:</th>
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<td>Circle/Band: 0.25, 0.50</td>
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<td>Center Point: 38.877691, -77.272174</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Circle/Band: 0.00, -0.50</td>
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APPENDIX 9:
TDM PROGRAM DEVELOPMENT RFP
1. BACKGROUND

THE COUNTY OF FAIRFAX, VIRGINIA, Department of Transportation, through Pulte Home Corporation, is soliciting Requests for Proposals from qualified applicants and/or firms to develop a program to benchmark mode splits and travel patterns in the vicinity of the Vienna-Fairfax-GMU Metro Station, in addition to providing a menu of transportation demand management strategies to be employed in the immediate area.

“Transportation Demand Management (TDM) is a general term for strategies that result in more efficient use of transportation resources. There are many different TDM strategies with a variety of impacts. Some improve the transportation options available to consumers, while others provide an incentive to choose more efficient travel patterns. Some reduce the need for physical travel through mobility substitutes or more efficient land use. TDM strategies can change travel timing, route, destination, or mode.”

According to the Northern Virginia 2020 Transportation Plan, by the year 2020 congestion in the vicinity of the Vienna-Fairfax-GMU Station, specifically along I-66, will worsen significantly with stop-n-go conditions throughout the peak period, making the need for these improvement strategies even more critical. Accordingly a variety of transportation strategies are needed to meet these challenges now and in the future. Some of the major issues confronting us are:

- Funding needed to meet system improvement demands;
- Increased construction costs for new roadway and transit facilities;
- Increased need to improve operational efficiency;
- Changes in travel patterns;
- Lower densities making traditional transit an inefficient option in many areas; and
- Need to reduce transportation related air pollution.

As recommended by Fairfax County’s Comprehensive Plan, transportation management strategies have been, and will continue to be, critical to addressing these issues. To that end, the Board of Supervisors established a Countywide goal of balancing land use with supporting transportation infrastructure, including the regional network. Regional and local efforts to achieve a balanced transportation system through the development of rapid rail, commuter rail, expanded bus service and the reduction of excessive reliance upon the automobile should be the keystone policy for future planning and facilities. To that end, the Board established 14 Countywide objectives and policies, including but not limited to the following:

---

1 On-Line TDM Encyclopedia from the Victoria Policy Institute
• Provide for a multi-modal transportation system that places the primary emphasis on alternatives to the single occupant vehicle
• Increase the number of commuters using non-motorized and public transportation so that by the year 2000, 60% of County trips to the metropolitan core (D.C), 20% of the commuters to Tysons, 15% of the commuters to the suburban or transit station areas and 5% of all other commuting work trips will be made by public transportation.
• Provide a road system that provides adequate local access and capacity for through movements.
• Provide complementary land use and transportation policies.

In furtherance of the goals and objectives stated above, the Board of Supervisors recently approved a change to the County’s Comprehensive Plan for certain land units within the Vienna Transit Station Area; specifically land units C and I. The proposed plan change was necessary in order to facilitate the development of a true “Transit Oriented Community” at the Vienna-Fairfax-GMU Metro station. A copy of the adopted Plan text is provided as Exhibit A.

The Metro-oriented mixed-use option for the station area represents “a highly integrated vision, whose synergy lessens the impacts of development on this site by creating conditions that minimize the need for automobile use. This density/intensity will be successful only if several core components – retail, commercial, and transportation demand management – succeed individually and collectively, and are also designed to serve the needs of the surrounding neighborhoods.”

To that end, the Plan recommends that a TDM program be provided in conjunction with any development approvals for the Metro-oriented mixed-use option in order to encourage the use of transit (Metrorail and bus) and high occupant vehicle commuting modes thereby reducing the demand for single occupant vehicle (“SOV”) trips.

In general, at build out, it is expected that for the residential portion of the project, a reduction in peak hour SOV trips of 47% should be achieved through the use of transit and other means; for the office portion of the development, a peak hour SOV trip reduction of 25% is expected to be achieved through similar means. The TDM program will be evaluated at three milestones; first at the time of rezoning, second before and during construction and third after build out. During the first stage, at rezoning, an application for rezoning should demonstrate that TDMs would be provided to achieve the peak hour SOV trip reduction goals stated above. Throughout the process, periodic surveys, traffic counts and reports based on empirical measurements will be conducted under the County’s auspices to document the success of the program in reaching the target reductions.

---

2 OTPA S02-II-V2, Board Motion, December 6, 2004, Page 6 of 20
The purpose of this RFP is to first determine the current state of peak hour commuting/travel patterns and mode splits within the Vienna-Fairfax-GMU Metro Station Area; second to investigate “best practices” throughout the region, across the country and/or comparable international programs; and third to develop a menu of successful TDM strategies and benchmarking opportunities to be considered for implementation at any transit-oriented mixed-use development planned for the Vienna-Fairfax-GMU Station Area (“Vienna TOD”). This effort will result in the compilation of empirical and quantitative measurements of mode splits and transit and HOV usage in the areas proximate to the transit station. During the review of the recently approved changes to the Comprehensive Plan extensive research and data collection had been completed by the Fairfax County Department of Transportation (“FCDOT”) and others. At this time, FCDOT now seeks a Consultant to build on prior work and complete a comprehensive and independent evaluation of existing mode splits, transit and HOV usage and travel patterns in the vicinity of the station, as well as strategies for increasing future mode splits.

Representatives of FCDOT and others will participate in the project as “Project Members”. Day-to-day oversight of this project will be provided by Angela Rodeheaver, Engineer IV, Fairfax County Department of Transportation (the “Project Manager”).

2. SCOPE OF WORK

The following activities and deliverables are expected from this project:

Project Kickoff Meeting(s): The selected Consultant will meet with Project Members to develop a clear understanding of the project’s goals, objectives and concerns. The Consultant should provide Project Members with suggested TDM programs/measures within the region and across the country that may be included for evaluation within the draft program, as well as how best to benchmark program performance.

Develop a Project Timeline: Based on the results of the kickoff meeting(s), the Consultant shall develop a timeline, defining in detail the steps necessary to complete the survey of existing conditions and make recommendations for TDM elements that may be appropriate for the Vienna-Fairfax-GMU TOD. The project must be completed within 45 to 60 days after notice to proceed.
Potential TDM Recommendations for the Vienna TOD: This document will include the following elements:

**Literature Search:**

- Review and summarize the state of TDM programs in Fairfax County. (County staff will provide the Consultant with copies of programs proffered throughout the County.)

- Identify barriers to TDM implementation in Fairfax County including a discussion of all relevant issues, pro and con, with appropriate responses to each. Include a description of the role education, outreach, and support can play in local TDM’s.

- Identify the state of TDM programs in neighboring jurisdictions, throughout the Country and those comparable or relevant international programs at similarly sized TODs. Include a discussion best practices, successes and failures, as well as relevant issues, pro and con. Provide empirical information on program performance.

**Benchmarking:**

- Identify quantifiable measurements to establish existing conditions and evaluate TDM program progress/success in communities surrounding and proximate to the Vienna-Fairfax-GMU Metro Station. Such measurements may include surveys, traffic counts, etc. The Consultant should identify those communities deemed relevant to the projects goals and objectives.

- Provide a review of benchmarking practices at other similarly sized and successful TOD’s either within the region or nationally.

- Recommend a sequence of events required for successful TDM program implementation through build out, including recommendations for implementation, timing and benchmarking progress.

- Summarize the results of the data collected.

**Recommendations:**

- Using information provided by accepted sources and/or Project Members, as well as other accepted sources, develop a set of TDM recommendations specific to the Vienna-Fairfax-GMU TOD, to include
strategies appropriate to the types and levels of development planned for the TOD, as well as interim and ultimate TDM goals.

- Identify how funding and/or technical assistance might be provided to establish the TDM program and identify the levels of effort/costs of implementing each step of the program throughout the Comprehensive Plan’s recommended stages.

The Consultant is free to present the TDM program document in a sequence and format of their choosing as long as each element is addressed.

**Project Review Meeting(s):** The Consultant will meet with the Project Members on a regular basis at key points during the project. The Consultant will incrementally present the results respectively of the literature survey, benchmarking and recommendation phase to the Project Members for review and comment. Draft documents will be distributed at least two weeks prior to any review meetings.

**Final TDM Program Document:** Following the final project review meeting, the Consultant shall present the final results of the survey and TDM recommendations to a meeting of the Project Members, and others.

The anticipated outcomes of the final document should include:

- A complete understanding of current peak hour travel patterns for the existing communities and developments proximate to the Transit Station Area.

- A summary of best practices locally, nationally and at comparable international locations along with empirical data supporting similar types of TODs.

- Assessment and recommendations of best TDM practices for the Vienna-Fairfax-GMU TOD.

- Identification, development, and quantification of specific empirical benchmarks to meet the Comprehensive Plan recommended SOV reduction goals.

- Identification of program elements and monitoring strategies.

- Cost estimates for implementing and sustaining on-going TDM efforts.
3. **STANDARDS AND DELIVERABLES**

All documents should be provided in both hard copy (paper) and digital format (MS Word). Data should be provided in MS compatible formats (Excel or Access).

All data, databases, reports and materials, in digital and hard copy format created under this project shall be transferred to FCDOT and Project Members upon completion of the project and remain the sole property of the Funding Entity with use by FCDOT permitted and approved in accordance with the contract to be executed with the Consultant.

The Consultant will provide ten (10) copies of the draft and twenty-five (25) copies of the final document. Interim reports must be submitted one to two weeks prior to meetings at which they will be discussed. In addition, one unbound copy of both the draft and final report will be provided to the Project Manager and Funding Entity. Original copies of the draft and final reports must be submitted to the FCDOT Project Manager for distribution to Project Members unless otherwise directed.

The Consultant will provide written bi-weekly progress reports to the Project Manager.

4. **PROPOSAL REQUIREMENTS**

Consultants will be evaluated on technical expertise and past performance. To assist with the evaluation please provide the following:

- A description of the Consultant’s qualifications, which should demonstrate:
  a. Expertise in the full range of TDM strategies and their evaluation.
  b. Experience in benchmarking TDM effectiveness, including development of surveys, statistical analyses, etc.
  c. An understanding of Transit Oriented Development.

- A description of how the team would accomplish the work outlined in the Scope of Work including an explanation of any proposed changes to the scope of work based on insights/expertise related to the topic.

- Include the names, titles and experience of key personnel, including day-to-day project manager.

- Describe the skills and services your firm offers
• Describe relevant experience of the firm and of personnel assigned to this task on similar types of TODs.

• Provide at least three relevant references and samples of completed work.

• Provide hourly and overtime rates for all classifications of personnel who may be utilized under this contract. These rates shall be presented and broken down by direct labor costs per class of labor and overhead cost.

• In order to be responsive to this RFP, each proposal shall conform to the following requirements. The Consultant shall:
  a. Submit ten (10) copies of the technical proposal in one sealed envelope. Number all pages consecutively.
  b. Submit one (1) copy of the cost proposal in a sealed envelope separate from the technical proposal.
  c. Provide a copy of the firm’s Standard Form 254.

• Clearly indicate the following on the outside of each of the sealed envelopes or packages containing the technical and cost proposals:
  a. Name and address of the Prime Consultant.
  b. Due date and time.
  c. Envelope contents (i.e., technical proposal, cost proposal.)
  d. Program Name - Vienna-Fairfax-GMU Station Area TDM Benchmarking & Strategies.

5. CONSULTANT EVALUATION AND SELECTION

The technical proposal will be evaluated by the Project Members and ranked first. The technical proposal evaluation criteria are the following:

• Qualifications of the firm and personnel to be assigned to the project and their experience working as a team to complete similarly relevant projects.

• Demonstration of overall project understanding, insights into local conditions and potential issues and knowledge of the project area and region.

• Clarity of proposal and creativity and thoughtfulness in addressing the scope of work.
• Completeness of submitted proposal with all elements required by the RFP.

The cost proposal will be reviewed for consistency with the technical proposal.

The Project Members reserve the right to seek clarification of any proposal submitted.

The Project Members reserve the right to engage in discussion with one or more Consultants, deemed fully qualified as a result of the review of the technical and cost proposals. Repetitive informal interviews shall be permitted. Consultants shall be encouraged to elaborate on their proposal and performance data, staff expertise, as well as alternative concepts. Proprietary information from Consultants shall not be disclosed to the public or competitors. At the conclusion of the interviews, and on the basis of the technical/cost proposals and interviews, the Project Members shall select one Consultant.

The Project Members reserve the right to reject any and all proposals received as a result of this solicitation, to negotiate with any qualified source, to waive any formality and any technicalities or to cancel in any part or in its entirety this RFP if it is in the best interests of the Project Members. This solicitation of proposals in no way obligates the Fairfax County DOT, Project Members, and/or the Funding Entity to award a contract.

6. ADDITIONAL INFORMATION

The contract shall be awarded to the most qualified bidder based on the quality of proposal response and Consultant interviews. This solicitation in no way obligates the Project Members to award a contract.

The Consultant will submit monthly invoices to the County’s Project Manager accompanied by brief, written progress reports.

Ten percent of the total contract cost will be withheld pending successful project completion.

All proposals become the property of the Project Members upon submission. The cost of preparing, submitting and presenting a proposal lies solely with the proposer.

Work must be completed and a final report submitted by the Consultant within 45 to 60 days after notice to proceed or as set forth in the contract.
Technical and cost proposals in two separate sealed envelopes should be submitted no later than 4:30 PM on Monday, February 14, 2005 to:

Angela K. Rodeheaver, Engineer IV  
Fairfax County Department of Transportation  
12055 Government Center Parkway  
Suite 1034  
Fairfax, Virginia  22035

Proposals submitted after the deadline will **not** be accepted. Questions regarding this RFP should be directed to Angela K. Rodeheaver at 703/324-1100.
Local Area Transportation Review and Transportation Policy Area Review Guidelines

Montgomery County Planning Department
M-NCPPC
MontgomeryPlanning.org
Abstract
The Local Area Transportation Review and Policy Area Mobility Review Guidelines were updated by the Planning Board on May 13, 2010, June 17, 2011, and February 9, 2012.

On November 13, 2012 the County Council adopted changes to the Subdivision Staging Policy eliminating the Policy Area Mobility Review as an area-wide test for transportation adequacy and replacing it with Transportation Policy Area Review. The Planning Board approved these revised guidelines to incorporate the Council’s action on January 24, 2013. This document reflects those changes.

These Guidelines are to be used for preparation and review of transportation impact studies for development in Montgomery County. This document should be used by transportation engineers, planners, public agency reviewers, and community members participating in the development review process.

Source of Copies
The Maryland-National Capital Park and Planning Commission
8787 Georgia Avenue
Silver Spring, MD 20910-3760

Online at: www.mc-mncppc.org/transportation/index.shtm
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Introduction

Section 50-35(k) of the County Code directs the Montgomery County Planning Board to find that public facilities will be adequate to serve proposed development. This Adequate Public Facilities (APF) finding requires forecasting traffic generated by proposed development and comparing it to the capacity of existing and programmed roads and transit. An applicant for proposed development must show that adequate transportation facilities will be in place within a specified period of time. Alternatively, the applicant must provide those facilities or make a Traffic Mitigation Payment toward area-wide transportation needs. These guidelines show the methodology for determining adequacy, specify mitigation for projected traffic generated by proposed development projects, and describe how Traffic Mitigation Payments are determined.

There are two tests for determining transportation adequacy—the Local Area Transportation Review (LATR) test and the policy area test called Transportation Policy Area Review (TPAR). These tests are required by the 2012-2016 Subdivision Staging Policy adopted by the County Council on November 13, 2012.

LATR determines the adequacy of local roads by measuring congestion at roadway intersections based on critical lane volume (CLV) and volume to capacity ratio (v/c). The estimated vehicle trips generated by a proposed development are compared to the applicable policy area standard to evaluate likely future congestion. The development’s trips that contribute to nearby intersections exceeding the standard must be mitigated in some fashion.

The TPAR test first considers whether a policy area is considered inadequate for transit or roadways (or both). If the area is inadequate, a development in the area must make a Traffic Mitigation Payment based on the number of dwelling units or square footage of nonresidential space, or make improvements that increase capacity in the policy area to address identified specific roadway and transit inadequacies.

These Guidelines explain the methodology for documenting and analyzing the likely impact of proposed development on intersection performance, that is, the LATR part of Subdivision Staging. The Guidelines focus on LATR because this aspect of the transportation adequacy test reflects the majority of the analysis conducted by applicants using these Guidelines. The TPAR test is updated every two years by the Planning staff and adequacy standards are established by the Planning Board. The current TPAR standards (2012-2014) are also presented in this document.

The criteria in these Guidelines determine whether a development can satisfy the requirements for transportation adequacy. Following the standards of the Subdivision Staging Policy, the Planning Board must not approve a development if unacceptable weekday peak-hour intersection congestion will result. The Planning Department staff’s review and the Planning Board’s decision is based on existing and programmed roads, available and programmed mass transportation, and physical improvements or trip mitigation measures to be provided by the applicant.

Together, the two transportation tests provide a picture of traffic impacts, and the necessary improvements to maintain congestion standards.

APPLICABILITY

LATR is applied to development projects that will generate more than 30 total weekday peak hour trips. TPAR is applied to projects that will generate three or more total weekday peak hour trips. Projects that generate fewer than 30 total weekday peak hour trips must prepare a traffic exemption statement describing the basis for any exemption from LATR and/or TPAR.

Both tests are applied by policy area (see Map 1). Detailed maps, with streets shown, can be found at: www.montgomeryplanning.org/research/growth_policy/subdivision_staging_policy/2012/documents/SSPappendix5.pdf. Each policy area has a particular congestion standard for intersections, which is applied to meet the LATR test. Each policy area also has a transportation adequacy determination for roadway and transit service applied in the TPAR test. These standards and mitigation requirements are adopted by the County Council and specified in these Guidelines, which are updated as needed to reflect industry standards, local traffic conditions, and Council action.
LATR and TPAR compliance is not required for developments in the White Flint Policy Area if applicants agree to participate in the White Flint Special Taxing District for transportation infrastructure improvements in lieu of satisfying the transportation APF tests for LATR and TPAR.

LATR and TPAR mitigation and/or payments are not required for public facility project mandatory referrals, in which the Planning Board’s comments are advisory. Mandatory referrals are often unique uses, such as schools or other public services, and their traffic review follows Mandatory Referral Guidelines, which requires a pedestrian and bicycle safety statement, pedestrian and vehicular circulation plan, and a traffic exemption statement or traffic study as applicable.

HOW TO USE THESE GUIDELINES

These Guidelines are to be used by applicants to prepare traffic studies for Planning Board approval and by staff when reviewing those studies. These Guidelines are also recognized as the standard for reports to the Board of Appeals and Hearing Examiner for special exception and zoning cases, respectively.

The following chart illustrates the steps needed to arrive at a recommendation for approval of the transportation test for the Adequate Public Facilities Ordinance. These Guidelines describe the information needed from the applicant to determine the answer at each step of the process and the considerations staff must evaluate when reviewing the document.

Figure 1: Montgomery County Transportation Review Process – LATR and TPAR

Project applications requiring LATR/TPAR studies:
- preliminary plan (as part of a subdivision application)
- site plans not requiring subdivision
- special exception and zoning cases before the Board of Appeals and County Council

These Guidelines may also apply to building permit review cases requiring an APF finding, though in some cases (less than 12 months vacancy, no increase in square footage, fewer than 30 new weekday peak hour trips) the APF test may be approved administratively by Planning Department staff.
When a proposed development is projected by the LATR test to generate an unacceptable level of peak hour congestion, the applicant should consult with Planning Department staff, the Montgomery County Department of Transportation (MCDOT), the Maryland State Highway Administration (SHA), and the municipalities of Rockville and Gaithersburg (when applicable) to develop recommendations for trip reduction, including specific intersection improvements or pedestrian, bicycle, and transit enhancements that can mitigate the project’s impact and thereby gain Planning Board approval.

The Guideline procedures outlined in this document are intended to provide a snapshot of estimated future traffic conditions for proposed development. These procedures are not intended to establish delay-free travel conditions.
Local Area Transportation Review

INTENT AND STANDARDS

The LATR test is undertaken in two steps to best measure congestion levels. The initial Critical Lane Volume (CLV) analysis is performed to screen out intersections with a CLV less than 1,600, the threshold between stable (but close to congested) and unstable (over-congested) road conditions.

For intersections with a CLV of 1,600 or greater, the more detailed Highway Capacity Manual (HCM) method is used to measure delay. In these cases, the applicant should use a traffic-flow model such as Synchro or CORSIM.

In the HCM method, intersection level of service is expressed as a volume/capacity (v/c) ratio and the standards are set at levels parallel with the current CLV standards in a policy area. For example, the 1,600 CLV standard, applicable in the Bethesda/Chevy Chase, Silver Spring/Takoma Park, Kensington/Wheaton, and Germantown Town Center policy areas (see Map 1) is expressed as a v/c ratio of 1.00. For Metro Station Policy Areas (MSPAs), the applicable 1,800 CLV standard is expressed as a v/c ratio of 1.13 (that is, 1,800/1,600).

APPLICANT’S PREPARATION OF AN LATR TRAFFIC STUDY

Applicants should use the following general criteria and analytical techniques to demonstrate the expected impact on public roadway intersections by the proposed development. The analysis should consider existing traffic, background traffic generated by developments approved and not yet built, and projected traffic generated by the applicant’s project. Planning Department staff may require that traffic from nearby pending applications is included in the traffic study if those applications are likely to be approved by the Planning Board before the subject application’s projected Planning Board hearing date. Otherwise, the traffic study would have to be updated to include the pending applications that were approved between the traffic study’s scoping and the Planning Board hearing date. Traffic studies should also reflect any traffic improvements that will be made by nearby projects.

Scope of an LATR Traffic Study

If the project is not exempt, the applicant must prepare a traffic study. Depending on the project size, uses, and location, the contents of a traffic study will vary. The applicant and Planning Department staff, in a meeting or through correspondence, will establish a scope for the study using the elements described below. (For zoning and special exception cases, Planning Department staff may consult with the Hearing Examiner, and initiate a meeting with the applicant and interested groups or individuals to establish the scope of the traffic analysis.)
A traffic study must consider the following elements:
1. CLV of intersections
2. Approved but unbuilt development
3. Existing intersection turning movement counts
4. Trip generation, directional distribution, and trip assignment
5. Mode split assumptions
6. CIP and CTP improvements
7. Circulation and Safety for High Traffic impact venues
8. Land use and size
9. Queuing/delay analysis (if applicable)
10. Pedestrian and bicycle impacts
11. Improvement and mitigation options
12. Traffic mitigation agreement (if needed)

1. Intersections
The number of intersections included will be based on the projected trips generated by the development under consideration (see page 17, Staff’s Evaluation of Traffic Study, for specific criteria regarding “land at one location”). As shown in Table 1, the number of signalized intersections and significant non-signalized intersections in each direction is based on the maximum number of total weekday peak hour trips generated by the proposed land uses, unless Planning Department staff in consultation with MCDOT, SHA, and municipalities if appropriate, finds that special circumstances warrant a more limited study.

<table>
<thead>
<tr>
<th>Weekday Peak Hour Site Trips</th>
<th>Minimum Number of Intersections in Each Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 – 249</td>
<td>1</td>
</tr>
<tr>
<td>250 – 749</td>
<td>2</td>
</tr>
<tr>
<td>750 – 1,249</td>
<td>3</td>
</tr>
<tr>
<td>1,250 – 1,749</td>
<td>4</td>
</tr>
<tr>
<td>1,750 – 2,249</td>
<td>5</td>
</tr>
<tr>
<td>2,250 – 2,749</td>
<td>6</td>
</tr>
<tr>
<td>&gt;2,750</td>
<td>7</td>
</tr>
</tbody>
</table>

The term “each direction” applies to every study intersection. For example, in a hypothetical grid, the first ring would include four intersections. The second ring would include not only the next four intersections along the streets serving the site, but also the four intersections with cross streets encountered in the first ring. As the number of intersections in each direction grows linearly from one to five, the number of total study area intersections grows at a greater rate.

Planning Department staff, in cooperation with the applicant, will use judgment and experience in deciding the significant intersections to be studied. For example, the ramps and termini of future interchanges will be treated as signalized intersections. The County’s central business districts (CBDs) and Metro Station Policy Areas (MSPAs) have more closely-spaced intersections. Accordingly, not every signalized intersection should be studied and as a result, the study may cover a larger area. Site access driveways are not included in the first ring of intersections.
When determining the intersections to be studied, Planning Department staff will also consider:

- geographic boundaries such as rivers, major streams, parks, interstate routes, railroads
- political boundaries, although intersections located within the Cities of Rockville and Gaithersburg, where the Planning Board does not have subdivision authority, will be included in the traffic study and the studies will be shared with nearby incorporated cities1
- contiguous land under common ownership
- the type of trip generated: existing, new, diverted, or pass-by
- the functional classification of roadways, for example six-lane major highway.

If a site’s number of peak hour vehicle trips is projected to increase the critical lane volume through an intersection by fewer than five trips and the applicant is required to improve another intersection for the same project and/or is participating in a traffic mitigation program, that intersection does not need to be analyzed in the traffic study, even if it would otherwise be identified as appropriate to study. Applicants may develop a trip distribution and assignment pattern before the study scoping process and work with Planning Department staff to determine which intersections don’t require full study. This process will be documented in the scoping correspondence.

**CLV Intersection Analysis Method**

An intersection’s ability to carry traffic is expressed as CLV, the level of congestion at critical locations with conflicting vehicle movements, usually an intersection. Current CLV standards for each policy area are based on achieving approximately equivalent combined transportation roadway and transit levels of service in all areas of the County (see Map 1). Greater vehicular traffic congestion is permitted in policy areas with greater transit accessibility and use.

For a traffic study, the existing, background, and site-generated traffic for identified intersections should be measured against intersection capacity using the critical lane volume method. The analysis should be carried out for the peak hour of both the weekday morning and evening peak periods and should use traffic data for non-holiday weekdays and other non-typical occurrences.

The CLV method is generally accepted by most Maryland public agencies including SHA, MCDOT, the Cities of Rockville, Gaithersburg, Takoma Park, and M-NCPPC Planning Department. The methodology will fit most intersection configurations and can be easily varied for special situations and unusual conditions.

While some assumptions, for example lane use factors (see Step 3 below), may vary between jurisdictions and agencies, the general CLV methodology is consistent. An excellent reference source is SHA’s web site: [http://marylandroads.com/Index.aspx?PagId=461](http://marylandroads.com/Index.aspx?PagId=461).

The CLV method can be used at signalized or unsignalized intersections. For unsignalized intersections, a two-phase operation should be assumed. The traffic volumes should be those approaching the intersection as determined in each step of the traffic study (existing, existing plus background, and existing plus background plus site).

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1 In such cases, the coordination of any proposed intersection improvements shall be in accordance with the memorandum of understanding provided as Appendix 7.
Applicants should use the following steps to determine the congestion level of an intersection with a simple two-phase signal operation.

Step 1: Determine the signal phasing, number of lanes, and the total volume of entering turning movements on all intersection approaches and the traffic movements permitted in each lane.

Step 2: Subtract from the total approach volume any right-turn volume that operates continuously throughout the signal cycle (a free-flow right-turn bypass). Also, subtract the left-turn volume if it has an exclusive lane. An exclusive turning lane must be long enough to store all of the turning vehicles in a typical signal cycle without overflowing into the adjacent through lanes. Otherwise, none or only percentage of the turning volume may be subtracted from the total approach volume.

Step 3: Determine the maximum volume per lane for each approach by multiplying the volume calculated in Step 2 by the appropriate lane-use factor selected from Table 2. (Note: Do not count lanes established for exclusive use such as right- or left-turn storage lanes. The lane use factor for a single exclusive use lane is 1.00. Consult with Planning Department staff and MCDOT regarding any overlap signal phasing.)

<table>
<thead>
<tr>
<th>Number of Approach Lanes</th>
<th>Lane Use Factor*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00</td>
</tr>
<tr>
<td>2</td>
<td>0.53</td>
</tr>
<tr>
<td>3</td>
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<td>4</td>
<td>0.30</td>
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<tr>
<td>5</td>
<td>0.25</td>
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</table>

* Based on local observed data and the 2010 Edition of the Highway Capacity Manual

Step 4: Select the maximum volume per lane in one direction (e.g., northbound) and add it to the opposing (e.g., southbound) left turn volume.

Step 5: Repeat Step 4 by selecting the maximum volume per lane in the opposite direction (e.g., southbound) and the opposing (e.g., northbound) left-turn volume.

Step 6: The higher total of Step 4 or Step 5 is the critical volume for phase one (e.g., north-south).

Step 7: Repeat Steps 4 through 6 for phase two (e.g., east-west).

Step 8: Sum the critical lane volumes for the two phases to determine the CLV for the intersection. At some intersections, two opposing flows may move on separate phases. For these cases, each opposing phase becomes a part of the intersection’s CLV (see Table 3).

Step 9: Compare the resultant CLV for the intersection with the congestion standards in Map 1.
An example of a CLV calculation for a hypothetical intersection is provided in Table 3.

Table 3: Critical Lane Volume Calculations

<table>
<thead>
<tr>
<th>direction from the</th>
<th>lane approach volume</th>
<th>critical lane use factor</th>
<th>approach volume</th>
<th>opposing lefts</th>
<th>lane volume per approach</th>
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<tbody>
<tr>
<td>north</td>
<td>775^1</td>
<td>x</td>
<td>0.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>south</td>
<td>800^2</td>
<td>x</td>
<td>0.53</td>
<td></td>
<td></td>
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<td></td>
<td>500</td>
<td>x</td>
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<td></td>
</tr>
<tr>
<td>east</td>
<td>700^3</td>
<td>x</td>
<td>0.53</td>
<td></td>
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<td>west</td>
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</table>

1 Approach volumes are the sum of through, right, and left turn movements in two lanes.
2 For a heavy right turn, evaluate worst of rights in one lane or through and rights in two lanes.
3 Approach volumes are the sum of through and right turn movements in two lanes.
4 Approach volumes are through only because of free right and separate left.
5 Intersection Critical Lane Volume = higher sum = 675 + 548 = 1,223.

The following conditions should be observed where applicable.

- Right turn overlaps can be assumed where an exclusive right turn lane exists, except in cases when an approach is signed for a “no turn on red” condition.
- The CLV for five-leg intersections should be addressed according to the individual signal phases identified in the field.
- In cases where pedestrian crossing time criteria are not met, applicants must inform MCDOT, request that they revise the signal timing, and include this in the pedestrian statement.
- Crossing distances are to be measured from the curb to the edge of the far travel lane (not curb to curb).
- “Desired times” are to be determined by dividing the crossing distance by 3.5 ft/sec and then subtracting the total clearance time for that associated phase, as per the Manual on Uniform Traffic Control Devices.
- The CLV calculation for roundabouts should calculate the sum of the approach flow and circulating flows, as defined by the Highway Capacity Manual, for each approach and comparing the highest sum to the LATR standards.

2. Approved but Unbuilt Development

As a general guideline, background traffic from approved but unbuilt developments will be in the same geographic area as the intersections to be studied, defined by a polygon connecting the intersections farthest from the site. If the background traffic is generated from a large, staged development, the traffic study and its review will also be staged. As noted above, background traffic data should also include effective trip mitigation programs or uncompleted physical improvements that have been required of nearby developments. In appropriate cases, Planning Department staff may require that traffic from nearby unapproved applications also be included in the traffic study as described on page 6.
3. Existing Intersection Turning Movement Counts

Generally, intersection turning movement counts less than one year old when the traffic study is submitted are acceptable. Traffic counts should not be conducted:

- on a Monday or Friday
- during summer months or when public schools are not in session
- on federal, state, or county holidays
- on the day before or after federal holidays
- during the last two weeks of December and the first week of January or when a major incident or event results in significantly different traffic volumes and patterns
- when weather or other conditions have disrupted normal daily traffic.

For special circumstances such as summer camps, non-summer or summer traffic counts, whichever is higher, will be used in the study.

4. Trip Generation, Directional Distribution, Directional Split, and Trip Assignment

Trip Generation

Trips projected to be generated by the proposed development and background traffic should be determined in accordance with the latest Trip Generation Guidelines (see Appendix 1). Developments that generate less than five peak hour background trips (i.e., subdivisions of four or fewer single-family detached houses) are not generally included unless located at a critical analyzed intersection, since tracking those trips is not pragmatic.

Trip generation equations and rates are shown in Appendix 1 for general office, retail, residential, fast food restaurants, child day care centers, private schools/educational institutions, senior/elderly housing, mini-warehouse, and automobile filling stations with or without ancillary uses. Equations for calculating trips from other land uses or zoning classifications can be obtained from the Institute of Transportation Engineer’s (ITE) latest edition of the Trip Generation Manual, as can guidance regarding pass-by, diverted, and internal trip capture rates.

Applicants should use Appendix 1 for trip generation rates and equations for typical land uses within Montgomery County. Planning Department staff can assist in calculating trips and using the trip generation tables in Appendix 2. Appendix 3 contains the trip generation rates for the Silver Spring, Bethesda, and Friendship Heights CBDs, which reflect higher transit use. Planning Department staff is authorized to make minor technical changes to Appendixes 1, 2, and 3 to reflect new information or to correct errors. Applicants should check with staff to ensure they are using the latest version of the Appendix.

Another special case is retail sites over 200,000 square feet of gross leasable area. Their trip generation rates will be set after discussion with staff and the applicant’s analysis of data for one or more similar-sized retail sites within the County. In lieu of data collection, a trip rate set at two times the rate in the latest edition of ITE’s Trip Generation Manual may be used.

In some cases, adjusting the trips from the trip generation rates and equations in the Appendix may be appropriate. For example, the effect of pass by and diverted trips for retail, including fast food restaurants, child day care centers, and automobile filling stations; and the total trips from mixed uses such as office and retail will be considered on a case-by-case basis, using the best available information. Deviations may also be appropriate for a particular site. Appropriate rates for these sites could be based on traffic counts of comparable facilities on vehicles both entering and leaving those sites, preferably in the County, and will be considered by staff.

Directional Distribution

Planning Department staff provides applicants with guidance pertaining to the directional distribution of background and site traffic generated by office and residential uses from the latest edition of the Trip Distribution and Traffic Assignment Guidelines (see Appendix 4). The distribution of trips entering and leaving the proposed development will be determined based on the relative location of other traffic generators, including background development, employment centers, commercial centers, regional or area shopping centers, transportation terminals, or other trip table information provided by staff. For land uses not covered in the Appendix, distribution should be developed in consultation with Planning Department staff.
Directional Split
The directional split is the percentage of the trips entering or leaving the site during the peak hour and the direction in which those trips are traveling. Appendix 1 contains the directional split for general land uses and Appendix 3 contains directional split assumptions for the Bethesda, Friendship Heights, and Silver Spring CBDs. For all other uses, refer to the latest edition of ITE’s Trip Generation Manual. If data are not available, staff and the applicant will determine an appropriate in-out directional split.

Trip Assignment
Trip assignment is an estimate of the impact of future traffic on the nearby road network. It tends to be less accurate farther from the origin or destination of travel. The assignment factors shall be determined in consultation with Planning Department staff and applied to the generated trips. The resulting volumes will be assigned to the nearby road network. Generated trips, background traffic, and existing traffic will be combined to determine the adequacy of transportation facilities. Trip assignment will be extended to the nearest major intersection, or intersections, in consultation with Planning Department staff (see Table 1).

Once an intersection assignment exceeds a CLV of 2,000, diverting estimated traffic to alternate routes may be considered. Diversions will be based on feasible alternatives and should create a balance that reflects the project’s traffic impacts on both primary and alternate routes, and without excessively burdening local residential streets. Impacts on primary and alternate intersections must be mitigated in accordance with the policy area congestion standards. Staff, in consultation with the applicant, SHA, and MCDOT, will resolve these cases individually before presentation to the Planning Board.

5. Mode Split Assumptions
Estimates of transit use should be included if the study is to include trip reduction generated using non-auto trip factors. For mixed-use developments, the trip-generation rates and formulas in ITE’s Trip Generation Manual include the impacts of transit users.

6. Capital Improvement Projects and Consolidated Transportation Program Improvements
Transportation projects fully funded for construction within six years in the latest version of the County’s Capital Improvement Program (CIP), the State’s Consolidated Transportation Program (CTP), or any relevant municipal capital improvements program should be included in the study, along with techniques for estimating traffic diversion to major new programmed facilities.

Applicants should use the CIP and CTP to define a capital improvements project to be included in their traffic study. For an improvement to qualify for use, it must be fully funded for construction in the first six years of the applicable CIP or CTP as of the date of the traffic study’s submission.

If a capital project is not currently fully funded for construction within six years of the capital program, but such funding is reasonably anticipated to occur in the next capital program, Planning Department staff may recommend the Planning Board delay an APF decision until the County or State is ready to appropriate that funding. The Planning Board would then require the developer to consult with the County or State when building permit applications are filed. If the County or State agrees at that time in writing that the capital project will be constructed within six years, then the developer will contribute an amount equivalent to the cost of the LATR improvements that they would otherwise be required to make.

7. Circulation and Safety
The traffic study should provide peak hour turning movement projections (into and out of the site) for all driveways to commercial and multifamily residential developments, sites that share access through an easement agreement, and proposed intersections of any new public streets with existing public roads.

On sites with public or private facilities with 800 or more seats or that can otherwise accommodate 800 or more people during an event, which may have high traffic impacts, traffic studies should address concerns about site access and circulation.

8. Land Use and Size
The study should include the number and square footage of buildings on the site and whether they are commercial, residential, or some other use as described in Appendix 2 and in the latest version of the Highway Capacity Manual.
9. Queuing Analysis
The study should be based on data from the Highway Capacity Manual methodology, and reflect the different standards for CBDs and MSPAs (see Map 1). See page 18 for more detail.

10. Pedestrian and Bicycle Impact Statement
To ensure safe and efficient pedestrian and bicycle access and circulation to and within the site, the study should include:

- pedestrian and bicycle counts at each intersection: pedestrian counts will be recorded at each leg of the intersection; bicycle counts will be recorded as turn movements
- any capital or operating modifications required to maximize safe pedestrian and bicyclist access to the site and surrounding area
- inventory map of existing and proposed sidewalks, off-road shared-use paths, and bikeways near the site noting whether these facilities are generally consistent with the County’s Road Code design standards for sidewalk, path, landscape panel width, and street trees
- existing and proposed bus stops, shelters, and benches, including real time transit information
- pedestrian and bicycle accommodations at nearby intersections, including crosswalks, countdown pedestrian signals (CPS), push buttons, median refuges, and ADA-compliant ramps and accessible pedestrian signals (APS)
- information on bus route numbers, service frequency, and end destinations of bus routes
- in CBDs and MSPAs, recognition of peak pedestrian and bicycle activity periods
- inventory of existing streetlighting and additional lighting needs in the vicinity of the site.

11. Improvement and Mitigation Recommendations
The study should include a feasible range of traffic engineering improvements and/or trip mitigation measures associated with implementing the development.

12. Traffic Mitigation Agreement
If an applicant is proposing trip reduction measures, the study must include:

- a description of proposed Traffic Mitigation Agreement (TMAg) elements that will be entered into by the Planning Board, the Board of Appeals and MCDOT, and included in the opinions issued by the Board of Appeals. The description must include, at a minimum, the following elements:
  - the vehicle trip reduction goals, including the specific number of peak hour vehicles to be reduced in both the weekday morning and evening peak periods
  - the TMAg’s actions and a quantitative assessment of how they will achieve the required vehicle trip reduction goal
  - the required duration of the TMAg, whether the TMAg will be enforced based on the provision of specified actions (regardless of outcome), the measured outcome (regardless of actions provided), or a combination of both
  - the measures to be used in enforcement
  - the suggested method of monitoring
  - a security instrument to fund the continuation of the traffic mitigation program for its remaining term if the applicant defaults
  - the penalties if the vehicle trip reduction goals are not met.
- written statements from both MCDOT and Planning Department staffs concurring with the proposed approach to traffic mitigation.

Additional Guidance on Scope Elements
The project’s size and location will determine its traffic impact, as will the land uses in the proposed development. In calculating their impact, the applicant’s traffic study must consider the following factors.

Peak Hour
Traffic studies should be based on the one hour period with the highest trips during the typical weekday morning (6:30 a.m. to 9:30 a.m.) and/or evening (4:00 p.m. to 7:00 p.m.) peak period. This one-hour period shall be determined from the highest sum of the existing traffic entering all approaches to each intersection during four consecutive 15-minute intervals.
Traffic Data
Current existing traffic volume data may be available from the Planning Department’s intersection traffic count database, SHA, or MCDOT. New traffic counts should be conducted by the applicant if, in staff’s opinion, traffic volumes have increased due to some change in the traffic pattern, such as the completion of a nearby development or roadway project after the count was made. Applicants are responsible for collecting new traffic counts if turning movement data are more than one year old when the project application is considered complete by the Planning Department or if there are locations for which traffic count data are non existent.

Intersection traffic counts obtained from public agencies or conducted by the applicant must be manual turning movement counts of vehicles and pedestrian/bicycle crossing volumes in 15-minute intervals covering the typical weekday peak periods, 6:30 a.m. to 9:30 a.m. and 4:00 p.m. to 7:00 p.m., or some other agreed upon time period. The data must be collected in 15-minute intervals to allow selection of the peak hour within the nearest 15 minutes. All weekday peak-period turning movement data should be submitted as part of the applicant’s traffic study.

All new intersection traffic counts for vehicles, pedestrians, and bicycles must be submitted digitally to Planning Department staff to become part of the Planning Department’s Intersection Traffic Count database, which is available to developers, consultants, and others. Traffic counts affected by adverse weather or nearby traffic incidents will not be accepted (see page 11, Applicant’s Preparation of an LATR Traffic Study, Existing Intersection Turning Movement Counts).

Submitting an LATR Traffic Study
If an applicant is uncertain whether a traffic study is required, a traffic exemption statement must be filed as a part of an applicant’s development submittal. The traffic exemption statement must show:

• that the number of peak hour vehicle trips generated by the project’s proposed land use is fewer than 30 trips
• how the TPAR test is satisfied.

Planning Department staff will review the initial traffic exemption statement and determine if a traffic study is necessary.

If a traffic study is necessary, Planning Department staff has 15 working days to develop a study scope after receiving a written request and working with the applicant. As part of the scope, staff will supply the applicant with information on approved but unbuilt developments, relevant pending applications, nearby intersections to study, trip distribution and traffic assignment guidelines, and other information required to complete the study.

When determined to be complete and adequate, the applicant can return the study with the complete development application. Planning Department staff has 15 working days to let the applicant know if the study is complete and adequate.

TPAR and LATR are separate evaluation processes, but must be examined concurrently as part of a development application submission. Each applicant must satisfy both TPAR and LATR requirements. The requirements must be addressed in a single document, which may include a combination of traffic exemption statements and traffic studies.

Traffic Study Submittals
Two copies of the traffic study must be submitted with the development application. Once Planning Department staff confirms that the traffic study is complete and adequate, 13 copies must be submitted within five working days of notification, along with a PDF copy for inclusion in the application file and available for public view via the Planning Department website’s Development Activity Information Center (DAIC).

A complete and adequate traffic study must include:

• A site or area map showing:
  - existing roads serving the site and any CIP or CTP transportation improvements that are fully funded for construction within six years and that affect traffic at the critical intersections
  - nearby approved but unbuilt developments and associated improvements that would affect traffic at the critical intersections with their location shown on the area map. (This information is provided by staff and included as part of the traffic study.)
• Name and contact information of the licensed or certified professional submitting the traffic study. LATR traffic studies must be submitted by a registered Professional Engineer (PE), Certified Professional Traffic Operations Engineer (PTOE), Certified Professional Transportation Planner (PTP) or AICP Certified Transportation Planner (AICP CTP).

• Existing pedestrian and bicycle weekday morning and evening peak period traffic count summaries for the intersections analyzed in the traffic study. The summary should include any safety deficiencies or conditions that fail to comply with the Americans with Disabilities Act.

• For approved but unbuilt development:
  - weekday morning and evening peak hour trips expected to be generated by each nearby approved but unbuilt development, including the source of the generation rates and equations for each trip distribution patterns, as percentages, during the weekday morning and evening peak hours. The pattern of both distribution and assignment should be shown on an area map of the local roadway network.

• For the proposed development:
  - weekday morning and evening peak hour trips entering and leaving the site, including the site driveways
  - trip distribution patterns, as percentages, during the weekday morning and evening peak hours. The pattern of both distribution and assignment should be shown on an area map of the local roadway network.

• Maps that show separately and in combination:
  - existing weekday morning and evening peak hour traffic volumes using the affected highway system, including turning movements at analyzed intersections
  - projected weekday morning and evening peak hour trips assigned to the affected highway system and turning movements at analyzed intersections for all nearby approved developments, included as part of the background
  - traffic volumes derived by adding trips from approved development to existing traffic
  - if a roadway CIP/CTP or developer-sponsored project is considered as being in place, the resulting reassignment and redistribution of trip patterns
  - projected weekday morning and evening peak hour trips assigned to the affected highway system and turning movements at analyzed intersections for the proposed development
  - traffic volumes derived by adding site trips to the sum of existing plus background traffic assigned to the affected highway system and turning movements at the analyzed intersections.

• Any study performed to help determine how to assign recorded or proposed development trips, such as a license plate study or special turning movement counts.

• Copies of all critical lane volume analyses for each analyzed intersection, showing calculations for each approach.

• A list of all transportation improvements, if any, that the applicant agrees to provide and a scaled drawing of each improvement showing available or needed right-of-way, proposed roadway widening, and area available for sidewalks, bikeway, landscaping, as required. Coordination with MCDOT, SHA and, if impacted, the Cities of Rockville and Gaithersburg, should be shown.

Electronic copies of all vehicle, pedestrian, and bicycle traffic counts in approved digital format submitted to: www.montgomeryplanning.org/transportation/latr_guidelines/submission.pdf.

• Traffic counts affected by adverse weather, nearby traffic incidents, or other factors resulting in non-typical volumes will not be accepted.

Before a traffic study is accepted for review, the applicant must show proof that the MCDOT Development Review Fee (to review the traffic study) has been paid, in accordance with Executive Regulation No. 28-06 AM (Schedule of Fees for Transportation-related Reviews of Subdivision Plans and Documents).

Once a traffic study is determined to be complete and adequate (see Table 4), the date of Planning Department staff acceptance of that study becomes the completion date. Planning Department staff will inform the Planning Department’s Development Application and Regulatory Coordination division that the study is complete and adequate. As part of a development application, the traffic study will follow the standard notification process.
Planning Department staff is available to review the traffic study’s recommendations with community representatives. Traffic studies are available for public review as part of the application’s general file. Copies can be made or requested from the applicant, as needed. PDF copies are also available online at the Planning Department’s Development Activity Information Center.

After the traffic study is complete and adequate, Planning Department staff will distribute it to MCDOT, SHA, and incorporated cities, if applicable. Traffic studies should be distributed at or before the date when subdivision plans are distributed for review by the Development Review Committee. These agencies will have 30 days to review the traffic study and comment. Planning Department staff will determine if a traffic study’s recommendations are acceptable in consultation with the applicant, MCDOT, and SHA. Planning Department staff will work with the applicant to obtain comments from SHA and MCDOT five weeks prior to a scheduled Planning Board hearing.

It is the applicant’s responsibility to determine how to respond to written and/or oral communication by Planning Department staff regarding issues associated with and/or required modifications to the traffic study.

Table 4: Checklist for Complete and Adequate Traffic Studies

<table>
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<tr>
<th>Process</th>
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<tr>
<td>Traffic study submitted/receipt date</td>
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<tr>
<td>Contact information of licensed or certified person who prepared it</td>
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<tr>
<td>Has an electronic copy of traffic counts been received/receipt date</td>
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<tr>
<td>Have the fees required by Executive Regulation 28-06 AM been paid?</td>
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<tr>
<td>Does the study follow LATR/TPAR Guidelines, the traffic study scope letter, and generally accepted transportation planning principles?</td>
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<tr>
<td>Are policy area congestion standards, lane configurations, lane factors, and CLV calculations in the traffic study acceptable?</td>
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| Information about surrounding area |  |
| Are existing traffic conditions presented accurately? |  |
| Are pipeline developments adequately represented? |  |
| Are background traffic conditions appropriate? |  |
| Are the relevant fully-funded transportation network improvements included? |  |

| Information about the proposed development |  |
| Does the study reflect latest submitted development plan and land uses? |  |
| Is site trip generation estimated according to LATR requirements? |  |
| Is the TPAR fee calculated based on the number of dwelling units and gross square footage? |  |
| Are assumptions for the percent of new, diverted, pass-by, internal trips acceptable? |  |
| Does site trip distribution represent regional travel patterns in the LATR/TPAR Guidelines and local road network? |  |
| Is site trip assignment acceptable? |  |

| Information about proposed mitigation |  |
| If proposed, what percentage of LATR trips needs to be reduced and mitigated? Are intersection and roadway improvements identified? |  |
| Is the Pedestrian and Bicycle Impact Statement acceptable? |  |
| Are necessary trip reduction measures identified? |  |
| Are intersection and roadway improvements identified? |  |
| If proposed, are trip reduction measures acceptable? |  |
| If proposed, are the required elements of the Traffic Mitigation Agreement (TMAg) identified? |  |
| Has the PDF copy of the traffic study been submitted? |  |
STAFF’S EVALUATION OF A TRAFFIC STUDY

Planning Department staff evaluates traffic studies considering the following elements, described here to ensure consistent review by staff and to provide applicants additional information about how their studies will be analyzed. The review includes variations for MSPAs, CBDs, and projects with multiple applicants.

Project Size and Location
To warrant an LATR traffic study, a proposed development must have a measurable traffic impact on a local area. Measurable traffic impact is defined as a development that generates 30 or more total (i.e., existing, new, pass-by, and diverted) weekday peak hour trips in the morning (6:30 a.m. to 9:30 a.m.) and/or evening (4:00 p.m. to 7:00 p.m.) peak periods. If the proposal generates less than 30 trips or is a renovation of an existing development and will generate no net increase in trips, a traffic exemption statement is required instead of a traffic study.

An LATR traffic study is not required for any expansion that generates five or fewer additional peak hour trips if use and occupancy permits for at least 75 percent of the originally approved development were issued more than 12 years before the LATR traffic study exemption request. If an LATR traffic study is required, the number of signalized intersections in the study will be based on the increased number of peak hour trips rather than the total number of peak hour trips.

To determine if a development will generate 30 or more weekday trips, Planning Department staff uses the following criteria:

- For office or residential development, all peak hour trips are counted even if, as part of the analysis, some of the trips will be considered as existing, pass by, or diverted trips to the site from existing traffic.
- For retail development, pass-by and diverted trips are included in establishing the 30-vehicle threshold for a traffic study and later, for designing site access and circulation. Pass-by and diverted trips are not added to site-generated trips because they are already on the network, but diverted turning movements are considered in evaluating CLV measurement.
- Planning Department staff shall exercise their professional judgment in consultation with the applicant in determining the appropriate land area to consider. Parcels that will be separated by unbuilt roadways remain “land at one location” but parcels separated by business district streets, arterial roadways, major highways, or freeways may cease to be “land at one location” even if still in common ownership.

In certain circumstances, Planning Department staff may, in consultation with the applicant, require analysis of traffic conditions during a different three-hour weekday peak period for example, 6:00 a.m. to 9:00 a.m. (versus the standard 6:30 a.m. to 9:30 a.m.) or 3:30 p.m. to 6:30 p.m. (versus the standard 4:00 p.m. to 7:00 p.m.), to reflect the site’s location or trip-generation characteristics, existing conditions, or background traffic. For example, a school where classes end before the start of the evening peak period may warrant analysis of an earlier peak period.

The applicant calculates the number of trips using the following sources:

- in the Silver Spring, Bethesda, and Friendship Heights CBD Policy Areas, use the trip generation rates in Appendix 3, Tables 3-1 or 3-2.
- in all other parts of the County:
  - for general office, general retail, residential, fast food restaurant, private school, child day-care center, automobile filling station, senior/elderly housing, or mini-warehouse, use the formulas provided in Appendix 1 and the tables provided in Appendix 2.
  - for other land uses, use the latest edition of the Trip Generation Manual published by the Institute of Transportation Engineers (ITE).

For some specialized land uses, trip-generation rates may not be available. In such cases, Planning Department staff may request that determining rates be a part of the traffic study, most likely by collecting existing driveway counts at similar land uses. If special rates are to be used, staff must approve them prior to submission of the traffic study.

An applicant shall not avoid the intent of this requirement by submitting piecemeal applications or approval requests. However, an applicant may submit a plan of subdivision for less than 30 peak hour trips if agreeing in writing that, upon filing future applications, the applicant will comply with the requirements of the LATR/TPAR Guidelines when the total number of site-generated peak hour vehicle trips at one location has reached 30 or more. Then, a traffic study will be required to evaluate the impact of the total number of site-generated trips in accordance with the Guidelines.
Planning Department staff may elect to waive the criteria described in this section if the development results in no net increase in weekday peak-hour trips.

**Congestion Standards**

The County Council establishes congestion standards throughout the County (stated in terms of CLV levels), which depend on the character of development and the availability of transit options. These standards are developed by policy area and adopted in the Subdivision Staging Policy (see Map 1). Planning Department staff maintains an inventory of intersection traffic data based on traffic counts collected by MCDOT, SHA, and private traffic consultants to provide applicants with a preliminary assessment of conditions in the vicinity of a proposed development.

**Reviewing Development in MSPAs and CBDs**

In reviewing MSPA and CBD applications, staff uses the following criteria.

**Adequacy of Traffic Flows**

- Any intersection with a CLV less than 1,600 will be considered acceptable with no further analysis required. The CLV will be calculated in accordance with the procedures defined in these Guidelines.
- If the CLV is 1,600 or higher, an HCM analysis shall be performed. Existing queues shall be measured by the applicant and total traffic (existing, background, and site) and planned roadway and circulation changes shall be taken into account. The HCM methodology shall be applied using simulation software such as SYNCHRO or CORSIM based on simulation parameters agreed upon by the applicant and Planning Department staff. The average queue length in the weekday peak hour should not extend more than 80 percent of the distance to an adjacent signalized intersection, provided the adjacent signalized intersections are greater than 300 feet apart. The 80 percent standard provides a margin of safety for peaking. If adjacent signalized intersections are closer together than 300 feet, the average queue length in the weekday peak hour should not extend more than 90 percent of the distance to the adjacent signalized intersection. The assumed signal timing analysis must be consistent with the crossing time required for pedestrians as described in the CLV Analysis Methods section (page 8).

**Site Access and Pedestrian/Bicycle Safety**

In addition to the traffic flow analysis, applicants must demonstrate that the following guidelines are not violated by their site development.

- Vehicle access points for parking and loading must be located so that they will not interfere with traffic flows on the adjacent streets or with access points to neighboring buildings or transit terminal areas. Access directly onto roads classified as arterials or above should be avoided, but if proposed it will be considered in the context of the application.
- In addition to the pedestrian and bicycle impact statement, pedestrian and bicycle safety shall be assessed based on the potential for conflicts between pedestrians, bicycles, and vehicles. Actions shall be taken to minimize conflicts and ensure pedestrian and bicycle safety on and adjacent to the site.

In MSPA cases where pedestrian crossing time criteria are not met, the applicant must inform MCDOT and request them to revise the signal timing. Any adjustments must be documented in the traffic study submitted as part of the development application. In the analysis, all pedestrian and bicycle movements are assumed to be made at the street level.

**Other Criteria**

- Total traffic is defined as the existing traffic, plus trips from approved but unbuilt development, plus the trips from the proposed development during the peak hour of the weekday morning and evening peak periods.
- Critical intersections are those within the CBD or MSPA, defined by Planning Department staff, generally adjacent to the site, or allowing site traffic to enter an arterial or major road. In some cases, where site volumes are large, additional intersections within or contiguous to the CBD or MSPA may be identified by staff for inclusion in the traffic study.
- Vehicles can be assigned to parking garages encountered on their trip into the CBD or MSPA. The capacity of parking garages must be accounted for based on guidance from Planning Department staff and consultation with MCDOT.
- Trip generation rates for background and site development traffic are contained in Appendixes 1, 2, and 3.

Multiple Applicants

Applicants can request that trip mitigation programs or intersection improvements be considered for more than one application. In those cases, the program or improvement must provide enough capacity to allow all participating applicants to satisfy LATR conditions.

An intersection improvement that is not yet complete may be used by two or more developments to meet LATR conditions. To be considered, the improvement must provide sufficient capacity to:
- result in a CLV that is less than the congestion standard for that policy area; and
- result in a CLV reduction equal to 150 percent of the CLV impact generated by the developments, that is, the intersection improvement must not only mitigate the impact of a proposed development, but improve conditions.

Any type of mitigation listed in this document or acceptable to MCDOT, SHA, and the Planning Board can be used to achieve this goal.

When development is conditioned on intersection and roadway improvements by more than one application, those improvements must be permitted and bonded, under construction, or under contract for construction prior to the issuance of building permits for any new development. Exceptions may be made if an applicant’s trip contribution to an intersection or roadway is less than 25 percent of the sum of total trips.

This requirement may be fulfilled by the creation of a road club or other mechanism approved by the Planning Board that:
- includes the terms, conditions, and responsibilities for funding 100 percent of the cost for design approval, right-of-way acquisition, and construction of the improvements as set forth in the individual project APF approvals; and ensures that all parties contribute in accordance with their respective shares to the total cost of the improvements
- ensures the improvements are either permitted and bonded or under contract for construction within three years of the first building permit issued for any of the developments dependent on the required improvements
- ensures the improvements are substantially complete and open within five years of the first building permit issued for any of the developments dependent on the required improvements.

If the second or third conditions above have not been met, no building permit that is conditioned on construction of the improvements may be issued to any other participant in the road club until all above conditions are met.

If a road club or other mechanism is formed, but not all parties responsible for the improvements join, the non-participating parties will not be permitted to proceed with platting or construction of their projects until they either join the road club or, if the improvements have been completed, reimburse the other road club participants for their share of the total costs. Non-participating parties include those with projects with preliminary plan or APF approvals, which are obligated to participate in the same improvements, whether the approval occurred before or after the road club formation.

Construction of an improvement by one applicant does not relieve other applicants of their responsibility to participate in the cost of that improvement. The final percentage of the construction cost contribution is determined by the participating applicants.

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1 This condition is satisfied if the project is included in the first six years of the County’s Capital Improvement Program or the State’s Consolidated Transportation Program and the developer’s contribution is applied to that project.
2 Trip total is the sum of the total peak-hour trips generated by all developments required by the Planning Board to participate in the construction of the particular improvement.
3 In certain APF approvals, an applicant is not required to build an improvement until a certain number of building permits have already been released. Such a project would not be responsible for constructing those improvements until the specified number of building permits has been released.
If the Planning Board is asked to consider extending the time period to comply with APF requirements for an approved preliminary plan, Planning Department staff will determine if the traffic study needs to be updated based on the APF validity period.

**Participation in Transportation Improvements**
The Planning Board may require that applicants participate in some capital program transportation improvements. Participation will be proportional to the development’s impact on the improvement and will be determined by Transportation Planning staff, MCDOT, SHA, and other agencies that fund transportation-related improvements. If the traffic study identifies roadway changes or other transportation-related activities required to mitigate the proposed development’s on- or off-site impact, these changes will be the responsibility of the applicant as part of LATR.

**Traffic Mitigation Agreement**
Each applicant in a Transportation Management District (TMD) must have a proposed Traffic Mitigation Agreement (TMAg) outlining a participation plan for trip reduction measures and other strategies for participating in efforts to achieve the non-auto mode share goals for that policy area. This plan should be prepared in conjunction with the area’s TMD, MCDOT, and Planning Department staff. The TMAg for TMD participation may be structured to incorporate applicable LATR and TPAR requirements.

A TMAg may be required in areas where Transportation Demand Management is anticipated in the future, or in situations where the applicant has claimed credit for travel volume reductions by using transit without identifying specific measures to guarantee those reductions.

Proposed Traffic Mitigation Agreements should be:
- submitted as a draft, electronically and in writing, with subdivision plan submissions (the draft document should detail the project’s proposed the trip reduction program);
- executed and recorded before the issuance of the project’s first building permit.

**Information Provided by Staff**
The following information may be provided to the applicant by Planning Department and MCDOT staffs for use in the traffic study.
- Existing traffic counts at selected locations. (The applicant shall be required to update these data if the application is submitted more than one year after the applicant submits a completed development application to the Planning Department.)
- Trip generation rates or equations and their source.
- Initial directional distributions (see Appendix 4) to be refined based on the existing road network
- In CBDs, parking garage capacity information and locations of future public parking garages.
- A list of approved but unbuilt developments and their locations.
- Public and private transportation improvements in the study area, with funding assigned for construction within six years (see Appendix 6).

**Staff Findings**
In their report to the Planning Board, staff presents findings for each of the following categories and makes recommendations about the adequacy of transportation facilities. The Planning Board will use these findings and recommendations, along with comments and recommendations from the public, MCDOT, SHA, and incorporated cities and towns, to determine the adequacy of public facilities for the proposed development.

Staff determines adequacy by finding that:
- congestion conditions will not exceed policy area standards
- proposed intersections improvements are feasible and will improve congestion conditions
- the applicant will pay into a fund to make required improvements.

**Transportation Solutions**
If the applicant’s traffic study identifies a condition that exceeds the congestion standard for the policy area, Planning Department staff will notify the applicant, MCDOT and SHA so that feasible mitigation can be developed. The Planning Department staff may recommend and the Planning Board may approve traffic mitigation...
agreements, non-automobile transportation facilities, or physical road improvements, alone or in combination, as the required means to relieve local congestion. For LATR, priority will be given to non-physical improvements in MSPAs and CBDs. No transportation mitigation improvement or transportation mitigation payment is required under TPAR in MSPAs.

The Subdivision Staging Policy seeks to reduce congestion in areas where it may already be unacceptable. It stipulates that in policy areas where local area conditions exceed the congestion standard, development may only be approved if the applicant agrees to mitigate the LATR impact by either:

- making improvements that bring the local area condition to within the congestion standard, or
- reducing CLV by an amount to equal to 150 percent of the CLV impact generated by the development.

Whenever modifications to signalized intersections and other physical improvements are proposed to remedy congestion standard issues, the traffic study must provide preliminary information to establish the feasibility of implementing the proposed measures. In these instances, the traffic study should include:

- alternative intersection improvements that were considered but not recommended, plus the rationale for not proposing them
- existing and proposed pavement
- existing and proposed right-of-way
- the length and width of proposed modifications
- cross sections of existing and proposed improvements in the right-of-way
- modifications to receiving lanes (such as additional through or turn lanes) or right-turn lanes
- the adequacy of turn radii—particularly for opposing vehicle movements where additional turn lanes are proposed
- proposed changes to the operation of existing traffic signals (timing, phasing, etc.).

Once the applicant, Planning Department staff, and MCDOT and SHA have identified solutions that will create local transportation capacity, these solutions will be incorporated as conditions of approval in the Planning Department staff report. These solutions could include additional traffic engineering or operations changes beyond those currently programmed, or new transit or ridesharing activities.

For applicants participating in traffic mitigation or intersection improvements to satisfy LATR requirements, that participation also counts toward meeting LATR for intersections where site-generated trip volume is less than five critical lane movements.

Establishing Local Congestion Standards
The applicant’s traffic study must identify a development proposal’s impact and the degree of intersection congestion for the peak hour of the weekday morning and evening peak periods by comparing the calculated CLVs with the policy area congestion standards in Map 1. For intersections straddling policy area boundaries, the higher congestion standard shall be used.

The LATR congestion standards are based on an approximately equivalent level of service that balances transit availability with roadway congestion in all County policy areas. In areas of greater transit accessibility and use, greater traffic congestion is permitted (see Map 1).

If staff finds that congestion standards are exceeded under background conditions, an applicant is required to provide a traffic mitigation program consisting of either or both trip reduction or intersection improvements. The mitigation program should:

- bring the intersection to acceptable levels of congestion, or
- reduce CLV by an amount equal to 150 percent of the CLV impact generated by the development.

Unavoidable Congestion
In their analysis, Planning Department staff will identify alternate routes to serve associated trips that could mitigate congestion. If there are no appropriate alternate routes, then it must be assumed that trips from the proposed development will increase local area congestion. It is not appropriate to anticipate that the development’s associated trips associated would use local streets other than for site access unless those streets are classified as arterial, business district, or higher.
Transportation Demand Management Strategies

As part of the traffic study review and approval, staff, in coordination with MCDOT, will confirm the degree to which transit, ridesharing, or other TDM activities can mitigate vehicle trips generated by a development. This activity should occur before the traffic study scoping letter stage to aid in preparing and reviewing the report. If the proposed development or immediate area can be served with transit or ridesharing services, then priority will be given to developing a transit alternative or trip mitigation program using transit. If it is physically or fiscally ineffective for public agencies to provide transit or ridesharing services, then it must be assumed that trips from the proposed development will increase local area congestion. In most cases, TDM strategies will be included in TMAgs and monitored over time to ensure effectiveness.

Project-Related Traffic

Planning Department staff will identify the degree to which local traffic congestion is attributable to the proposed development by measuring traffic from three sources: existing traffic, background traffic generated by the total of all nearby approved but unbuilt development, and total trips generated by the proposed development. The more trips the proposed development contributes to local traffic congestion, the greater the local impact area.

Table 5: LATR Intersection Congestion Standards—Critical Lane Volume and Volume-to-Capacity Equivalencies

<table>
<thead>
<tr>
<th>policy area</th>
<th>critical lane volume standard</th>
<th>volume to capacity equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural East</td>
<td>1,350</td>
<td>0.84</td>
</tr>
<tr>
<td>Rural West</td>
<td>1,400</td>
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</tr>
<tr>
<td>Damascus</td>
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<td>0.89</td>
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<tr>
<td>Clarksburg</td>
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<tr>
<td>Gaithersburg City</td>
<td></td>
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<td>Germantown East</td>
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<tr>
<td>Germantown West</td>
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<tr>
<td>Montgomery Village/Airpark</td>
<td></td>
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<tr>
<td>Cloverly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Potomac</td>
<td>1,450</td>
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<tr>
<td>Olney</td>
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</tr>
<tr>
<td>Potomac R&amp;D Village</td>
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<tr>
<td>Aspen Hill</td>
<td>1,475</td>
<td>0.92</td>
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<tr>
<td>Derwood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairland/White Oak</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rockville City</td>
<td>1,500</td>
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<tr>
<td>North Bethesda</td>
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<td>1,600</td>
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<td>Kensington-Wheaton</td>
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<td>Silver Spring-Takoma Park</td>
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<td>Bethesda CBD</td>
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<td>Silver Spring CBD</td>
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<td>Wheaton CBD</td>
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<tr>
<td>White Flint MSPA</td>
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</tbody>
</table>
Exceptions to LATR

There are several exceptions or additions to the LATR process and standards.

In the Potomac Policy Area the only developments subject to LATR are those with site-generated trips that will impact the following intersections:

- Montrose Road and Seven Locks Road
- Democracy Boulevard and Seven Locks Road
- Tuckerman Lane and Seven Locks Road
- Bradley Boulevard and Seven Locks Road
- Democracy Boulevard and Westlake Drive
- Westlake Drive and Westlake Terrace
- Westlake Drive and Tuckerman Lane
- River Road and Bradley Boulevard
- River Road and Piney Meetinghouse Road
- River Road and Seven Locks Road
- River Road and Falls Road
- Falls Road and Democracy Boulevard.

Alternative Review Procedure

The congestion standard for intersections in Metro Station Policy Areas is a CLV of 1,800 (see Map 1) and development within these areas is eligible for the Subdivision Staging Policy’s Alternative Review Procedure (ARP), which exempts projects from LATR and requires paying twice the TMD fees and reducing their trips by at least 50 percent.

For applicants using the Alternative Review Procedure (see Subdivision Staging Policy Section TA2), the solutions must be identified, agreed to, and made conditions of approval.

An applicant for a subdivision that will be built completely within an MSPA need not take any action under TPAR or LATR if they agree in a contract with the Planning Board and MCDOT to:

- submit an application containing all information, including a traffic study, that would normally be required for LATR
- meet trip reduction goals of no less than 50 percent set by the Planning Board as a condition of approving that subdivision, either by reducing trips from the subdivision itself or from other occupants of that policy area per an executed and recorded Traffic Mitigation Agreement, and provide a surety document to ensure that the reduction of trips in fact takes place
- participate in programs operated by, and take actions specified by, a TMO to be established for that policy area (or a group of policy areas) to meet the established mode share goals
- pay an on-going annual contribution or transportation development impact tax to fund the TMO’s operating expenses, including minor capital items such as buses, as established by County law
- pay 75 percent of the applicable General District Transportation Impact Tax without claiming any credits for transportation improvements.

To calculate mitigated trips for the Alternate Review Procedure, the applicant must explicitly document the conversion between person-trips and vehicle trips to account for transit use, vehicle occupancy, walk/bike use, internal site trip capture, and telecommute options. The estimates should document the effect of home-based work trips separately from all other trips. Special trip rates in Appendix 2, such as for office uses within 1,000 feet of Metrorail stations outside the Beltway, or rates for any uses within the Bethesda, Silver Spring, and Friendship Heights CBDs (Appendix 3), should not be used in either ARP or LATR-TPAR trip calculations. Countywide rates in Appendixes 1 and 2 are allowed, otherwise calculation rates and procedures recommended by the ITE or the TRB must be applied and referenced for Planning Department staff to consider the quantification of any trip reduction proposal.

Subdivision Staging Alternative Review Process

For commercial or residential developments, an applicant can meet LATR requirements by doing all of the following:

- paying 75 percent of the applicable development impact tax without claiming any credit for transportation improvements
- participating in and paying an on-going annual contribution to a Transportation Management Organization (TMO) if and when one exists
- mitigating 50 percent of their total weekday morning and evening peak hour vehicle trips per an executed and recorded TMAg
- submitting a traffic study to identify intersection improvements and trip mitigation measures that would have been required.
ALTERNATIVE SOLUTIONS AND MITIGATION APPROACHES

If an applicant’s LATR findings indicate an unacceptable intersection congestion level, their options to mitigate that impact include the physical or program improvements as outlined below.

In general, any mitigation measure or combination of mitigation measures must be scheduled for completion or be operating before or at the same time the proposed development is scheduled to be completed. The nature, design, and scale of any additional facility or program must receive approval from any government agency that would construct or maintain it and the applicant and public agency must execute an appropriate agreement before the Planning Board approves a record plat.

Both the subdivision plan and the necessary mitigation measures must be consistent with an adopted master plan or other relevant land use policy statement. For the Planning Board to accept a roadway improvement as a mitigation measure, the applicant must show that alternative non-auto mitigation measures are not feasible or desirable. In evaluating mitigation measures proposed by an applicant, the Board must place a high priority on design excellence to create a safe, comfortable, and attractive public realm for all users, with a particular focus on high-quality pedestrian and transit access to schools, libraries, recreation centers, and other neighborhood facilities.

If an approved subdivision already constructed or participated in the construction of off-site improvements to accommodate its peak hour trips (based upon the LATR requirements the Board imposed when it approved a development plan), and if the development later converts one or more approved uses or reduces its size so that the subdivision generates fewer or an equal number of peak hour trips than estimated when the Board imposed the LATR requirements, the trip mitigation agreement must reduce the development’s peak hour trip mitigation requirement by one trip for each peak hour trip that no longer would be generated by the development. If the conversion of all or part of the subdivision from one use to another would cause a different trip distribution or would place new or different burdens on one or more intersections, and if the subdivision is otherwise required to do so, the subdivision must construct or contribute to improvements specified by the Board to mitigate that result.

Applicants required to make intersection improvements to satisfy LATR may apply the capital cost of those improvements toward any TPAR mitigation obligation only if the conditions qualifying those improvements as being appropriate for TPAR mitigation are met.

LATR Mitigation Options

Traffic Mitigation Agreements

The applicant may be required to reduce or mitigate trips by entering into a legally-binding transportation mitigation agreement (TMAg). Each traffic mitigation program will be required to operate for at least 12 years, but not more than 15 years, once trip reduction requirements are initially achieved and after use and occupancy permits are drawn. Some elements are designed to continue in perpetuity.

TMAg measures could include:

- subsidizing transit fares to increase ridership
- constructing and maintaining a new park-and-ride facility or providing funds to increase use of an existing park-and-ride facility
- funding a private shuttle service, for example, between the site and a nearby Metrorail station or park-and-ride facility
- constructing queue-jumper lanes, providing traffic signal priority treatment for transit (after MCDOT and SHA have implemented this process) and other techniques to improve bus travel times (only results that improve travel times will be considered)
- parking management activities
- establishing live-near-work, flex-time, or telecommuting programs.

Other measures may be suggested by applicants, Planning Department staff, or MCDOT. Creative approaches to reducing traffic impacts are encouraged. The final trip reduction measures must be approved by the Planning Department and MCDOT staffs.
To ensure compliance with the contract conditions, TMAgs will be monitored at a minimum on a quarterly basis, at the applicant’s expense, by MCDOT staff or a consultant selected by the Planning Board. If the quarterly monitoring finds that the goals are not being met, the TMAg will be monitored on a monthly basis until the goals are met for three consecutive months. When the goals aren’t being met, staff and the applicant will work together to seek alternative or additional measures and monthly monitoring will take place until the trip reduction goals are met.

Non-Auto Transportation Facilities

To maintain an equivalent level of service for both auto and non-auto modes of travel, the Planning Board may permit an applicant to provide fewer roadway improvements or less traffic mitigation in exchange for providing non-auto transportation facilities that will enhance pedestrian safety or encourage non-auto mode choices.

Such facilities must be implemented to reduce the congestion levels at intersections that exceed the congestion standard and where an improvement need has been identified. Trip distribution and assignment assumptions in the LATR Traffic Study are key factors in determining local intersection impacts and the level of trip mitigation required.

Table 6 identifies trip reduction options. Any or all of these may be used for a given application. The maximum trip reduction per development is a function of the policy area congestion standard for the development site.

In determining the adequacy of improvements, the Planning Board must balance the environmental and community impacts of reducing congestion as well as the safe and efficient accommodation of pedestrians, bike riders, and bus patrons. Periodic monitoring may or may not be required of non-auto transportation facilities.

Non-auto facilities to mitigate congestion include sidewalks, bike paths, Super Shelters, bus shelters and benches, bike racks and lockers, and static or real time transit information signs, described in more detail below.

<table>
<thead>
<tr>
<th>non-automobile transportation facility</th>
<th>1,350-1,500</th>
<th>1,550-1,600</th>
<th>1,800</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 linear feet of five-foot wide sidewalk</td>
<td>0.5</td>
<td>0.75</td>
<td>1.0</td>
</tr>
<tr>
<td>100 linear feet of eight-foot wide bike path</td>
<td></td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>other non-automobile facilities</td>
<td>$12,000 per vehicle trip</td>
<td></td>
<td></td>
</tr>
<tr>
<td>maximum trip credits</td>
<td>60</td>
<td>90</td>
<td>120</td>
</tr>
</tbody>
</table>

Table 6 identifies trip reduction options. Any or all of these may be used for a given application. The maximum trip reduction per development is a function of the policy area congestion standard for the development site.

In determining the adequacy of improvements, the Planning Board must balance the environmental and community impacts of reducing congestion as well as the safe and efficient accommodation of pedestrians, bike riders, and bus patrons. Periodic monitoring may or may not be required of non-auto transportation facilities.

Non-auto facilities to mitigate congestion include sidewalks, bike paths, Super Shelters, bus shelters and benches, bike racks and lockers, and static or real time transit information signs, described in more detail below.

Sidewalks, Bike Paths, Pedestrian Refuge Islands, Accessible or Countdown Pedestrian Signals, and Curb Ramps

These features can be constructed off-site and should provide safe access from the proposed or existing development to any of the following uses:

- rail or bus transit stations or stops
- public facilities (school, library, park, post office, etc.)
- recreation centers
- retail centers that employ 20 or more persons at any time
- housing developments of 27 or more single-family detached units
- office centers that employ 100 or more persons
- existing sidewalks or bike paths
- adjacent private amenity space (sitting area, theater, community center).

Accessible pedestrian signals (for the visually-impaired), retrofitting existing traffic signals with countdown lights, and reconstructing existing substandard curb ramps (to current ADA guidelines) should be allowed as optional facilities.

These features must be within one-quarter mile of the edge of the proposed development. For transit stations or stops, the frequency of transit service must be at intervals of 20 minutes or less during the weekday morning and evening peak periods. Appropriate new bikeway segments can be found in the Countywide Bikeways Functional Master Plan, or in the applicable master or sector plan. The Plan prioritizes bikeways by activity center, for example Metro stations, CBDs, park trails, etc.
Super Shelters, Bus Shelters, and Benches
An applicant may propose to construct a Super Shelter, bus shelter, or bench, including a concrete pad. Encouraging bus use can reduce weekday peak hour vehicle trips by diverting some person-trips to buses. Two types of shelters can be provided: standard bus shelters and Super Shelters.

- The County has an agreement with Clear Channel Outdoor, Inc. (CCO) to provide a minimum of 500 standard bus shelters in the County. CCO has first choice of locations for these shelters, a number of which will carry advertising. Standard bus shelters provided under LATR must be located in areas where CCO chooses not to provide shelters. CCO must be offered right of first refusal for any new sites before shelter placement is accepted from the developer.
- Super Shelters include heating and lighting, have larger capacity, four walls (with openings to enter and exit), and a higher level of design than standard shelters. A Super Shelter is located on Rockville Pike near Marinelli Road (as part of an agreement with Target/Home Depot). They may be provided only where CCO has chosen not to provide shelters. If agreed to by MCDOT and the developer, Super Shelters should be incorporated as part of development planning and coordinated with existing and planned locations for standard shelters.

All shelters must be on a bus route, at an existing stop or a new stop approved by DTS, within one-quarter mile of the edge of the proposed development. The service frequency must be at 20 minute intervals or less during the weekday morning and evening peak periods.

Bike Racks and Lockers
An applicant may propose to reduce LATR impact by providing bike racks, lockers, or a secured bike area in a parking garage for a minimum of eight bikes, at an activity center located within a one-mile radius of the edge of the proposed development.

Transit Information Signs and Kiosks
An applicant may propose to reduce LATR impact by providing static or electronic signs and information kiosks at bus shelters, large office buildings, retail centers, transit centers, or residential complexes. The signs should communicate scheduled or real-time transit information, for example, the scheduled or estimated arrival of the next bus on a given route. The applicant must work with and obtain approval from WMATA for Metrobus routes or with the Montgomery County Division of Transit Services (DTS) for Ride On routes.

Static transit information signs may be provided only at locations other than CCO-provided standard bus shelters, since they include that information. The applicant will be required to provide for way to change static transit information as often as three times a year.

Other Non-Auto Facilities
An applicant may reduce LATR impact by providing other non-auto facilities, including but not limited to bus layover spaces, crosswalks or pedestrian bridges, on-road bicycle lanes, park-and-ride lots, park trails, transit stations, streetlights, transitways, and busways.

For these facilities, pedestrians and bicyclists should be able to safely cross any roadway to reach their destination. The applicant may provide improvements that Planning Department, MCDOT, and SHA staffs agree would increase the safety of the crossing.

Applying Trip Reduction Measures
Applicants may only apply a trip reduction measure after the total number of peak hour trips is determined using standard trip rates. Developments generating more than 30 total weekday peak hour trips will be required to complete a traffic study, which should include proposed trip reduction strategies. Applicants may be required to gather data on current bus patronage or pedestrian/bicycle activity within the local area to aid in evaluating the strategies.

Payment Instead of Construction
Where an applicant has made a good faith effort to implement an acceptable improvement and where the Board finds that a desirable improvement cannot feasibly be implemented by the applicant but that it can be implemented by a public agency within six years after the subdivision is approved, the County Council has authorized the Planning Board to accept payment to the County of a fee commensurate with the cost of the required improvement.
Transportation Policy Area Review

INTENT AND STANDARDS

Transportation Policy Area Review (TPAR) is a policy area-wide test of public transportation facilities. The test is separate from LATR in that it considers average transportation system performance for defined policy area boundaries. This process evaluates the adequacy of transit and roadways separately to allow more in-depth analysis and staging of improvements of these two types of transportation.

TPAR measures transit adequacy by evaluating neighborhood bus service using three measures of adequacy: coverage, peak headway, and span of service.

• Coverage is the percentage of the "transit-supportive area" of a policy area that is within ¼-mile of a bus stop or ½-mile of a transit station. This definition is consistent with the Transportation Research Board’s Transit Capacity and Quality of Service Manual (2nd edition, 2002) that describes a "transit-supportive area" as one with a household density of at least three units per gross acre or an employment density of at least four jobs per gross acre. Transit-supportive areas do not include land uses such as parks, farms, golf courses, bodies of water, major road rights-of-way, and low-density housing and employment zones.

• Peak headway is average time between buses traveling in the same direction during the weekday peak hour in the peak direction.

• Span of service is the average duration of weekday bus service for that subset of routes in each policy area that is scheduled to operate throughout most of the day without a split in service during the midday hours.
TPAR measures roadway adequacy, based on vehicle miles traveled (VMT) over a 10-year horizon (year 2022) by forecasting travel speed on arterial roads in peak travel directions (derived from the Planning Department’s regional travel demand model). This result is compared to uncongested, free flow speed. Roads with the most trips are weight-averaged to reflect their impact on the overall network.

The resulting ratio of forecasted speed to uncongested speed is consistent with analysis standards in the Highway Capacity Manual. It is then compared with Subdivision Staging Policy adequacy standards for Urban, Suburban, and Rural policy areas—40 percent (level of service D/E), 45 percent (mid-Level of Service D), and 50 percent (level of service C/D), respectively.

The results of the TPAR roadway adequacy analysis, by policy area, are depicted in Figure 2.

Three policy areas—Potomac, Fairland/White Oak, and Gaithersburg City—are forecast to be inadequate or approach inadequacy by 2022.
Table 7 summarizes the TPAR transportation adequacy status and transportation mitigation payment requirement for each policy area between January 1, 2013 and July 1, 2014.

<table>
<thead>
<tr>
<th>Policy area</th>
<th>Transit test</th>
<th>Roadway test</th>
<th>TPAR payment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rural areas</strong></td>
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<tr>
<td>Rural East</td>
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<td>exempt</td>
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<tr>
<td>Rural West</td>
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<td>exempt</td>
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</tr>
<tr>
<td>Damascus</td>
<td>adequate</td>
<td>adequate</td>
<td></td>
</tr>
<tr>
<td><strong>Suburban areas</strong></td>
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<td>Aspen Hill</td>
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<td>adequate</td>
<td></td>
</tr>
<tr>
<td>Clarksburg</td>
<td>inadequate</td>
<td>adequate</td>
<td>25 % of Impact Tax</td>
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<tr>
<td>Fairland/White Oak</td>
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<td>25 % of Impact Tax</td>
</tr>
<tr>
<td>Gaithersburg City</td>
<td>adequate</td>
<td>inadequate</td>
<td>25 % of Impact Tax</td>
</tr>
<tr>
<td>Germantown East</td>
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<td>Germantown West</td>
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<td>Montgomery Village/Airpark</td>
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<td>inadequate</td>
<td>adequate</td>
<td>25 % of Impact Tax</td>
</tr>
<tr>
<td><strong>Urban areas</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derwood</td>
<td>inadequate</td>
<td>adequate</td>
<td>25 % of Impact Tax</td>
</tr>
<tr>
<td>Rockville City</td>
<td>inadequate</td>
<td>adequate</td>
<td>25 % of Impact Tax</td>
</tr>
<tr>
<td>North Bethesda</td>
<td>inadequate</td>
<td>adequate</td>
<td>25 % of Impact Tax</td>
</tr>
<tr>
<td>Bethesda-Chevy Chase</td>
<td>inadequate</td>
<td>adequate</td>
<td>25 % of Impact Tax</td>
</tr>
<tr>
<td>Germantown Town Center</td>
<td>inadequate</td>
<td>adequate</td>
<td>25 % of Impact Tax</td>
</tr>
<tr>
<td>Kensington-Wheaton</td>
<td>inadequate</td>
<td>adequate</td>
<td>25 % of Impact Tax</td>
</tr>
<tr>
<td>Silver Spring-Takoma Park</td>
<td>inadequate</td>
<td>adequate</td>
<td>25 % of Impact Tax</td>
</tr>
<tr>
<td><strong>CBDs and Metro Station Policy Areas</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bethesda CBD</td>
<td>exempt</td>
<td>adequate</td>
<td></td>
</tr>
<tr>
<td>Silver Spring CBD</td>
<td>exempt</td>
<td>adequate</td>
<td></td>
</tr>
<tr>
<td>Wheaton CBD</td>
<td>exempt</td>
<td>adequate</td>
<td></td>
</tr>
<tr>
<td>Friendship Heights CBD</td>
<td>exempt</td>
<td>adequate</td>
<td></td>
</tr>
<tr>
<td>Glenmont MSPA</td>
<td>exempt</td>
<td>adequate</td>
<td></td>
</tr>
<tr>
<td>Grosvenor MSPA</td>
<td>exempt</td>
<td>adequate</td>
<td></td>
</tr>
<tr>
<td>Rockville Town Center MSPA</td>
<td>exempt</td>
<td>adequate</td>
<td></td>
</tr>
<tr>
<td>Shady Grove MSPA</td>
<td>exempt</td>
<td>adequate</td>
<td></td>
</tr>
<tr>
<td>Twinbrook MSPA</td>
<td>exempt</td>
<td>adequate</td>
<td></td>
</tr>
<tr>
<td>White Flint MSPA</td>
<td>exempt</td>
<td>exempt</td>
<td></td>
</tr>
</tbody>
</table>
EVALUATING A TPAR CONDITION

Staff will evaluate the following information submitted by the applicant, using the TPAR adequacy standards in the relevant policy area.

- The development’s policy area.
- The type of development as defined in the development impact legislation.

TPAR MITIGATION OPTIONS

If projected transportation capacity in a policy area is not adequate, the Planning Board may approve a subdivision in that area if the applicant commits to either:

- fully mitigate the incremental traffic impact of the subdivision by adding capacity or implementing a trip reduction program
- pay a Transportation Mitigation Payment as provided in County law.

The Transportation Mitigation Payment is charged to developments in policy areas determined as inadequate for transit or roadway conditions based on the analysis prepared every two years by Planning Department staff and approved by the Planning Board. It is calculated as an amount equal to a percentage of the General District Transportation Impact Tax based on the type and amount of development. Table 7 shows which Policy Areas are required to pay the Transportation Mitigation Payment. The General District Transportation Tax rate for different types of development is updated by County Council and can be found at:
http://permittingservices.montgomerycountymd.gov/DPS/fee/ImpactTaxes.aspx

The TPAR payment must be made prior to release of any building permit and may not be credited toward the applicable development impact tax. The funds are used to make transportation improvements that will bring a policy area into roadway and transit adequacy.

- No TPAR compliance is necessary if the Planning Board finds that the proposed development will generate three or fewer new peak hour trips, or if the proposed development is in a policy area adequate for both transit and roadways.
- Developments in MSPAs are exempt from Transportation Mitigation Payments.
- TPAR compliance is necessary in policy areas found inadequate. Payment rates for roadways and transit are to equal 25 percent of the General District Transportation Impact tax for the same project based on the type and amount of development. In areas inadequate for both roadways and transit, payment rates are set to equal 50 percent of the General District Transportation Impact Tax for the same project based on the type and amount of development.

It is possible to provide significant improvements to transit and/or roadway capacity instead of making the payment.

To fully mitigate the subdivision’s incremental traffic impact (by adding capacity or implementing a trip reduction program), added capacity must improve congestion in the affected policy area by addressing roadway inadequacies or transit inadequacies. Transit improvements can be used to address either roadway or transit inadequacies if they can be shown to improve roadway capacity. See Appendix 6 for preferred roadway improvements.

Roadway improvements must:

- Improve transportation capacity in the same policy area as the development project
- have logical end points and connect at least two signalized intersections
- be approved by MCDOT for operation and safety considerations.

Transit improvements to improve capacity under TPAR may only consist of the purchase of new Ride On buses to provide improved transit service in the relevant policy area if that policy area is inadequate for peak headway or coverage. The number of buses required to achieve mitigation will be determined in consultation with Planning Department and MCDOT staffs. If the relevant policy area is inadequate for span of service, the TPAR payment is the only option.
The cost of the transportation capacity improvement must be equal to or exceed the value of the TPAR payment and the expenditure is not creditable for future use under the transportation impact tax (that is, the TPAR payment and the impact tax are additive). In general, any mitigation measure or combination of mitigation measures must be scheduled for completion or be operating before or at the same time the proposed development is scheduled to be completed. The nature, design, and scale of any additional facility or program must receive approval from any government agency that would construct or maintain it and the applicant and public agency must execute an appropriate agreement before the Planning Board approves a record plat.
## APPENDIX 1  LATR Weekday Peak Hour Trip Generation Formulas and Rates

### Table 1-1: General Office

<table>
<thead>
<tr>
<th>Applicable Size</th>
<th>Formula/Rate</th>
<th>Directional Distribution</th>
</tr>
</thead>
</table>
| Under 25,000 sf GFA | AM: T = 1.38(A)  
PM: T = 2.24(A) | AM: Enter  
PM: Enter |
| 25,000 sf GFA and over | AM: T = 1.70(A) - 8  
PM: T = 1.44(A) + 20 | 87%  
13%  |
| Over 300,000 sf GFA with special characteristics (See Table B-1) | AM: T = 1.70(A) + 115  
PM: T = 1.44(A) + 127 | 17%  
83%  |
| Within 1,000-foot radius of Metrorail station and outside the Beltway (D) | AM: Deduct P = 50% total trips from “T”  
PM: Deduct P = 4 \((1000-D)/100\) from “T” |

T = weekday peak-hour vehicle trips  
A = gross floor area (GFA) of building in 1,000 sf  
P = percentage reduction in trips (P/100)  
D = straight line distance (in feet) from the main entrance to station

### Table 1-2: General Retail

<table>
<thead>
<tr>
<th>Applicable Size</th>
<th>Formula/Rate*</th>
<th>Directional Distribution</th>
</tr>
</thead>
</table>
| All sizes except convenience retail | AM: Use 25% of the weekday evening peak-hour trips | AM: Enter  
PM: Enter |
| Under 50,000 sf GLA | PM: T = 12.36(A) | 52%  
48%  |
| From 50,000 sf up to 200,000 sf GLA | PM: T = 7.43(A) + 247 | 52%  
48%  |
| Over 200,000 sf GLA | Special analysis required by applicant or use two times applicable ITE rate | |
| Convenience retail not part of a shopping center or groups of stores | AM and PM: Use applicable ITE formula/rate | |

T = weekday peak-hour vehicle trips  
A = gross leasable area (GLA) of building in 1,000 sf  
P = 0.05 + 0.002 \((200-A)\)

### Table 1-3: Fast Food Restaurants

<table>
<thead>
<tr>
<th>Weekday peak-hour trip-generation rates of fast food restaurants vary based on their type of menu selection (e.g., hamburgers vs. tacos vs. chicken) and their location relative to traffic volume on the adjacent roadway.</th>
<th>Formula/Rate</th>
<th>Directional Distribution</th>
</tr>
</thead>
</table>
| Develop trip-generation rates based on driveway counts from existing similar fast food restaurants at similar locations (e.g., McDonald’s Restaurant on major highways) if data are available or can be obtained from previous studies.  
Otherwise, use ITE trip-generation data. | AM | PM |
| Enter  | Exit | Enter  | Exit |
| 53%  | 47%  | 53%  | 47%  |
### Table 1-4: Residential

<table>
<thead>
<tr>
<th>Applicable Size</th>
<th>Formula/Rate</th>
<th>Directional Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single-Family Detached</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 75 units</td>
<td>AM: ( T = 0.95 ) ( U )</td>
<td>25% 75% 64% 36%</td>
</tr>
<tr>
<td></td>
<td>PM: ( T = 1.11 ) ( U )</td>
<td></td>
</tr>
<tr>
<td>75 units or over</td>
<td>AM: ( T = 0.62 ) ( U ) + 25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM: ( T = 0.82 ) ( U ) + 21</td>
<td></td>
</tr>
<tr>
<td><strong>Townhouses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 100 units</td>
<td>AM: ( T = 0.48 ) ( U )</td>
<td>17% 83% 67% 33%</td>
</tr>
<tr>
<td></td>
<td>PM: ( T = 0.83 ) ( U )</td>
<td></td>
</tr>
<tr>
<td>100 units and over</td>
<td>AM: ( T = 0.53 ) ( U ) – 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM: ( T = 0.48 ) ( U ) + 35</td>
<td></td>
</tr>
<tr>
<td><strong>Garden and Low-Rise Apartments</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 75 units</td>
<td>AM: ( T = 0.44 ) ( U )</td>
<td>20% 80% 66% 34%</td>
</tr>
<tr>
<td></td>
<td>PM: ( T = 0.48 ) ( U )</td>
<td></td>
</tr>
<tr>
<td>75 units and over</td>
<td>AM: ( T = 0.40 ) ( U ) + 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM: ( T = 0.47 ) ( U ) + 1</td>
<td></td>
</tr>
<tr>
<td><strong>High-Rise Apartments</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 100 units</td>
<td>AM: ( T = 0.40 ) ( U )</td>
<td>25% 75% 61% 39%</td>
</tr>
<tr>
<td></td>
<td>PM: ( T = 0.46 ) ( U )</td>
<td></td>
</tr>
<tr>
<td>100 units and over</td>
<td>AM: ( T = 0.29 ) ( U ) + 11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM: ( T = 0.34 ) ( U ) + 12</td>
<td></td>
</tr>
</tbody>
</table>

\( T \) = weekday peak-hour vehicle trips  \( U \) = housing units

Note: For residential units in the Bethesda, Friendship Heights, and Silver Spring CBD Policy Areas, use Appendix 3. For residential units in all other Metro Station Policy Areas, the number of trips in Table 1-4 may be reduced by 18 percent.

### Table 1-5: Private School (Weekday Morning Peak Period)

<table>
<thead>
<tr>
<th>Applicable Size</th>
<th>Formula/Rate</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-8</td>
<td>AM: ( T = N \times 0.92 )</td>
<td>For the weekday morning peak period, a special study is required to determine the trip-generation rate for private schools with over 400 students.</td>
</tr>
<tr>
<td>K-12</td>
<td>AM: ( T = N \times 0.78 )</td>
<td>For the evening peak period, the applicant may be required to provide more data on site-generated traffic if it is anticipated that there will be major school-sponsored events during the evening peak period that would generate 50 or more weekday peak-hour trips.</td>
</tr>
<tr>
<td>Private schools predominately grades 10-12</td>
<td>Use the rates in the Institute of Transportation Engineer’s Trip Generation Report for high schools (Land Use Code 530)</td>
<td>Trip-generation formulas or rates for private schools were developed based on the number of students during only the weekday morning peak period. Since classes for private schools end before the weekday evening peak period, a trip-generation rate during the weekday evening peak period was not developed.</td>
</tr>
</tbody>
</table>

### Directional Distribution

<table>
<thead>
<tr>
<th>Grade</th>
<th>New</th>
<th>Pass-by</th>
<th>Diverted</th>
<th>Enter</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-8</td>
<td>53%</td>
<td>15%</td>
<td>32%</td>
<td>54%</td>
<td>46%</td>
</tr>
<tr>
<td>K-12</td>
<td>65%</td>
<td>6%</td>
<td>29%</td>
<td>59%</td>
<td>41%</td>
</tr>
</tbody>
</table>

\( T \) = weekday peak-hour vehicle trips  \( N \) = number of students
### Table 1-6: Automobile Filling Station

<table>
<thead>
<tr>
<th>Applicable Size</th>
<th>Formula/Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Rates per Pumping Station(^1):</td>
<td>AM</td>
</tr>
<tr>
<td>Station with fuel sales and:</td>
<td>Upcounty(^2)</td>
</tr>
<tr>
<td>1) no other facilities</td>
<td>11.31</td>
</tr>
<tr>
<td>2) garage</td>
<td>11.00</td>
</tr>
<tr>
<td>3) convenience store(^3)</td>
<td>12.28</td>
</tr>
<tr>
<td>4) car wash and convenience store</td>
<td>17.33</td>
</tr>
</tbody>
</table>

\(^1\) A pumping station is defined as the area at which any one vehicle can stop and pump fuel at any one time. A pumping station could also be referred to as a fueling position in front of a single nozzle dispenser or a multi-produce dispenser.

\(^2\) Downcounty locations are considered the urbanized areas with a congestion standard of 1,500 or higher (see Table 1). All other locations are considered up-County.

\(^3\) Note: A convenience store as an accessory use to an automobile filling station must have less than 1,650 square feet of patron area. Otherwise, such land uses are considered to be a “convenience store with gasoline pumps” with trip-generation rates in the ITE Trip Generation Report under Land Use Code 853.

### Table 1-7: Senior/Elderly Housing

<table>
<thead>
<tr>
<th>Type of Facility</th>
<th>Formula/Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retirement Community with active seniors and minimal support services</td>
<td>Use ITE Land Use Code 250</td>
</tr>
<tr>
<td>Independent-Living Facilities with some support services plus minimal assisted-living and nursing home facilities</td>
<td>Formula</td>
</tr>
<tr>
<td>Up to 150 units: AM: (T = 0.05 (U)) PM: (T = 0.04 (U))</td>
<td></td>
</tr>
<tr>
<td>Over 150(^*) units: AM: (T = 0.08 (U)) PM: (T = 0.11 (U))</td>
<td></td>
</tr>
<tr>
<td>Assisted-Living Facilities</td>
<td>AM: (T = 0.03 (U)) PM: (T = 0.06 (U))</td>
</tr>
<tr>
<td>Nursing Homes</td>
<td>As a land use requiring a special exception, site-generated traffic can be determined based on the statement of operations rather than using ITE’s trip-generation data. Except for the administrative staff, employees usually arrive before the weekday morning peak period to prepare and serve breakfast. They usually stay through the weekday evening peak period to prepare and serve dinner.</td>
</tr>
</tbody>
</table>

\(^*\) Usually large facilities with different levels of support services; may be considered “life cycle” care.
### Table 1-8: Mini-Warehouse

<table>
<thead>
<tr>
<th>Type of Facility</th>
<th>Formula/Rate</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Site Vehicle Rental</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>AM: $T = 0.01 ,(N)$ PM: $T = 0.01 ,(N)$</td>
<td>Based on ITE Land Use Code 151 supplemented with more current local data</td>
</tr>
<tr>
<td>Yes</td>
<td>AM: $T = 0.015 ,(N)$ PM: $T = 0.02 ,(N)$</td>
<td></td>
</tr>
</tbody>
</table>

$T = \text{weekday peak-hour vehicle trips}$  $N = \text{number of storage units}$

### Table 1-9: Child Daycare Center

<table>
<thead>
<tr>
<th>Type of Facility</th>
<th>Formula/Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>For 6 to 25 staff</td>
<td>AM: $T = 1.75N + 17$ PM: $T = 2.06N + 16$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trip Purpose Directional Distribution</th>
<th>AM Enter</th>
<th>AM Exit</th>
<th>PM Enter</th>
<th>PM Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Period</td>
<td>New</td>
<td>Pass-by</td>
<td>Diverted</td>
<td></td>
</tr>
<tr>
<td>AM</td>
<td>32%</td>
<td>27%</td>
<td>41%</td>
<td>53%</td>
</tr>
<tr>
<td>PM</td>
<td>27%</td>
<td>12%</td>
<td>61%</td>
<td>49%</td>
</tr>
</tbody>
</table>

$T = \text{weekday peak-hour vehicle trips}$  $N = \text{number of storage units}$
## Appendix 2

### LATR Weekday Peak Hour Trip Generated by Land Uses

#### Table 2-1: Number of Weekday Peak Hour Trips Generated by General Office

<table>
<thead>
<tr>
<th>Bldg Size (SF of GFA)</th>
<th>Weekday Peak-Hour Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
</tr>
<tr>
<td>5,000</td>
<td>7</td>
</tr>
<tr>
<td>10,000</td>
<td>14</td>
</tr>
<tr>
<td>15,000</td>
<td>21</td>
</tr>
<tr>
<td>20,000</td>
<td>28</td>
</tr>
<tr>
<td>25,000</td>
<td>35</td>
</tr>
<tr>
<td>30,000</td>
<td>43</td>
</tr>
<tr>
<td>40,000</td>
<td>60</td>
</tr>
<tr>
<td>50,000</td>
<td>77</td>
</tr>
<tr>
<td>60,000</td>
<td>94</td>
</tr>
<tr>
<td>70,000</td>
<td>111</td>
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<tr>
<td>80,000</td>
<td>128</td>
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<td>90,000</td>
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<td>100,000</td>
<td>162</td>
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<td>110,000</td>
<td>179</td>
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<td>120,000</td>
<td>196</td>
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<tr>
<td>130,000</td>
<td>213</td>
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<tr>
<td>140,000</td>
<td>230</td>
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<tr>
<td>150,000</td>
<td>247</td>
</tr>
<tr>
<td>160,000</td>
<td>264</td>
</tr>
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<td>170,000</td>
<td>281</td>
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<tr>
<td>180,000</td>
<td>298</td>
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<td>190,000</td>
<td>315</td>
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<tr>
<td>200,000</td>
<td>332</td>
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<tr>
<td>220,000</td>
<td>366</td>
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<tr>
<td>240,000</td>
<td>400</td>
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<tr>
<td>260,000</td>
<td>434</td>
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<tr>
<td>280,000</td>
<td>468</td>
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<tr>
<td>300,000</td>
<td>502</td>
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<tr>
<td>320,000</td>
<td>536</td>
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<tr>
<td>340,000</td>
<td>570</td>
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<td>360,000</td>
<td>604</td>
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<tr>
<td>380,000</td>
<td>638</td>
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<tr>
<td>400,000</td>
<td>672</td>
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<tr>
<td>420,000</td>
<td>706</td>
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<tr>
<td>440,000</td>
<td>740</td>
</tr>
<tr>
<td>460,000</td>
<td>774</td>
</tr>
<tr>
<td>480,000</td>
<td>808</td>
</tr>
<tr>
<td>500,000</td>
<td>842</td>
</tr>
</tbody>
</table>

### Equations Used

AM peak-hour trips = \(1.38(GFA/1000)\)
PM peak-hour trips = \(2.24(GFA/1000)\)

For buildings 25,000 sf and over:

AM peak-hour trips = \(1.70(GFA/1000) - 8\)
PM peak-hour trips = \(1.44(GFA/1000) + 20\)

#### Special Cases

If a building is within 1,000 feet of a Metrorail station and outside the Beltway, reduce weekday peak-hour trips from chart at left.

<table>
<thead>
<tr>
<th>Straight Line Distance to Station (in feet)</th>
<th>Percent Reduction in Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>50% 40%</td>
</tr>
<tr>
<td>50</td>
<td>50% 38%</td>
</tr>
<tr>
<td>100</td>
<td>50% 36%</td>
</tr>
<tr>
<td>150</td>
<td>50% 34%</td>
</tr>
<tr>
<td>200</td>
<td>50% 32%</td>
</tr>
<tr>
<td>250</td>
<td>50% 30%</td>
</tr>
<tr>
<td>300</td>
<td>50% 28%</td>
</tr>
<tr>
<td>350</td>
<td>50% 26%</td>
</tr>
<tr>
<td>400</td>
<td>50% 24%</td>
</tr>
<tr>
<td>450</td>
<td>50% 22%</td>
</tr>
<tr>
<td>500</td>
<td>50% 20%</td>
</tr>
<tr>
<td>550</td>
<td>50% 18%</td>
</tr>
<tr>
<td>600</td>
<td>50% 16%</td>
</tr>
<tr>
<td>650</td>
<td>50% 14%</td>
</tr>
<tr>
<td>700</td>
<td>50% 12%</td>
</tr>
<tr>
<td>750</td>
<td>50% 10%</td>
</tr>
<tr>
<td>800</td>
<td>50%  8%</td>
</tr>
<tr>
<td>850</td>
<td>50%  6%</td>
</tr>
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<td>50%  2%</td>
</tr>
<tr>
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<td>50%  0%</td>
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</table>

### Equations Used

AM peak-hour trips = \(1.70(GFA/1000) + 115\)
PM peak-hour trips = \(1.44(GFA/1000) + 127\)

Note: Trip generation rates are calculated using the size of individual buildings, not the combined size of a group.
### With Major Food Chain Store

<table>
<thead>
<tr>
<th>Bldg Size (SF of GFA)</th>
<th>AM</th>
<th>PM</th>
</tr>
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### Without Major Food Chain Store

<table>
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</table>

**Equations Used**

**50,000 to 200,000 sf**

- AM peak-hour trips = 0.25 \([7.43 \text{ (GLA/1000)} + 247]\)
- PM peak-hour trips = \([7.43 \text{ (GLA/1000)} + 247]\)

**Adjustment Factor for No Major Food Chain Store**

- \(P = 0.05 + 0.002 \left[200 - \left(\frac{\text{GLA}}{1000}\right)\right]\)

**Note:** Under 50,000 sf, no equations, since major food chain store is typically at least 50,000 sf
Table 2-3: Number of Weekday Peak Hour Trips Generated by Residential Units

<table>
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<tr>
<th>No. of Units</th>
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<th>Garden Apartment</th>
<th>High-Rise Apartments</th>
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<td>PM</td>
<td>AM</td>
<td>PM</td>
</tr>
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<td>1</td>
<td>1</td>
<td>0</td>
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<td>5</td>
<td>6</td>
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<td>11</td>
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<tr>
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<td>513</td>
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</tbody>
</table>

Equations Used

**SINGLE-FAMILY DETACHED**

**Under 75 Units**

AM peak-hour trips = 0.95(# of units)
PM peak-hour trips = 1.11(# of units)

**75 Units and Over**

AM peak-hour trips = 0.62(# of units) + 25
PM peak-hour trips = 0.82(# of units) + 21

**TOWNHOUSES OR SINGLE-FAMILY ATTACHED**

**Under 100 Units**

AM peak-hour trips = 0.48(# of units)
PM peak-hour trips = 0.83(# of units)

**100 Units and Over**

AM peak-hour trips = 0.53(# of units) - 5
PM peak-hour trips = 0.48(# of units) + 35

**GARDEN AND LOW-RISE APARTMENTS**

**Under 75 Units**

AM peak-hour trips = 0.44(# of units)
PM peak-hour trips = 0.48(# of units)

**75 Units and Over**

AM peak-hour trips = 0.40(# of units) + 3
PM peak-hour trips = 0.47(# of units) + 1

**HIGH-RISE APARTMENTS**

**Under 100 Units**

AM peak-hour trips = 0.40(# of units)
PM peak-hour trips = 0.46(# of units)

**100 Units and Over**

AM peak-hour trips = 0.29(# of units) + 11
PM peak-hour trips = 0.34(# of units) + 12

---

Note: For residential units in the Bethesda, Friendship Heights, and Silver Spring CBD Policy Areas, use Appendix 3. For residential units in all other Metro Station Policy Areas, the number of trips in Table 2-3 may be reduced by 18 percent.
## Table 2-4: Number of Weekday Peak Hour Trips Generated by a Child Daycare Center

<table>
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<th>Number of Staff</th>
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### Directional Distribution

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<th>Pass-by</th>
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<td>PM</td>
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<td>51%</td>
<td>27%</td>
<td>12%</td>
<td>61%</td>
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</table>

Note: For six or fewer staff, there is no need for a traffic study to satisfy LATR. The applicant may proffer a specific schedule of the arrival and departure of those staff arriving during weekday peak periods specified in the special exception statement of operation.

## Table 2-5: Number of Weekday Peak Hour Trips Generated by a Private School

<table>
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<th>Number of Students Enrolled</th>
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<td>375</td>
<td>293</td>
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<tr>
<td>400</td>
<td>312</td>
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</table>

Note: For over 400 students, a special study is required to determine the trip-generation rate.
Table 2-6: Number of Weekday Peak Hour Trips Generated by an Automobile Filling Station

<table>
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<tr>
<th>No. of Pumping Stations</th>
<th>With Fuel Only AM</th>
<th>With Fuel Only PM</th>
<th>With Fuel and Garage Only AM</th>
<th>With Fuel and Garage Only PM</th>
<th>With Fuel and Convenience Store Only AM</th>
<th>With Fuel and Convenience Store Only PM</th>
<th>With Fuel, Car Washes, and Convenience Store AM</th>
<th>With Fuel, Car Washes, and Convenience Store PM</th>
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<tbody>
<tr>
<td></td>
<td>All Areas AM</td>
<td>All Areas PM</td>
<td>Upcounty AM</td>
<td>Upcounty PM</td>
<td>Downcounty AM</td>
<td>Downcounty PM</td>
<td>Upcounty AM</td>
<td>Upcounty PM</td>
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<td>435</td>
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<tr>
<td>Rate per Pumping Station</td>
<td></td>
<td>11.31</td>
<td>14.96</td>
<td>11.00</td>
<td>12.28</td>
<td>21.75</td>
<td>12.28</td>
<td>17.33</td>
</tr>
</tbody>
</table>

LATR/TPAR Guidelines
### Table 3-1: Weekday Morning and Evening Peak-Hour Trip Generation Rates for the Bethesda and Friendship Heights CBDs

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Rate AM Peak-Hour Vehicle Trips per Unit of Development (% In % Out)</th>
<th>Rate PM Peak-Hour Vehicle Trips per Unit of Development (% In % Out)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office (1,000 sf)</td>
<td>1.50* 85 15</td>
<td>1.50 25 75</td>
</tr>
<tr>
<td>Retail (1,000 sf)</td>
<td>0.65 50 50</td>
<td>2.60 50 50</td>
</tr>
<tr>
<td>Grocery Store (1,000 sf)</td>
<td>1.22 70 30</td>
<td>6.20 50 50</td>
</tr>
<tr>
<td>Residential High Rise (dwelling unit)</td>
<td>0.30 20 80</td>
<td>0.30 67 33</td>
</tr>
<tr>
<td>Residential Garden Apt. (dwelling unit)</td>
<td>0.45 20 80</td>
<td>0.45 67 33</td>
</tr>
<tr>
<td>Residential Townhouse (dwelling unit)</td>
<td>0.45 20 80</td>
<td>0.45 67 33</td>
</tr>
<tr>
<td>Residential Single-Family (dwelling unit)</td>
<td>0.80 25 75</td>
<td>0.80 67 33</td>
</tr>
<tr>
<td>Hotel (room)</td>
<td>0.22 60 40</td>
<td>0.22 55 45</td>
</tr>
<tr>
<td>Miscellaneous Service (1,000 sf)</td>
<td>1.30 50 50</td>
<td>1.30 50 50</td>
</tr>
<tr>
<td>Hospital (employee)</td>
<td>0.33 70 30</td>
<td>0.29 30 70</td>
</tr>
<tr>
<td>Industrial (1,000 sf)</td>
<td>1.10 85 15</td>
<td>1.10 15 85</td>
</tr>
</tbody>
</table>

*Information in Table 1-4 and 2-3 as annotated may be used in lieu of the residential trip generation rates in Appendix 3.
*MAY use the lower Countywide rate of 1.38*(gross square fet of building in 1,000 sf)

### Table 3-2: Weekday Morning and Evening Peak Hour Trip Generation Rates for the Silver Spring CB

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Rate</th>
<th>Morning % In % Out</th>
<th>Evening % In % Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office (existing vacant/1,000 sf)</td>
<td>1.60*</td>
<td>85 15</td>
<td>1.60 15 85</td>
</tr>
<tr>
<td>Office (pending + future/1,000 sf)</td>
<td>1.40</td>
<td>85 15</td>
<td>1.40 15 85</td>
</tr>
<tr>
<td>Industrial (1,000 sf)</td>
<td>1.00</td>
<td>85 15</td>
<td>1.00 15 85</td>
</tr>
<tr>
<td>Retail (1,000 sf)</td>
<td>0.50</td>
<td>50 50</td>
<td>2.00 50 50</td>
</tr>
<tr>
<td>Residential (high rise)</td>
<td>0.30</td>
<td>20 80</td>
<td>0.30 70 30</td>
</tr>
<tr>
<td>Residential (townhouse)</td>
<td>0.45</td>
<td>20 80</td>
<td>0.45 67 33</td>
</tr>
<tr>
<td>Hotel (room)</td>
<td>0.20</td>
<td>60 40</td>
<td>0.20 55 45</td>
</tr>
</tbody>
</table>
APPENDIX 4 Trip Distribution and Traffic Assignment Guidelines

Introduction
This document provides trip distribution guidance to be used in all traffic studies prepared for development sites in Montgomery County. Vehicle trip distribution and trip assignment are described in Sections VII-D and VII-F of the Guidelines. For most development sites, the process is a combination of trip distribution and traffic assignment.

Definitions
Trip distribution specifies the location where trips that originate at a development site are destined to, and the origin of trips that are destined to a development site.

Traffic assignment specifies the individual local area intersections used to access (enter and leave) a development site.

Discussion
The tables in this appendix provide generalized assumptions for trip distribution for both background development(s) and the development site. For the purpose of reviewing trip distribution, Transportation Planning staff divided the region into 16 geographic areas, called super districts. Eleven of these super districts are in Montgomery County, as shown in Map 4-1. The remaining five super districts represent neighboring jurisdictions.

The trip distribution assumptions are contained in Tables 4-1 through 4-11 for developments within each of the eleven super districts in Montgomery County. For each super district, the assumed distribution of trips for general office development and for residential development is listed. For instance, 18.1 percent of trips generated by a general office development in Germantown (see Table 4-9) would be expected to travel to or from Frederick County. However, only two percent of trips generated by a residential development in Germantown would be expected to travel to or from Frederick County.

The trip distribution assumptions in these tables are based on 1990 census journey-to-work information, updated to reflect regional housing and employment totals as of 1998. The distribution for residential development in each super district is based on the reported workplace locations for 1990 census respondents who lived in that super district. Similarly, the distribution for office development for each super district is based on the distribution of all census households nationwide that reported a workplace in that super district. Trip distribution for other land uses will be decided based on consultation with staff and the applicant prior to submission of the traffic study.

The application of the trip distribution information in Tables 4-1 through 4-11 is straightforward in cases where a traffic study has a limited number of alternate routes. In other cases, judgment is required to convert the trip distribution information into traffic assignment information useful for conducting the Local Area Transportation Review.

Figure 4-2 provides an example of how the trip distribution information can be converted to traffic assignment information for a hypothetical case in the Rockville/North Bethesda super district with both office and residential components.

The leftmost column of data shows the trip distribution by super-district as found in Table 4-4 (used for development in the Rockville/North Bethesda super district). The information located in the center of the table (inside the boxes) describes the assumed route, or assignment, taken for trips between the site and each super-district. The data inside the boxes must be developed using judgment and confirmed by Transportation Planning staff. The rightmost portion of the table multiplies the percent of trips distributed to each super-district by the percent of trips from that super-district assigned to each route to calculate the percent of total site-generated trips using each combination of distribution and assignment. The assignment data is then summed to develop an aggregate trip assignment for the trips generated by the office and residential components of the site, respectively.
Map 4-1: Super Districts in Montgomery County
Table 4-1: Trip Distribution - Assignment Matrix
Hypothetical Case in North Bethesda with both Office and Residential Components

### Part 1 - Office Component

<table>
<thead>
<tr>
<th>Trip distribution by super district</th>
<th>Trip assignment for origin by super-district</th>
<th>Trip assignment for development case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montrose west</td>
<td>MD 355 north</td>
<td>Randolph east</td>
</tr>
<tr>
<td>Bethesda</td>
<td>3.5%</td>
<td></td>
</tr>
<tr>
<td>Silver Spring</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Potomas</td>
<td>8.0</td>
<td>80%</td>
</tr>
<tr>
<td>Rockville</td>
<td>12.8</td>
<td>25%</td>
</tr>
<tr>
<td>Kensington</td>
<td>7.2</td>
<td>80%</td>
</tr>
<tr>
<td>Fairland</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td>Gaithersburg</td>
<td>14.4</td>
<td>75%</td>
</tr>
<tr>
<td>Olney</td>
<td>8.5</td>
<td>20%</td>
</tr>
<tr>
<td>Germantown</td>
<td>6.5</td>
<td>90%</td>
</tr>
<tr>
<td>Agricultural Area (West)</td>
<td>0.9</td>
<td>100%</td>
</tr>
<tr>
<td>Agricultural Area (East)</td>
<td>4.2</td>
<td>40%</td>
</tr>
<tr>
<td>Washington, DC</td>
<td>3.6</td>
<td>70%</td>
</tr>
<tr>
<td>Prince George’s County</td>
<td>8.8</td>
<td></td>
</tr>
<tr>
<td>Virginia</td>
<td>7.8</td>
<td>80%</td>
</tr>
<tr>
<td>Frederick County</td>
<td>4.6</td>
<td>100%</td>
</tr>
<tr>
<td>Howard County</td>
<td>2.9</td>
<td>10%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

**USE > 44% 20% 14% 18% 4% 100%**

### Part 2 - Residential Component

<table>
<thead>
<tr>
<th>Trip distribution by super district</th>
<th>Trip assignment for origin by super-district</th>
<th>Trip assignment for development case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montrose west</td>
<td>MD 355 north</td>
<td>Randolph east</td>
</tr>
<tr>
<td>Bethesda</td>
<td>15.6%</td>
<td></td>
</tr>
<tr>
<td>Silver Spring</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>Potomas</td>
<td>3.3</td>
<td>80%</td>
</tr>
<tr>
<td>Rockville</td>
<td>31.0</td>
<td>25%</td>
</tr>
<tr>
<td>Kensington</td>
<td>2.6</td>
<td>80%</td>
</tr>
<tr>
<td>Fairland</td>
<td>0.7</td>
<td>80%</td>
</tr>
<tr>
<td>Gaithersburg</td>
<td>10.6</td>
<td>75%</td>
</tr>
<tr>
<td>Olney</td>
<td>1.7</td>
<td>20%</td>
</tr>
<tr>
<td>Germantown</td>
<td>1.0</td>
<td>90%</td>
</tr>
<tr>
<td>Agricultural Area (West)</td>
<td>0.0</td>
<td>100%</td>
</tr>
<tr>
<td>Agricultural Area (East)</td>
<td>0.2</td>
<td>40%</td>
</tr>
<tr>
<td>Washington, DC</td>
<td>13.9</td>
<td>70%</td>
</tr>
<tr>
<td>Prince George’s County</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td>Virginia</td>
<td>9.7</td>
<td>80%</td>
</tr>
<tr>
<td>Frederick County</td>
<td>0.5</td>
<td>100%</td>
</tr>
<tr>
<td>Howard County</td>
<td>0.7</td>
<td>10%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

**USE > 38% 27% 4% 22% 9% 100%**
Table 4-2: Trip Distribution Report in Super District 1: Bethesda/Chevy Chase
Auto-Driver Trip Distribution for Development in Super District 1: Bethesda/Chevy Chase

<table>
<thead>
<tr>
<th>Trip Distribution to Super District for</th>
<th>Office Development</th>
<th>Residential Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bethesda/Chevy Chase</td>
<td>11.7%</td>
<td>22.8%</td>
</tr>
<tr>
<td>2. Silver Spring/Takoma Park</td>
<td>3.8%</td>
<td>2.1%</td>
</tr>
<tr>
<td>3. Potomac/Darnestown/Travilah</td>
<td>7.3%</td>
<td>1.8%</td>
</tr>
<tr>
<td>4. Rockville/North Bethesda</td>
<td>9.4%</td>
<td>9.8%</td>
</tr>
<tr>
<td>5. Kensington/Wheaton</td>
<td>8.7%</td>
<td>1.6%</td>
</tr>
<tr>
<td>6. White Oak/Fairland/Cloverly</td>
<td>4.3%</td>
<td>0.7%</td>
</tr>
<tr>
<td>7. Gaithersburg/Shady Grove</td>
<td>7.5%</td>
<td>4.0%</td>
</tr>
<tr>
<td>8. Aspen Hill/Olney</td>
<td>5.1%</td>
<td>0.4%</td>
</tr>
<tr>
<td>9. Germantown/Clarksburg</td>
<td>3.3%</td>
<td>0.2%</td>
</tr>
<tr>
<td>10. Rural: West of I-270</td>
<td>0.6%</td>
<td>0.0%</td>
</tr>
<tr>
<td>11. Rural: East of I-270</td>
<td>2.0%</td>
<td>0.15%</td>
</tr>
<tr>
<td>12. Washington, DC</td>
<td>7.4%</td>
<td>39.5%</td>
</tr>
<tr>
<td>13. Prince George’s County</td>
<td>12.4%</td>
<td>4.6%</td>
</tr>
<tr>
<td>14. Virginia</td>
<td>12.2%</td>
<td>11.7%</td>
</tr>
<tr>
<td>15. Frederick County</td>
<td>2.1%</td>
<td>0.2%</td>
</tr>
<tr>
<td>16. Howard County</td>
<td>2.2%</td>
<td>0.5%</td>
</tr>
</tbody>
</table>

Table 4-3: Trip Distribution Report in Super District 2: Silver Spring/Takoma Park
Auto-Driver Trip Distribution for Development in Super District 2: Silver Spring/Takoma Park

<table>
<thead>
<tr>
<th>Trip Distribution to Super District for</th>
<th>Office Development</th>
<th>Residential Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bethesda/Chevy Chase</td>
<td>2.2%</td>
<td>9.1%</td>
</tr>
<tr>
<td>2. Silver Spring/Takoma Park</td>
<td>11.5%</td>
<td>13.3%</td>
</tr>
<tr>
<td>3. Potomac/Darnestown/Travilah</td>
<td>2.2%</td>
<td>0.9%</td>
</tr>
<tr>
<td>4. Rockville/North Bethesda</td>
<td>3.0%</td>
<td>7.7%</td>
</tr>
<tr>
<td>5. Kensington/Wheaton</td>
<td>10.0%</td>
<td>4.6%</td>
</tr>
<tr>
<td>6. White Oak/Fairland/Cloverly</td>
<td>11.9%</td>
<td>2.7%</td>
</tr>
<tr>
<td>7. Gaithersburg/Shady Grove</td>
<td>3.9%</td>
<td>4.2%</td>
</tr>
<tr>
<td>8. Aspen Hill/Olney</td>
<td>6.3%</td>
<td>0.8%</td>
</tr>
<tr>
<td>9. Germantown/Clarksburg</td>
<td>1.3%</td>
<td>0.6%</td>
</tr>
<tr>
<td>10. Rural: West of I-270</td>
<td>0.1%</td>
<td>0.6%</td>
</tr>
<tr>
<td>11. Rural: East of I-270</td>
<td>2.8%</td>
<td>0.2%</td>
</tr>
<tr>
<td>12. Washington, DC</td>
<td>7.2%</td>
<td>32.5%</td>
</tr>
<tr>
<td>13. Prince George’s County</td>
<td>24.5%</td>
<td>12.8%</td>
</tr>
<tr>
<td>14. Virginia</td>
<td>6.4%</td>
<td>8.9%</td>
</tr>
<tr>
<td>15. Frederick County</td>
<td>1.1%</td>
<td>0.2%</td>
</tr>
<tr>
<td>16. Howard County</td>
<td>5.6%</td>
<td>1.4%</td>
</tr>
</tbody>
</table>
### Table 4-4: Trip Distribution Report in Super District 3: Potomac/Darnestown/Travilah

Auto-Driver Trip Distribution for Development in Super District 3: Potomac/Darnestown/Travilah

<table>
<thead>
<tr>
<th>Trip Distribution to Super District for</th>
<th>Office Development</th>
<th>Residential Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bethesda/Chevy Chase</td>
<td>5.7%</td>
<td>13.0%</td>
</tr>
<tr>
<td>2. Silver Spring/Takoma Park</td>
<td>2.4%</td>
<td>1.9%</td>
</tr>
<tr>
<td>3. Potomac/Darnestown/Travilah</td>
<td>21.0%</td>
<td>6.2%</td>
</tr>
<tr>
<td>4. Rockville/North Bethesda</td>
<td>12.1%</td>
<td>20.5%</td>
</tr>
<tr>
<td>5. Kensington/Wheaton</td>
<td>6.8%</td>
<td>1.4%</td>
</tr>
<tr>
<td>6. White Oak/Fairland/Cloverly</td>
<td>2.3%</td>
<td>0.7%</td>
</tr>
<tr>
<td>7. Gaithersburg/Shady Grove</td>
<td>11.1%</td>
<td>13.3%</td>
</tr>
<tr>
<td>8. Aspen Hill/Olney</td>
<td>5.1%</td>
<td>0.6%</td>
</tr>
<tr>
<td>9. Germantown/Clarksburg</td>
<td>4.5%</td>
<td>1.7%</td>
</tr>
<tr>
<td>10. Rural: West of I-270</td>
<td>1.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>11. Rural: East of I-270</td>
<td>2.2%</td>
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</tr>
<tr>
<td>12. Washington, DC</td>
<td>3.8%</td>
<td>22.1%</td>
</tr>
<tr>
<td>13. Prince George’s County</td>
<td>7.2%</td>
<td>5.1%</td>
</tr>
<tr>
<td>14. Virginia</td>
<td>10.4%</td>
<td>12.4%</td>
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<tr>
<td>15. Frederick County</td>
<td>2.8%</td>
<td>0.4%</td>
</tr>
<tr>
<td>16. Howard County</td>
<td>1.5%</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

### Table 4-5: Trip Distribution Report in Super District 4: Rockville/North Bethesda

Auto-Driver Trip Distribution for Development in Super District 4: Rockville/North Bethesda

<table>
<thead>
<tr>
<th>Trip Distribution to Super District for</th>
<th>Office Development</th>
<th>Residential Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bethesda/Chevy Chase</td>
<td>3.5%</td>
<td>15.6%</td>
</tr>
<tr>
<td>2. Silver Spring/Takoma Park</td>
<td>2.2%</td>
<td>2.4%</td>
</tr>
<tr>
<td>3. Potomac/Darnestown/Travilah</td>
<td>8.0%</td>
<td>3.3%</td>
</tr>
<tr>
<td>4. Rockville/North Bethesda</td>
<td>12.8%</td>
<td>31.0%</td>
</tr>
<tr>
<td>5. Kensington/Wheaton</td>
<td>7.2%</td>
<td>2.6%</td>
</tr>
<tr>
<td>6. White Oak/Fairland/Cloverly</td>
<td>4.1%</td>
<td>0.7%</td>
</tr>
<tr>
<td>7. Gaithersburg/Shady Grove</td>
<td>14.4%</td>
<td>10.6%</td>
</tr>
<tr>
<td>8. Aspen Hill/Olney</td>
<td>8.5%</td>
<td>1.7%</td>
</tr>
<tr>
<td>9. Germantown/Clarksburg</td>
<td>6.5%</td>
<td>1.0%</td>
</tr>
<tr>
<td>10. Rural: West of I-270</td>
<td>0.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>11. Rural: East of I-270</td>
<td>4.2%</td>
<td>0.2%</td>
</tr>
<tr>
<td>12. Washington, DC</td>
<td>3.6%</td>
<td>13.9%</td>
</tr>
<tr>
<td>13. Prince George’s County</td>
<td>8.8%</td>
<td>6.1%</td>
</tr>
<tr>
<td>14. Virginia</td>
<td>7.8%</td>
<td>9.7%</td>
</tr>
<tr>
<td>15. Frederick County</td>
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<tr>
<td>16. Howard County</td>
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<td>1.4%</td>
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### Table 4-6: Trip Distribution Report in Super District 5: Kensington/Wheaton

Auto-Driver Trip Distribution for Development in Super District 5: Kensington/Wheaton

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<th>Residential Development</th>
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<tbody>
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<td>1. Bethesda/Chevy Chase</td>
<td>2.7%</td>
<td>12.3%</td>
</tr>
<tr>
<td>2. Silver Spring/Takoma Park</td>
<td>6.2%</td>
<td>6.9%</td>
</tr>
<tr>
<td>3. Potomac/Darnestown/Travisla</td>
<td>2.6%</td>
<td>1.6%</td>
</tr>
<tr>
<td>4. Rockville/North Bethesda</td>
<td>5.1%</td>
<td>14.8%</td>
</tr>
<tr>
<td>5. Kensington/Wheaton</td>
<td>26.0%</td>
<td>11.1%</td>
</tr>
<tr>
<td>6. White Oak/Fairland/Cloverly</td>
<td>10.6%</td>
<td>2.2%</td>
</tr>
<tr>
<td>7. Gaithersburg/Shady Grove</td>
<td>5.5%</td>
<td>6.0%</td>
</tr>
<tr>
<td>8. Aspen Hill/Olney</td>
<td>10.3%</td>
<td>2.0%</td>
</tr>
<tr>
<td>9. Germantown/Clarksburg</td>
<td>2.1%</td>
<td>0.6%</td>
</tr>
<tr>
<td>10. Rural: West of I-270</td>
<td>0.2%</td>
<td>0.0%</td>
</tr>
<tr>
<td>11. Rural: East of I-270</td>
<td>4.3%</td>
<td>0.4%</td>
</tr>
<tr>
<td>12. Washington, DC</td>
<td>3.7%</td>
<td>22.6%</td>
</tr>
<tr>
<td>13. Prince George’s County</td>
<td>11.9%</td>
<td>9.5%</td>
</tr>
<tr>
<td>14. Virginia</td>
<td>4.1%</td>
<td>8.2%</td>
</tr>
<tr>
<td>15. Frederick County</td>
<td>1.5%</td>
<td>0.2%</td>
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<tr>
<td>16. Howard County</td>
<td>3.2%</td>
<td>1.5%</td>
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### Table 4-7: Trip Distribution Report in Super District 6: White Oak/Fairland/Cloverly

Auto-Driver Trip Distribution for Development in Super District 6: White Oak/Fairland/Cloverly

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<th>Trip Distribution to Super District for</th>
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<th>Residential Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bethesda/Chevy Chase</td>
<td>1.3%</td>
<td>6.8%</td>
</tr>
<tr>
<td>2. Silver Spring/Takoma Park</td>
<td>4.5%</td>
<td>9.0%</td>
</tr>
<tr>
<td>3. Potomac/Darnestown/Travisla</td>
<td>1.7%</td>
<td>0.6%</td>
</tr>
<tr>
<td>4. Rockville/North Bethesda</td>
<td>1.7%</td>
<td>9.3%</td>
</tr>
<tr>
<td>5. Kensington/Wheaton</td>
<td>6.1%</td>
<td>5.0%</td>
</tr>
<tr>
<td>6. White Oak/Fairland/Cloverly</td>
<td>23.5%</td>
<td>9.3%</td>
</tr>
<tr>
<td>7. Gaithersburg/Shady Grove</td>
<td>3.2%</td>
<td>3.8%</td>
</tr>
<tr>
<td>8. Aspen Hill/Olney</td>
<td>6.2%</td>
<td>1.4%</td>
</tr>
<tr>
<td>9. Germantown/Clarksburg</td>
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<td>0.4%</td>
</tr>
<tr>
<td>10. Rural: West of I-270</td>
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<td>11. Rural: East of I-270</td>
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<td>1.1%</td>
</tr>
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<td>12. Washington, DC</td>
<td>3.7%</td>
<td>23.4%</td>
</tr>
<tr>
<td>13. Prince George’s County</td>
<td>26.4%</td>
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<tr>
<td>14. Virginia</td>
<td>3.4%</td>
<td>7.1%</td>
</tr>
<tr>
<td>15. Frederick County</td>
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<td>0.0%</td>
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<tr>
<td>16. Howard County</td>
<td>5.6%</td>
<td>1.4%</td>
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Table 4-8: Trip Distribution Report in Super District 7: Gaithersburg/Shady Grove
Auto-Driver Trip Distribution for Development in Super District 7: Potomac/Gaithersburg/Shady Grove

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<th>Residential Development</th>
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<td>1. Bethesda/Chevy Chase</td>
<td>1.8%</td>
<td>8.5%</td>
</tr>
<tr>
<td>2. Silver Spring/Takoma Park</td>
<td>1.5%</td>
<td>2.2%</td>
</tr>
<tr>
<td>3. Potomac/Darnestown/Travilah</td>
<td>6.6%</td>
<td>2.1%</td>
</tr>
<tr>
<td>4. Rockville/North Bethesda</td>
<td>5.6%</td>
<td>23.7%</td>
</tr>
<tr>
<td>5. Kensington/Wheaton</td>
<td>3.7%</td>
<td>1.9%</td>
</tr>
<tr>
<td>6. White Oak/Fairland/Cloverly</td>
<td>2.2%</td>
<td>0.9%</td>
</tr>
<tr>
<td>7. Gaithersburg/Shady Grove</td>
<td>25.2%</td>
<td>32.4%</td>
</tr>
<tr>
<td>8. Aspen Hill/Olney</td>
<td>5.3%</td>
<td>1.8%</td>
</tr>
<tr>
<td>9. Germantown/Clarksburg</td>
<td>10.9%</td>
<td>3.4%</td>
</tr>
<tr>
<td>10. Rural: West of I-270</td>
<td>1.6%</td>
<td>0.1%</td>
</tr>
<tr>
<td>11. Rural: East of I-270</td>
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<td>0.8%</td>
</tr>
<tr>
<td>12. Washington, DC</td>
<td>2.5%</td>
<td>8.4%</td>
</tr>
<tr>
<td>13. Prince George’s County</td>
<td>6.7%</td>
<td>4.0%</td>
</tr>
<tr>
<td>14. Virginia</td>
<td>4.6%</td>
<td>7.9%</td>
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<tr>
<td>15. Frederick County</td>
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<td>1.3%</td>
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<tr>
<td>16. Howard County</td>
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Table 4-9: Trip Distribution Report in Super District 8: Aspen Hill/Olney
Auto-Driver Trip Distribution for Development in Super District 8: Aspen Hill/Olney

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<th>Trip Distribution to Super District for</th>
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<th>Residential Development</th>
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</thead>
<tbody>
<tr>
<td>1. Bethesda/Chevy Chase</td>
<td>1.2%</td>
<td>9.3%</td>
</tr>
<tr>
<td>2. Silver Spring/Takoma Park</td>
<td>1.9%</td>
<td>5.5%</td>
</tr>
<tr>
<td>3. Potomac/Darnestown/Travilah</td>
<td>1.9%</td>
<td>1.5%</td>
</tr>
<tr>
<td>4. Rockville/North Bethesda</td>
<td>6.1%</td>
<td>22.5%</td>
</tr>
<tr>
<td>5. Kensington/Wheaton</td>
<td>8.6%</td>
<td>5.7%</td>
</tr>
<tr>
<td>6. White Oak/Fairland/Cloverly</td>
<td>5.5%</td>
<td>2.8%</td>
</tr>
<tr>
<td>7. Gaithersburg/Shady Grove</td>
<td>9.4%</td>
<td>11.0%</td>
</tr>
<tr>
<td>8. Aspen Hill/Olney</td>
<td>26.0%</td>
<td>8.1%</td>
</tr>
<tr>
<td>9. Germantown/Clarksburg</td>
<td>3.1%</td>
<td>0.8%</td>
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<tr>
<td>10. Rural: West of I-270</td>
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<td>0.1%</td>
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<tr>
<td>11. Rural: East of I-270</td>
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<td>1.3%</td>
</tr>
<tr>
<td>12. Washington, DC</td>
<td>2.2%</td>
<td>15.2%</td>
</tr>
<tr>
<td>13. Prince George’s County</td>
<td>6.4%</td>
<td>7.7%</td>
</tr>
<tr>
<td>14. Virginia</td>
<td>3.1%</td>
<td>6.2%</td>
</tr>
<tr>
<td>15. Frederick County</td>
<td>4.7%</td>
<td>0.4%</td>
</tr>
<tr>
<td>16. Howard County</td>
<td>5.7%</td>
<td>1.9%</td>
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Table 4-10: Trip Distribution Report in Super District 9: Germantown/Clarksburg
Auto-Driver Trip Distribution for Development in Super District 9: Germantown/Clarksburg

<table>
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<th>Trip Distribution to Super District for</th>
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<th>Residential Development</th>
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<tbody>
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<td>1. Bethesda/Chevy Chase</td>
<td>0.6%</td>
<td>8.1%</td>
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<tr>
<td>2. Silver Spring/Takoma Park</td>
<td>1.4%</td>
<td>1.6%</td>
</tr>
<tr>
<td>3. Potomac/Darnestown/Travilah</td>
<td>5.5%</td>
<td>1.8%</td>
</tr>
<tr>
<td>4. Rockville/North Bethesda</td>
<td>3.5%</td>
<td>22.9%</td>
</tr>
<tr>
<td>5. Kensington/Wheaton</td>
<td>2.3%</td>
<td>1.6%</td>
</tr>
<tr>
<td>6. White Oak/Fairland/Cloverly</td>
<td>1.6%</td>
<td>0.2%</td>
</tr>
<tr>
<td>7. Gaithersburg/Shady Grove</td>
<td>17.2%</td>
<td>30.2%</td>
</tr>
<tr>
<td>8. Aspen Hill/Olney</td>
<td>2.5%</td>
<td>1.3%</td>
</tr>
<tr>
<td>9. Germantown/Clarksburg</td>
<td>25.2%</td>
<td>10.5%</td>
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<td>10. Rural: West of I-270</td>
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<td>0.1%</td>
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<tr>
<td>11. Rural: East of I-270</td>
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<td>1.0%</td>
</tr>
<tr>
<td>12. Washington, DC</td>
<td>0.7%</td>
<td>7.0%</td>
</tr>
<tr>
<td>13. Prince George’s County</td>
<td>5.8%</td>
<td>3.8%</td>
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<tr>
<td>14. Virginia</td>
<td>3.0%</td>
<td>7.4%</td>
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<tr>
<td>15. Frederick County</td>
<td>18.1%</td>
<td>2.0%</td>
</tr>
<tr>
<td>16. Howard County</td>
<td>2.1%</td>
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Table 4-11: Trip Distribution Report in Super District 10: Rural – West of I-270
Auto-Driver Trip Distribution for Development in Super District 10: Rural – West of I-270

<table>
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<th>Trip Distribution to Super District for</th>
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<th>Residential Development</th>
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<tbody>
<tr>
<td>1. Bethesda/Chevy Chase</td>
<td>0.8%</td>
<td>9.7%</td>
</tr>
<tr>
<td>2. Silver Spring/Takoma Park</td>
<td>2.7%</td>
<td>0.7%</td>
</tr>
<tr>
<td>3. Potomac/Darnestown/Travilah</td>
<td>4.3%</td>
<td>2.9%</td>
</tr>
<tr>
<td>4. Rockville/North Bethesda</td>
<td>2.1%</td>
<td>20.1%</td>
</tr>
<tr>
<td>5. Kensington/Wheaton</td>
<td>0.8%</td>
<td>1.2%</td>
</tr>
<tr>
<td>6. White Oak/Fairland/Cloverly</td>
<td>0.0%</td>
<td>0.4%</td>
</tr>
<tr>
<td>7. Gaithersburg/Shady Grove</td>
<td>7.0%</td>
<td>30.0%</td>
</tr>
<tr>
<td>8. Aspen Hill/Olney</td>
<td>3.0%</td>
<td>0.4%</td>
</tr>
<tr>
<td>9. Germantown/Clarksburg</td>
<td>4.1%</td>
<td>7.1%</td>
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<td>10. Rural: West of I-270</td>
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<td>9.1%</td>
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<td>11. Rural: East of I-270</td>
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</tr>
<tr>
<td>12. Washington, DC</td>
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<td>7.4%</td>
</tr>
<tr>
<td>13. Prince George’s County</td>
<td>2.1%</td>
<td>1.7%</td>
</tr>
<tr>
<td>14. Virginia</td>
<td>4.8%</td>
<td>4.5%</td>
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<tr>
<td>15. Frederick County</td>
<td>18.9%</td>
<td>3.8%</td>
</tr>
<tr>
<td>16. Howard County</td>
<td>0.0%</td>
<td>0.5%</td>
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Table 4-12: Trip Distribution Report in Super District 11: Rural – East of I-270
Auto-Driver Trip Distribution for Development in Super District 11: Rural – East of I-270

<table>
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<th>Residential Development</th>
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<tbody>
<tr>
<td>1. Bethesda/Chevy Chase</td>
<td>0.4%</td>
<td>5.9%</td>
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<tr>
<td>2. Silver Spring/Takoma Park</td>
<td>0.8%</td>
<td>3.9%</td>
</tr>
<tr>
<td>3. Potomac/Darnestown/Travilah</td>
<td>1.3%</td>
<td>1.0%</td>
</tr>
<tr>
<td>4. Rockville/North Bethesda</td>
<td>1.3%</td>
<td>17.7%</td>
</tr>
<tr>
<td>5. Kensington/Wheaton</td>
<td>3.4%</td>
<td>3.8%</td>
</tr>
<tr>
<td>6. White Oak/Fairland/Cloverly</td>
<td>8.8%</td>
<td>2.1%</td>
</tr>
<tr>
<td>7. Gaithersburg/Shady Grove</td>
<td>9.0%</td>
<td>23.5%</td>
</tr>
<tr>
<td>8. Aspen Hill/Olney</td>
<td>8.8%</td>
<td>6.9%</td>
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<tr>
<td>9. Germantown/Clarksburg</td>
<td>4.9%</td>
<td>4.1%</td>
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<tr>
<td>10. Rural: West of I-270</td>
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<td>0.1%</td>
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<tr>
<td>11. Rural: East of I-270</td>
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<td>6.7%</td>
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<tr>
<td>13. Prince George’s County</td>
<td>9.8%</td>
<td>7.0%</td>
</tr>
<tr>
<td>14. Virginia</td>
<td>0.5%</td>
<td>5.2%</td>
</tr>
<tr>
<td>15. Frederick County</td>
<td>10.5%</td>
<td>2.0%</td>
</tr>
<tr>
<td>16. Howard County</td>
<td>12.1%</td>
<td>2.8%</td>
</tr>
</tbody>
</table>
APPENDIX 5  Delegation Procedures for Certain APF Findings by Staff at Time of Building Permit

Procedures
For a building permit where a traffic exemption statement is submitted to demonstrate that TPAR is not applicable and an LATR traffic study are not needed, or when the LATR traffic study is conducted with a finding that no mitigation is required, Planning Department staff can make a finding that public facilities will be adequate to support the proposed development, set the validity period for the APF approval, and authorize release of the building permit.

For a building permit where the TPAR test requires mitigation less than five trips, Planning Department staff may authorize release of the building permit by letter if:

1. Planning Department staff finds that the public facilities will be adequate for the proposed development with the proposed trip mitigation and sets the validity period for the APF approval; and
2. MCDOT, the Superintendent of the Montgomery County Public School System, County Fire and Rescue Services, the Department of Police, and DPS have been notified of the method of mitigation, and have not explicitly objected; and
3. interested parties and the applicant have been given notice of the pending case, and have not objected to the proposed mitigation (see below, Noticing); and
4. a copy of a permit for construction within the right-of-way for the mitigation item has been received from DPS.

For cases requiring mitigation of five or more vehicle trips, the item will be scheduled for an APF finding at a public hearing before the Planning Board after 1, 2, and 4 above are met. If no objections are raised by any interested parties or any of the agencies listed in 2 above, the case may be scheduled as a consent item before the Planning Board.

If an Applicant requests a hearing before the Planning Board or if any interested party or agency listed in 2 or 3 above objects to the proposed mitigation, the item will be scheduled for an APF finding at a public hearing before the Planning Board.

Noticing
The applicant must notify all confronting and adjacent property owners, and community and homeowners associations (following the procedure in the Development Review Manual [link]) of the application for APF approval as well as any proposed mitigation measures. The notice must also state that anyone objecting to the proposal must do so in writing within 14 days to Transportation Planning and provide the appropriate contact information.
### Unbuilt Master Plan Projects

Master Planned Transportation Improvements Sorted by Policy Area, Mode, and Improvement Type and Not Programmed by 2018

<table>
<thead>
<tr>
<th>Policy Area(s)</th>
<th>Project Name</th>
<th>Implementation</th>
<th>Limits</th>
<th>Improvement Type</th>
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### Master Planned Transportation Improvements Sorted by Policy Area, Mode, and Improvement Type and Not Programmed by 2018

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</tr>
<tr>
<td>SSTP</td>
<td>Seminary Rd</td>
<td>County/Developer</td>
<td>MD 192 to MD 97</td>
<td>R</td>
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</tr>
<tr>
<td>RKV,GBG,GTE,CLK</td>
<td>I-270 (HOV and widening)</td>
<td>State</td>
<td>I-370 to Frederick Co Line</td>
<td>R</td>
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<tr>
<td>RURW</td>
<td>MD118 Germantown Rd</td>
<td>State</td>
<td>MD 28 to MD 117</td>
<td>R</td>
<td>2</td>
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<tr>
<td>RURW</td>
<td>Whites Ferry Rd Relocated</td>
<td>County</td>
<td>Partnership Rd to west of Partnership Rd</td>
<td>R</td>
<td>3</td>
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</tbody>
</table>
MEMORANDUM OF UNDERSTANDING BETWEEN

THE CITY OF GAITHERSBURG

AND

THE CITY OF ROCKVILLE

AND

THE MONTGOMERY COUNTY PLANNING BOARD OF
THE MARYLAND-NATIONAL CAPITAL PARK AND
PLANNING COMMISSION

FOR

THE COORDINATION OF TRAFFIC IMPACT STUDIES
FOR PROPOSED DEVELOPMENT PROJECTS

This Memorandum of Understanding (MOU) is entered into by and between Montgomery County Planning Department of The Maryland-National Capital Park and Planning Commission, the City of Gaithersburg, and the City of Rockville (collectively, the Parties)

WHEREAS, the purpose of this MOU is for the Parties to work cooperatively to better manage traffic conditions given the inter-jurisdictional impact of traffic generated by development in close proximity to nearby jurisdictions through the exchange of information regarding traffic reports (traffic impact study or applicable traffic statement) of proposed development and through the coordination and review of such reports; and

WHEREAS, the parties acknowledge that each has a different set of standards for traffic reports within their jurisdiction.

NOW, THEREFORE, the Parties agree to the following:

1. The methodology for determining the scope of traffic reports for proposed development projects, and also for analyzing the intersections included in such reports, will be determined in accordance with the standards set by the approving jurisdiction.

2. If a proposed development project has a signalized intersection within the scope’s study area and located in a neighboring jurisdiction (one of the other parties to this MOU), that such intersection will be analyzed as part of the required traffic reports in accordance with the standards set by the approving jurisdiction.
3. Each Party will notify their neighboring jurisdiction when a project is submitted for review that includes a signalized intersection within the scope's study area and located in that neighboring jurisdiction. This includes notification of pre-Development Review Committee/Development Review Team (DRC/DRT) meetings and regular DRC/DRT meetings for such project.

4. When a signalized intersection falls within a neighboring jurisdiction, the approving jurisdiction will provide the neighboring jurisdiction with a copy of the applicable traffic report scope between the applicant and the approving jurisdiction. The approving jurisdiction will also provide the accepted traffic report to the neighboring jurisdiction. The neighboring jurisdiction will then be allowed up to thirty (30) days to review and submit comments back to the approving jurisdiction regarding the proposed development's traffic report.

IN WITNESS WHEREOF, the undersigned being duly authorized by the respective agencies, has signed this MOU.

City of Gaithersburg, Maryland:

[Signature]
John Schlichting, Director, Planning and Code Administration
Date: 10/10/12

City of Rockville, Maryland:

[Signature]
Susan Swift, Director, Community Planning & Development Services
Date: 10-2-12

Montgomery County Planning Department:

[Signature]
Rose Krasnow, Acting Director
Date: 9-27-12
Local Area Transportation Review and Transportation Policy Area Review Guidelines

January 2013
The Office of Legislative Oversight’s review of transportation demand management in Montgomery County and other communities found that the County actively promotes transit and other alternative commuting modes, especially within urban centers. However, OLO also found that the County simultaneously implements parking policies that undercut efforts to encourage commuters to choose alternative travel modes.

OLO recommends the Council act to improve the consistency of the County’s transportation demand management policies and practices. As part of this, OLO recommends that the Council discuss how to establish a sustainable alternative commuting infrastructure. Practices of other places offer potential strategies for the County to consider.

WHAT IS TRANSPORTATION DEMAND MANAGEMENT?

“Transportation demand management” refers to a set of public policy strategies and programs aimed at providing convenient and affordable alternatives to the single-occupant vehicle to maximize use of a region’s alternative transportation resources.

When choosing how to travel to work, commuters weigh the relative cost, time, and convenience of alternative modes of travel against driving alone. Local governments control only some of the many factors that influence a commuter’s decision to drive alone or use an alternative travel mode.

Sufficient and reliable funding for transit and other alternative commuting modes is a necessary prerequisite for persuading a high percentage of commuters to use alternative modes. For example, suppose a jurisdiction successfully persuades a large number of commuters to use an alternative mode of travel by providing cost competitive, timely, and convenient alternatives to driving alone. This may generate a need for the jurisdiction to invest additional resources in its alternative transit infrastructure (e.g., buses or bikeways) so that commuters do not become frustrated by crowded transit or other inconveniences and return to driving alone.

MONTGOMERY COUNTY’S SERVICES AND PROGRAMS

The County’s alternative transportation infrastructure includes bus and rail transit systems, bikeways, and pedestrian facilities. The County also provides services and programs to promote these and other alternative commuting modes. For example, the County requires developers and employers to implement traffic mitigation measures and provides funding to employers who offer transit subsidies to their employees. The table below summarizes County services and programs designed to promote alternative commuting modes.

<table>
<thead>
<tr>
<th>Service/Program</th>
<th>Description</th>
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<tbody>
<tr>
<td>Transit</td>
<td>Metrorail, Metrobus, Ride On, MARC Train, and MTA (Maryland Transit Administration) Commuter Bus transit systems serve commuters.</td>
</tr>
<tr>
<td>Bikeways</td>
<td>A total of eight bikeways serve five County urban centers.</td>
</tr>
<tr>
<td>Pedestrian Facilities</td>
<td>Sidewalks, crosswalks, countdown crosswalk signals, and lighting assist pedestrians.</td>
</tr>
<tr>
<td>Traffic Mitigation</td>
<td>Certain developers and employers must implement traffic mitigation measures (such as limiting parking, providing carpooling or vanpooling incentives, or offering transit subsidies).</td>
</tr>
<tr>
<td>Transit Subsidies</td>
<td>Financial assistance is provided to employers who offer transit subsidies to employees.</td>
</tr>
<tr>
<td>Commuter Services</td>
<td>The County Department of Transportation:</td>
</tr>
<tr>
<td></td>
<td>• Markets alternative transportation to workers and residents;</td>
</tr>
<tr>
<td></td>
<td>• Encourages employers to promote alternative transportation;</td>
</tr>
<tr>
<td></td>
<td>• Implements commuter assistance programs; and</td>
</tr>
<tr>
<td></td>
<td>• Provides personalized rideshare matching for carpools and vanpools.</td>
</tr>
</tbody>
</table>
TRANSPORTATION MANAGEMENT DISTRICTS

The County focuses transportation demand management efforts on urban centers. Specifically, County law establishes transportation management districts in North Bethesda, downtown Bethesda, Friendship Heights, downtown Silver Spring, and Shady Grove. (The Shady Grove district, established in 2006, remains unfunded and inactive.) The County Department of Transportation (DOT) has also designated the Wheaton Central Business District as a “Transportation Planning and Policy Area.”

The County uses different approaches to manage and finance transportation demand management activities in North Bethesda, Bethesda, Friendship Heights, Silver Spring, and Wheaton. These differences reflect the uniqueness of each area, constituent interests, and management practices that existed when the transportation management district or transportation planning and policy area was established. For example, private organizations manage the transportation management districts in North Bethesda and Bethesda (under County contract), while the County’s Department of Transportation manages programs in Friendship Heights, Silver Spring, and Wheaton.

TRANSPORTATION DEMAND MANAGEMENT GOVERNANCE IN MONTGOMERY COUNTY

In Montgomery County, a decentralized structure of County and non-County entities shape the governance of transportation systems and transportation demand management programs. At times, this results in policies and programs that are not fully coordinated. This is common in most metropolitan areas, where governance entities may include state and local governments, regional organizations, transit systems, and parking authorities.

Some communities, notably universities with urban campuses, operate transportation demand management systems that offer a range of services that are consolidated under one centrally-managed program. In these places, a single entity promotes alternative commuting modes, offers transit incentives, operates local shuttle services, and sets parking pricing and supply policies.

IMPACT OF PARKING POLICIES ON TRANSPORTATION DEMAND MANAGEMENT

As currently implemented, County parking policies and transportation demand management objectives often work at cross purposes to one another, simultaneously promoting alternative commuting modes and providing single-occupant drivers easy access to plentiful, low-cost, conveniently-located parking. Such parking serves as an incentive to drive alone, which arguably undercuts County efforts to encourage alternative travel modes.

Under current zoning requirements, developments in urban centers must provide nearly the same amount of parking (for similar uses) as developments in less dense parts of the County. These requirements, adopted when the County was more suburban in nature, do not fully account for transit services and traffic congestion in urban centers today.

The County’s parking management practices also encourage commuters to drive alone. The County is a significant provider of parking in urban centers (see table below). Currently, most of the County-provided spaces in Bethesda, Silver Spring, and Wheaton are designated as long-term parking, which encourages commuters to drive alone. Except for a few County parking facilities which fill during peak hours, the overall supply of parking in each district exceeds demand. Further, the County’s parking rates are generally less expensive compared to private parking rates.

<table>
<thead>
<tr>
<th>County Parking Provided in Urban Centers</th>
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</thead>
<tbody>
<tr>
<td>**North Bethesda</td>
</tr>
<tr>
<td>Short-term</td>
</tr>
<tr>
<td>Long-term</td>
</tr>
<tr>
<td>Other*</td>
</tr>
<tr>
<td># of County Spaces</td>
</tr>
</tbody>
</table>

*Includes non-metered, handicapped, and government vehicle spaces
TRANSPORTATION DEMAND MANAGEMENT FUNDING IN MONTGOMERY COUNTY

Multiple County and non-County sources fund the County’s transportation infrastructure, which includes rail and bus systems, bikeways, and pedestrian facilities. The major funding sources for the County’s transit and transportation demand management services are two special funds:

- **The Maryland Transportation Trust Fund** supports State transportation programs, including operating MARC trains and MTA Commuter Buses and paying the County’s contributions to WMATA. State gas tax and motor vehicle taxes are the Fund’s largest revenue sources.

- **The County’s Mass Transit Fund** supports operation of the Ride On bus system, transportation demand management programs, and other activities of the DOT Division of Transit Services. Mass Transit Property Tax revenue contributes about two-thirds of all Mass Transit Fund resources.

Revenue from two special districts also supports County transportation demand management activities:

- **Transportation Management District** revenue funds transportation demand management activities through a special fee that the County charges certain property owners.

- **Parking Lot Districts (PLDs)** receive revenue from parking fees and fines and a special property tax. PLD revenue must first pay for parking facility operating and capital obligations; however, surplus revenue may be used to support a transportation management district.

The table below shows the different FY08 funding sources in the four Transportation Management Districts and one Transportation Planning and Policy Area (in Wheaton).

### FY08 FUNDING FOR TRANSPORTATION DEMAND MANAGEMENT IN URBAN CENTERS

<table>
<thead>
<tr>
<th></th>
<th>North Bethesda</th>
<th>Bethesda</th>
<th>Friendship Heights</th>
<th>Silver Spring</th>
<th>Wheaton</th>
</tr>
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<tbody>
<tr>
<td>Parking Revenue</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMD Fees</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass Transit Fund</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
</tr>
</tbody>
</table>

TRANSPORTATION DEMAND MANAGEMENT IN OTHER COMMUNITIES

Other communities implement a variety of transportation demand management strategies. Highlights from these strategies and observations about their applicability to Montgomery County are summarized below.

**Dedicated Funding for Transit**: Most large transit systems in the country are funded in part by revenue from a dedicated source. Examples of dedicated revenue are sales taxes, automobile fees, and toll revenue. Montgomery County would need State approval to establish any of these types of revenue as a dedicated funding source for transit.

Montgomery County is already authorized to implement other transit funding strategies used elsewhere. For example, the County could establish “transportation improvement districts” (a type of special taxing district) to raise revenue for transit system improvements. The County could also impose an excise tax on non-residential parking spaces, or it could raise public parking rates to support transit programs.

**Transportation Network Design**: Transportation network design may also promote efficient commuting practices. Examples include:

- Locating public parking facilities at the periphery of a central business district to intercept vehicles before they enter the congested district center.
- Installing traffic signaling systems that give precedence to transit vehicles at signal-controlled intersections.
- Building dedicated rights-of-way or roadway lanes used by frequent, high-capacity public commuter buses.
**Economic Incentives:** Economic incentives are a common tool to entice commuters to switch to transit or other alternative modes. Currently, the County reimburses some employer-provided transit subsidies. Other communities have developed different incentives to encourage commuting by alternative modes. For example:

- In Denver, Colorado, transit systems sell discounted passes for use by all workers in an organization. These programs offer those employees who do not need to drive every day an incentive to ride transit occasionally.
- The state of California requires many employers that provide parking subsidies to offer a cash allowance as an alternative to the parking subsidy.
- Redmond, Washington, has a pilot program that calculates an initial baseline number of commuter trips for a business, and then pays a business $300 annually for each trip it eliminates below the initial baseline.

**Driving Disincentives:** Several communities have adopted strategies to make driving alone less attractive than other commuting options. Examples of driving disincentive practices include:

- Reducing minimum parking requirements for urban areas served by transit. Alternatively, some communities set maximum limits – by site or by district - on the amount of parking permitted.
- Constraining the parking supply or raising parking rates.
- Adjusting transportation-related charges by time of day or by location (a practice known as “congestion pricing”). For example, London charges drivers a fee to enter the city center.

**OLO Recommendations**

OLO offers four recommendations for Council action to improve the consistency of the County’s policies and practices related to transportation demand management.

1. **Establish parking policies that are consistent with the County’s transportation demand management goals.**

   The Council should review and amend current parking policies to better align them with the County’s transportation demand management goals established in approved master plans and the Growth Policy. The Council should consider revising Zoning Ordinance parking requirements and establishing criteria for determining the supply and pricing of County-owned parking spaces.

2. **Ask the Executive and the Planning Board to report annually on commuting goals.**

   The Council is the sole entity with authority to align land use and transportation policies to achieve complementary objectives. The Council should ask the County Executive and the Planning Board to report annually on progress made toward achieving master plan commuting goals. Based on this input, the Council should determine what changes, if any, should be made to transportation or land use policies and programs.

3. **Ask the Executive to evaluate transportation demand management practices used in other communities.**

   The County has implemented a broad series of measures to promote alternative commuting modes; nonetheless, some practices from other jurisdictions merit further evaluation to assess their viability in Montgomery County. The Council should ask the County Executive to evaluate transportation demand management practices that could supplement the current array of County programs.

4. **Discuss approaches for creating and funding a sustainable alternative commuting infrastructure.**

   If the County's transportation demand management programs are successful, the increased demand created by a large scale shift in commuting practices could strain the County’s transit, bicycle, and pedestrian networks. The Council should discuss its long-term vision for building and funding additional capacity to accommodate workers who no longer commute by single-occupant vehicle. The Council should assess whether it expects to use existing revenue sources to build future improvements or whether it intends to pursue new funding resources for major new initiatives.
EXECUTIVE SUMMARY

I. Authority, Scope, and Organization of Report

II. Transportation Demand Management Concepts

III. Transportation Demand Management Governance and Implementation in Montgomery County

IV. County Parking Policies and Commuter Choice

V. Transit and Transportation Demand Management Funding

VI. Transportation Demand Management in Other Communities

VII. Findings

VIII. Recommendations

IX. Agency Comments

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Appendix B: Sample Traffic Mitigation Plan

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CHAPTER I: AUTHORITY, SCOPE, AND ORGANIZATION OF REPORT

A. Authority


B. Purpose and Scope of Report

Transportation demand management programs in urban centers are designed to change travel behavior by providing convenient and affordable alternatives to the single-occupant vehicle. The objectives of these programs are to reduce traffic congestion, decrease energy consumption, and improve air quality. Montgomery County offers a collection of transportation demand management programs that focus on urban center commuters.

The County Council directed OLO to prepare a report that describes the implementation, funding, and governance of transportation demand management strategies in Montgomery County and in other jurisdictions. Specifically, the Council asked OLO to:

- Describe transportation demand management practices in the County’s urban centers, including programs, governance structure, and financing;
- Provide case studies from other jurisdictions on alternative urban transportation demand management approaches; and
- Identify transportation demand management practices, governing structures, and financing techniques employed in other jurisdictions that could be considered for use in Montgomery County.

C. Organization of Report

Chapter II, Transportation Demand Management Concepts, describes concepts relating to transportation demand management.

Chapter III, Transportation Demand Management Governance and Implementation in Montgomery County, describes the County’s approach to transportation demand management.

Chapter IV, County Parking Policies and Commuter Choice, describes County policies and programs relating to parking in urban centers.

Chapter V, Transit and Transportation Demand Management Funding, presents information on the funding of transit and transportation demand management programs.

Chapter VI, Transportation Demand Management in Other Communities, identifies alternative transportation demand management practices employed in other communities and discusses the potential applicability of these practices to the County.

Chapter VII presents a summary of the Office of Legislative Oversight’s Findings.
Chapter VIII presents the Office of Legislative Oversight's Recommendations. Chapter IX presents Agency Comments received on a final draft of this report.

D. Methodology

Office of Legislative Oversight (OLO) staff members Aron Trombka and Jennifer Renkema conducted this study. OLO gathered information through document reviews, data analysis, and interviews with staff from the Department of Transportation (DOT) and the Department of Planning. OLO also met with managers of transportation management organizations and attended meetings of transportation management district advisory committees. OLO conducted internet research on transportation demand management programs around the country and abroad and made e-mail contact with program managers to learn more about specific initiatives. A primary source for much of the content of this report was the website of the Victoria Transport Policy Institute’s online Transportation Demand Management Encyclopedia (http://www.vtpi.org/tdm/index.php#incentives).

E. Acknowledgements

OLO received a high level of cooperation from everyone involved in this study. OLO appreciates the significant time commitment, the information shared, and the insights provided by all staff who participated. OLO thanks the following individuals who provided valuable input and information:

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- Charles Kines, M-NCPPC
- Phil McLaughlin, DOT
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- Danielle Milo, Bethesda Urban Partnership
- Ed Mondoñedo, DOT
- Steve Nash, DOT
- Glenn Orlin, County Council Staff
- Jeffery Riese, DOT
- Al Roshdieh, DOT
- Peggy Schwartz, Transportation Action Partnership
- William Selby, DOT
- Richard Siebert, DOT
- Jeremy Souders, DOT
- Emil Wolanin, DOT
CHAPTER II: TRANSPORTATION DEMAND MANAGEMENT CONCEPTS

This chapter introduces the reader to some of the basic concepts that influence the design and implementation of transportation demand management programs. This chapter includes two sections.

Section A, **Definition of Transportation Demand Management**, defines the concept and objectives of transportation demand management; and

Section B, **Factors that Influence Commuter Choices**, presents an overview of the different factors that influence commuter travel choices.

A. Definition of Transportation Demand Management

The phrase transportation demand management (TDM) refers to a set of strategies that increase the efficiency of a region’s transportation resources including roadways, transit lines, bikeways, pedestrian connections, and parking facilities. More specifically, TDM strategies seek to maximize the number of travelers that a transportation network can accommodate in a cost effective, timely, and convenient fashion. In jurisdictions such as Montgomery County, where communities are transitioning from suburban to urban densities, a central purpose of TDM is to change travel behavior by promoting viable alternatives to commuting by single-occupant automobile.

The Victoria Transport Policy Institute describes “transportation demand management” as follows:

“Transportation Demand Management refers to various strategies that change travel behavior (how, when and where people travel) in order to increase transport system efficiency and achieve specific planning objectives. TDM is increasingly used to address a variety of problems.

… Many factors affect people’s transport decisions including the relative convenience and safety of travel modes (such as whether streets have sidewalks and bikepaths, and the quality of transit services available), prices (transit fares and the price of parking at destinations); and land use factors (such as whether or not schools, parks and shops are located close to residential neighborhoods).

… Transportation Demand Management strategies influence these factors to encourage more efficient travel patterns, such as shifts from peak to off-peak periods, from automobile to alternative modes, and from dispersed to closer destinations.”

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The Montgomery County Code, Chapter 42A, defines transportation demand management as:

“any method of reducing demand for road capacity during a peak period, including an alternative work hours program, carpools, vanpools, subsidized transit pass, preferential parking, improved bicycle and pedestrian access and safety, or peak period parking charge.”

Of the various TDM strategies that influence commuting decisions, this OLO report focuses on strategies relating to:

- The funding of transit and other alternative commuting modes;
- Incentives to encourage the use of alternative commuting modes;
- Disincentives to commuting in a single-occupant automobile; and
- Land use and transportation network designs that promote efficient commuting patterns.

B. Factors that Influence Commuter Choices

If the goal of TDM strategies is to change travel behavior, it is helpful to identify the factors that commuters take into account when they decide how to travel to work. To address this question, OLO interviewed transportation management professionals in Montgomery County and reviewed academic and professional literature. OLO’s literature review relied, in particular, on work published by the U.S. General Accountability Office and the Victoria Transport Policy Institute.

As detailed below, most of the factors that influence commuter choices affect one of the following three attributes:

- Cost – the relative expense of alternative commuting modes;
- Time – the time it takes to commute by one mode compared to another; and
- Convenience – the ease, comfort, and reliability of alternative commuting modes.

In its interviews with transportation demand management professionals and its review of the literature, OLO found recurring descriptions of these three factors as having the greatest impact on commuter choices. As an illustrative example, the Transportation Research Board of the National Research Council studied factors that influence individuals’ travel decisions. As part of the study, the researchers conducted a survey of residents in metropolitan areas with a rail transit system. Consistent with the input OLO received from its interviews, the Transportation Research Board study found that a sizable majority of survey respondents sought “reliable transportation at low cost, … didn’t want to spend any additional time commuting, nor … to be dependent on someone else for their transportation.”

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2 MCC §42A-21.
3 Transportation Research Board, Understanding How Individuals Make Travel and Location Decisions: Implications for Public Transportation (TCRP REPORT 123), 2008
Examine these factors more closely, OLO found there are numerous conditions that impact the cost, time, and convenience of commuting. These conditions fall into three general categories: community conditions, individual circumstances, and external factors.

1. Community Conditions

The physical development of a community influences commuting choice. This section identifies five community factors that may contribute to an individual's decision to drive alone to work or to use an alternative mode of transportation.

**Land Use Patterns:** Land use patterns affect commuting options. The relative locations and density of jobs and housing influence whether alternatives to the single-occupant automobile are viable. Transit and carpooling become more feasible where geographically concentrated patterns of housing and/or jobs exist. This occurs because concentrating land uses enables the efficient operation of a fleet of shared vehicles to collect and transport commuters to their destinations. Moreover, in mixed-use urban centers, walking to work also becomes an option for some commuters.

**Transit Network:** To be a viable commuting option, a transit network must be capable of transporting a large number of people and must connect areas where people live with areas where they work. In addition, the frequency of service is an important factor in determining how many people use transit to commute to jobs. Moreover, for commuters to consider transit, the system must be reliable, convenient, and cost competitive.

**Roadway Network / Traffic Congestion:** The roadway network influences a commuter's travel behavior. A roadway network with excess capacity relative to demand easily accommodates all forms of automobile commuting, including single-occupant vehicles. In contrast, a roadway network with excess traffic congestion due to capacity constraints may prompt some commuters to consider alternative modes of transportation. Building roadway features such as dedicated bus lanes, high-occupancy vehicle lanes, and bicycle lanes support alternatives to driving alone.

**Parking Availability and Cost:** The availability and cost of parking plays a significant role in shaping commuting decisions. Plentiful low-cost parking serves as an incentive to drive alone; limited or high-cost parking provides an incentive to commute by alternative modes. Moreover, where parking is at a premium, the presence of reserved, preferred, or discounted spaces for carpools and vanpools may prompt some commuters to share the ride to work.

**Bicycle / Pedestrian Network:** The existence of bikeways connecting residential areas to urban employment centers offers a commuting alternative for some people. Within an urban center, an extensive and safe pedestrian network is necessary for people to feel comfortable walking from their transit stop to their place of employment. In mixed-use urban centers, pedestrian connections allow residents to walk to work.
Table 2-1 summarizes the community conditions that support either driving alone or alternative modes of commuting.

**Table 2-1: Summary of Community Conditions that Support Single-Occupant Auto and Alternative Commuting Modes**

<table>
<thead>
<tr>
<th></th>
<th>Conditions that Support Single-Occupant Auto Commuting</th>
<th>Conditions that Support Alternative Commuting Modes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land Use Patterns</strong></td>
<td>• Scattered residential and employment centers</td>
<td>• Concentrated residential and employment centers</td>
</tr>
<tr>
<td></td>
<td>• Limited housing in or near urban centers</td>
<td>• Housing within or in walking / biking distance to urban centers</td>
</tr>
<tr>
<td><strong>Transit Network</strong></td>
<td>• Limited transit between major employment and residential centers</td>
<td>• Expansive regional transit network that reaches major employment and residential centers</td>
</tr>
<tr>
<td></td>
<td>• Infrequent transit departures</td>
<td>• Frequent transit departures</td>
</tr>
<tr>
<td><strong>Roadway Network / Traffic Congestion</strong></td>
<td>• Road network that does not accommodate transit, high-occupancy vehicles, or bicyclists</td>
<td>• Road network that accommodates and supports transit, high-occupancy vehicles, and bicyclists</td>
</tr>
<tr>
<td></td>
<td>• Low levels of traffic congestion</td>
<td>• High levels of traffic congestion</td>
</tr>
<tr>
<td><strong>Parking Availability</strong></td>
<td>• Parking supply that exceeds demand</td>
<td>• Constrained parking supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reserved, preferred, or discounted parking for carpool and vanpools</td>
</tr>
<tr>
<td><strong>Bicycle / Pedestrian Network</strong></td>
<td>• Limited bikeways and walkways to and within urban centers</td>
<td>• Extensive bikeways and walkways to and within urban centers</td>
</tr>
</tbody>
</table>

**2. Individual Circumstances**

Besides the community conditions described above, a commuter’s individual circumstances will affect travel mode decisions. The affects of these circumstances are different for each person.

*Commuting Costs:* The relative costs of commuting alternatives influence personal decisions about how to travel to work. For example, the cost of driving alone not only depends on fuel prices (see page 9), but is also a function of other factors such as the type of vehicle driven, the cost of parking, and the availability of transit subsidies. A commuter who drives a relatively fuel efficient car may have significantly lower commuting costs than someone who drives a gas guzzler. Whether a commuter’s employer offers free (or below market rate) parking also is a significant factor in the overall cost of driving. In addition, whether an employer offers transit subsidies also can affect the cost competitiveness of transit relative to driving alone.

*Commuting Time:* The length of time it takes to travel door to door influences commuting decisions. In addition to community factors such as the level of roadway congestion and the quality of the transit network, personal circumstances affect travel time, which in turn affects
commuting choices. For example, an employee who lives near his/her workplace or near a transit line has more ways to reach work in an acceptable amount of time than an employee who lives far away from work or transit. An employer that permits a flexible work schedule may reduce employee commuting during peak hours. In addition, an organization that allows telework reduces an employee’s commute time to zero on days when s/he works from home.

**Commuting Convenience:** Driving alone and transit offer different types of conveniences and inconveniences for commuters. For example, a driver has an automobile at his/her immediate disposal for running errands on the way to work, during lunch time, or on the way home. In contrast, a transit rider may be able to perform other tasks during his/her commute. At times, a driver must contend with unexpected traffic congestion, accidents, and construction. On the other hand, some transit riders regularly encounter crowded buses or trains. During inclement weather, a driver encounters more difficult driving conditions; whereas a transit rider encounters less comfortable waiting conditions. Different individuals will weigh the value of these conveniences and inconveniences differently.

**Personal Preferences / Limitations:** Personal preferences or individual limitations also influence commuting choices. Environmental concerns may motivate some people to choose alternative commuting modes. Others may choose biking or walking to combine exercise with their commute. In contrast, some people with mobility limitations may consider driving alone the only feasible commuting option.

Table 2-2 on the following page summarizes the individual circumstances that support either driving alone or alternative modes of commuting.
Table 2-2: Summary of Individual Circumstances that Support Single-Occupant Auto and Alternative Commuting Modes

<table>
<thead>
<tr>
<th>Conditions that Support Single-Occupant Auto Commuting</th>
<th>Conditions that Support Alternative Commuting Modes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commuting Costs</strong></td>
<td></td>
</tr>
<tr>
<td>• Fuel efficient personnel vehicles</td>
<td>• Fuel inefficient personnel vehicles</td>
</tr>
<tr>
<td>• Free or below market rate parking</td>
<td>• High cost parking</td>
</tr>
<tr>
<td>• Transit subsidies</td>
<td>• Transit subsidies</td>
</tr>
<tr>
<td><strong>Commuting Time</strong></td>
<td></td>
</tr>
<tr>
<td>• Employees who live distant from both work and transit</td>
<td>• Employees who live close to either work or transit lines</td>
</tr>
<tr>
<td></td>
<td>• Organizations which permit flexible work schedules and telework</td>
</tr>
<tr>
<td><strong>Commuting Convenience</strong></td>
<td></td>
</tr>
<tr>
<td>• Desire to use automobile for running errands</td>
<td>• Desire to perform other tasks during commute</td>
</tr>
<tr>
<td>• Personal sense that driving is a reliable, predictable, and comfortable commuting option</td>
<td>• Personal sense that alternative modes are reliable, predictable, and comfortable commuting options</td>
</tr>
<tr>
<td><strong>Personnel Preferences / Limitations</strong></td>
<td></td>
</tr>
<tr>
<td>• A physical condition that makes alternative modes difficult</td>
<td>• A desire to conserve natural resources, reduce pollution</td>
</tr>
<tr>
<td></td>
<td>• A desire to get exercise while commuting</td>
</tr>
</tbody>
</table>

3. External Factors

Several conditions beyond the direct control of the County Government or County residents influence commuting decisions. This section presents three examples of external influences that affect commuting choices.

*Fuel Costs:* Rising fuel prices make transit more cost competitive with driving alone and increase the attractiveness of alternative commuting means such as carpooling and bicycling.

*Housing Market Conditions:* When housing costs spiked sharply in recent years, many people who work in the County chose to live in distant communities with more affordable housing. These choices lengthened people’s commutes, put more traffic on the roadway network, and limited the feasibility of alternatives to driving alone.

*Employer Work Schedule Policies:* Employers that permit employees to work flexible schedules or to telework may help reduce the number of peak hour commuting trips.
CHAPTER III: TRANSPORTATION DEMAND MANAGEMENT GOVERNANCE AND IMPLEMENTATION IN MONTGOMERY COUNTY

This chapter describes Montgomery County’s approach to transportation demand management (TDM) and includes the following three sections:

Section A, Governance Structure, describes transportation demand management governance and organizational structures in Montgomery County;

Section B, Special TDM Areas in Montgomery County, describes how the County has focused TDM requirements and resources in urban centers; and

Section C, County Transportation Demand Management Policies and Programs, presents the County’s strategies for implementing transportation demand management.

A. Governance Structure

Responsibility for transportation demand management in Montgomery County is decentralized and shared among multiple County and non-County entities. As detailed below, the County Council, County Executive, Department of Transportation, and the Maryland-National Capital Park and Planning Commission each exercise authority that shapes the County’s transportation demand management strategies. In addition, Montgomery County is located in a metropolitan area where transit services such as bus and rail cross jurisdictional lines. The County must work with the States of Maryland and Virginia, District of Columbia, and the Washington Metropolitan Area Transit Authority (WMATA), and the Metropolitan Washington Council of Governments to affect County and regional transit goals. The County is also influenced by Federal policies that influence transportation demand management.

1. County Entities

a. County Council and County Executive

County Council: The County Council exercises the authority to establish County policies that impact transportation demand management, such as land use patterns; the transit, roadway and bicycle networks; and parking availability. Specifically, the Council:

- Approves the County’s annual operating budget and capital improvements program, which fund transportation demand management programs and transit operations and facilities (e.g., bus facilities, bikeways, and sidewalks);
- Has final approval authority for master plans and the biannual Growth Policy;
- Enacts County law including the chapters of the County Code that directly impact transportation demand management: Chapter 42A, Ridesharing and Transportation Management; Chapter 59, the County Zoning Ordinance, and Chapter 60 Parking Lot Districts; and
- Sets parking rates for County parking facilities by annual resolution.
Additionally, under the County Code, the Council has the authority to create transportation management districts (described beginning on page 13) and confirm members of the Friendship Heights and Silver Spring Transportation Management District Advisory Committees. The Council also advocates at the State level for transportation funding and coordinates with other local governments to set regional transportation goals.

**County Executive**: The County Executive prepares and recommends an annual operating budget and biannual capital improvements program, including funding for transportation services and facilities. The County Executive also has legal authority to establish “share-a-ride districts” (see page 28) and nominate members to the Friendship Heights and Silver Spring Transportation Management District Advisory Committee (see pages 16 and 17).

### b. Department of Transportation

Four DOT organizational units manage County transportation facilities and services that shape the County’s transportation demand management strategies: the Office of the Director, the Division of Transit Services, the Division of Parking Management, and the Division of Traffic Engineering and Operations. The roles of these units are briefly described here, and more details about the specific programs they administer are found later in this chapter and in Chapter IV.

**Office of the Director**: The Office of the DOT Director oversees the implementation of transportation policies for the County Government. The Director’s Office sets priorities for all DOT programs including transit, commuter services, and parking management activities, and is also responsible for providing general program oversight.

In addition, the Director’s Special Assistant for Metro Affairs serves as the liaison between the County Government and outside agencies including the Washington Metropolitan Area Transit Authority (WMATA), the Maryland Transit Administration (MTA), and other local jurisdictions. For example, the Special Assistant attends WMATA board meetings and meets regularly with representatives from other jurisdictions to review the WMATA budget, programs, and policies. The Special Assistant also advocates for State support of transit services.

**Division of Transit Services**: The mission of the Division of Transit Services is to “provide an effective mix of public transportation services in Montgomery County.” The Division operates the County’s Ride On bus system, coordinates special transit services for seniors and persons with disabilities; regulates taxi services; provides commuter services; and oversees transportation management districts. More specifically, the Commuter Services Section manages County programs and services to decrease single-occupancy vehicle trips during peak travel hours by encouraging commuters to use alternate modes of transportation. The County’s array of commuter services is described in detail beginning on page 32. The Division also develops the County’s Transit Strategic Plan.

**Division of Parking Management**: This Division maintains and operates County parking facilities in the parking lot districts and determines the mix of short- and long-term parking. The Division’s responsibilities are described in Chapter IV.

**Division of Traffic Engineering and Operations**: This Division maintains bikeways, sidewalks, crosswalks, and lighting and installs pedestrian count-down signals.
c. Maryland-National Capital Park and Planning Commission

Montgomery County Planning Board: The Planning Board develops and recommends master plans and a biannual Growth Policy to the County Council. These documents influence transportation demand, roadway network capacity, and traffic congestion by shaping the type, location, density, and sequencing of development. Based on master plan and Growth Policy guidelines adopted by the Council, the Planning Board may require developers to implement traffic mitigation measures to reduce development impact on traffic congestion and to reduce single-occupancy vehicle trips.

Montgomery County Department of Planning: The Planning Department prepares draft master plans and Growth Policies for the Planning Board. The Planning Department’s Division of Transportation Planning analyzes the impact of traffic generated by new development on the County’s transportation network. The Division works with State and County transportation agencies and with developers to design and implement transportation elements in the County's master plans. In addition, the Division participates in drafting and enforcing traffic mitigation measures required by the Planning Board as part of the development approval process.

2. Non-County Entities

State of Maryland: The State of Maryland influences transportation demand management in Montgomery County in several ways. Specifically the State:

- Operates and funds Maryland Transit Administration (MTA) Commuter Buses and the MARC train system. The County has only an indirect role in determining levels of service or long-term planning for MARC. County responsibility related to MARC service consists only of facility and parking maintenance at some stations.
- Provides funding for Metrobus and Metrorail service to Montgomery County.
- Provides financial aid to the County’s Ride On bus service. The amount of State aid for Ride On varies from year to year and is subject to appropriation by the State General Assembly.
- Provides annual financial assistance to County ride-sharing programs.
- Controls right-of-way use, lane configurations, traffic signal settings, and other factors that influence transportation demand management on State highways. This is relevant for this study since most major roadways in County urban centers are State highways.
- Limits the County’s revenue collection authority. For example, the State, and not the County, retains the authority to levy a sales tax on gasoline, impose roadway tolls, or collect fees on the licensing and registration of motor vehicles.

Federal Government: Several federal government policies and programs impact transportation demand management in Montgomery County. For example, the Federal Government provides some funding for WMATA services. In addition, Federal tax laws stipulate that employer-provided transit subsidies that exceed $115 per month are taxable income.¹

¹ The Internal Revenue Service will increase the non-taxable transit benefit limit to $120 per month in January 2009.
The Washington Metropolitan Area Transit Administration (WMATA): WMATA operates the regional Metrobus and Metrorail systems which serve Montgomery County. The WMATA board includes two voting representatives from each jurisdiction: Maryland, Virginia, and the District of Columbia. The governor appoints Maryland’s two voting members, one to represent Montgomery County and the other to represent Prince George’s County. Montgomery County also has an alternate member who is appointed by the County Executive. The alternate member votes in committee and may vote with the full board when the permanent member is unavailable. Funding decisions for Metro that impact Montgomery County are primarily made by the State.

Metropolitan Washington Council of Governments (COG): COG provides regional coordination for transportation demand management efforts. COG’s efforts include employer outreach, marketing, maintaining a ridesharing database for use by regional governments (including the County), and offering the Guaranteed Ride Home (described on page 33). COG also provides grant funding for the County’s employer outreach activities related to transportation demand management.

B. Special TDM Areas in Montgomery County

The County provides transportation demand management and commuter services throughout the County. However, County policies and practices focus commuter services resources on certain “urban centers.” For the purposes of this report, the term “urban centers” refers to areas of the County with high concentrations of employment that are well served by transit. Specifically, this report focuses on the four active transportation management districts and the one transportation planning and policy area in the County. As this report addresses TDM strategies implemented by the County Government, the report does not discuss Federal Government employment centers or urban centers located within municipalities.

1. Transportation Management Districts

   a. Legal Framework

County Code Chapter 42A, Ridesharing and Transportation Management, establishes the Council’s authority to establish Transportation Management Districts (TMDs) in certain areas of the County. Specifically, the law:

- Explains the purposes of transportation demand management;
- Stipulates what types of areas may be designated as TMDs;
- Describes the role of DOT and the Planning Board in managing TMDs;
- Requires developers and some businesses within TMDs to implement plans to reduce traffic;
- Requires DOT to monitor and report on transportation demand management outcomes in the TMD; and
- Authorizes a special TMD fee that may be charged to developers and property owners within the TMD.
**Purposes of Transportation Demand Management** The County Code describes the relationship between transportation demand management and County land use and development objectives. Specifically, the law states that the County desires to “focus new development in high transit-service areas” but that “limited transportation infrastructure, traffic congestion, pedestrian access, and safety issues impede the County’s land use and economic development objectives.”

The law identifies three purposes of transportation demand management. These are to:

- “Provide sufficient transportation capacity to achieve County land use objectives and permit further economic development;

- Reduce the demand for road capacity, and promote traffic safety and pedestrian access; and

- Help reduce vehicular emissions, energy consumption, and noise levels.”

According to the Code, transportation demand management will result in “improved traffic levels and air quality, and a reduction in ambient noise levels [that] will help create attractive and convenient places to live, work, visit, and conduct business.”

The Code also stipulates that transportation demand management measures should be conducted:

- In conjunction with transportation facility review, capital improvement projects, and parking and traffic control measures;

- With cooperation from government, developers, employers, property owners, and the public; and

- Consistent with commuting goals in the Growth Policy.

**Areas that may be Designated as Transportation Management Districts** The Code authorizes the Council to establish TMDs in:

- Metro station policy areas and adjacent areas served by the same transportation network; and

- An area where transportation review applies under the Growth Policy.

**Governance of TMDs** The Code authorizes both the Department of Transportation and the Planning Board to implement transportation demand management measures in TMDs, as shown in Table 3-1 on the next page. In addition, the Code allows the Executive and the Council to establish transportation management district advisory committees in each TMD. The law also allows DOT to enter into sole source contracts with a transportation management organization to carry out transportation demand management programs in a TMD.

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2 MCC §42A-22 (a) and (b).
3 MCC §42A-22 (c).
4 MCC §42A-22 (d).
5 MCC §42A-22 (c).
6 MCC §42A-22 (e).
7 MCC §42A-22 (f).
8 MCC §42A-23.
9 MCC §42A-23 (e).
10 MCC §42A-23 (c).
Table 3-1: Authority of DOT and the Planning Board in TMDs

<table>
<thead>
<tr>
<th>Department of Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Regulate or limit parking</td>
</tr>
<tr>
<td>• Monitor and assess traffic patterns and pedestrian access and safety</td>
</tr>
<tr>
<td>• Adopt traffic and parking control measures</td>
</tr>
<tr>
<td>• Provide approved transportation-related capital projects</td>
</tr>
<tr>
<td>• Promote or implement transit and ridesharing incentives</td>
</tr>
<tr>
<td>• Promote regional cooperation between the County and other government agencies</td>
</tr>
<tr>
<td>• Create cooperative County-private sector programs</td>
</tr>
<tr>
<td>• Conduct studies to determine the effectiveness of efforts</td>
</tr>
<tr>
<td>• Impose transportation demand management measures as conditions of the Planning Boards approval of development</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planning Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Impose transportation demand management measures as conditions of development approval</td>
</tr>
</tbody>
</table>

Source: Montgomery County Code, Chapter §42A-23

**Outcome Monitoring**: The Code requires DOT to monitor and report on the results of traffic mitigation measures in TMDs through an annual commuter survey and a biennial report.

**Annual Commuter Survey.** DOT must conduct an annual commuter survey in TMDs to gather data on employee commuting patterns and monitor progress toward achieving Growth Policy commuting goals. The Code requires employers to make a “good faith effort” to achieve an 80 percent completion rate.\(^{11}\)

**Biennial Executive Report.** DOT must submit a biennial report to TMD Advisory Committees, the Planning Board, and the County Council on:

- Employee commuting patterns;
- Auto occupancy rates;
- Level of service measurements for each intersection in the policy area and selected critical intersections outside the area;
- Parking supply and demand;
- Status of road or intersection improvement, signal automation, improved bicycle and pedestrian access and safety, and other traffic modification in or near the policy area;
- Transit use and availability;
- Carpool and vanpool use; and
- The source and use of any funds received for the TMD.\(^{12}\)

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\(^{11}\) MCC §42A-26.

\(^{12}\) MCC §42A-27.
**Funding TMDs:** The Code authorizes the Council to establish an annual fee to be charged to developers and owners of optional method projects in TMDs. Fee revenue must be used for TMD administration or program implementation in the district where it was collected. In addition, the County funds TMD activities with General Fund and Parking Lot District Fund revenue. (See Chapter V for a complete description of funding for TMDs.)

**b. Established Transportation Management Districts**

The Council has established five transportation management districts: North Bethesda, Downtown Bethesda, Friendship Heights, Downtown Silver Spring, and Shady Grove. Although the Council established the Shady Grove district in 2006,\textsuperscript{13} it remains unfunded and inactive.

**North Bethesda TMD:** The Council established the North Bethesda TMD in 1995.\textsuperscript{14} This TMD includes the Metro Station Policy Areas of Grosvenor, Twinbrook, and White Flint and the surrounding areas of Executive Boulevard, Rock Spring Park, and Montgomery Mall. (See map page 18.) DOT contracts with Transportation Action Partnership (TAP) to manage the North Bethesda TMD. The North Bethesda TMD has an advisory committee with 12-18 voting members and three non-voting members who are appointed by the TAP Board of Directors. The North Bethesda TMD receives funding from a TMD fee and parking fees from County-operated parking in the district.

**Bethesda TMD:** In 1998, the Council established a transportation management district within the Bethesda Central Business District.\textsuperscript{15} (See map page 19.) DOT contracts with the Bethesda Urban Partnership (BUP) to manage the TMD. The Bethesda TMD has an advisory committee with 11 voting members and five non-voting members appointed by the BUP Board of Directors. The Bethesda TMD receives funding from a TMD fee and revenue transferred from the Bethesda Parking Lot District Fund.

**Friendship Heights TMD:** The Council established a transportation management district in the Friendship Heights Sector Plan area in 1999.\textsuperscript{16} (See map page 20.) The DOT Division of Transit Services manages the TMD. The Friendship Heights TMD has an advisory committee with 14 voting members and eight non-voting members who are nominated by the County Executive and confirmed by the County Council. The Friendship Heights TMD receives funding from a TMD fee and the County’s Mass Transit Fund.

\textsuperscript{13} Resolution 15-1432  
\textsuperscript{14} Resolution 13-319  
\textsuperscript{15} Resolution 14-56  
\textsuperscript{16} Resolution 14-325
Silver Spring TMD: In 1987, the Council established a transportation management district in the Silver Spring Central Business District. This district was reauthorized in 2002 to update to reflect changes to County Code Chapter 42A, Ridesharing and Transportation Management. (See map page 21.) The DOT Division of Transit Services manages the TMD. The Downtown Silver Spring TMD has an advisory committee with 12 voting members and four non-voting members who are nominated by the County Executive and confirmed by the County Council. The TMD receives funding from the County’s Mass Transit Fund. Although authorized, no TMD fees have been collected in Silver Spring because no developments required to pay the fee have been completed. DOT expects that some fees will be collected in FY09. In FY09, the Silver Spring TMD is receiving a transfer of about $200,000 from the Silver Spring Parking Lot District Fund.

2. Wheaton Transportation Planning and Policy Area

DOT designated the Wheaton CBD as a transportation planning and policy area (TPPA) in 1993. (See map page 22). DOT considers the TPPA as a precursor to a potential TMD in the Wheaton CBD. Initiatives in the TPPA are similar to those in a TMD, but they are not mandated by law. Within the TPPA, the DOT Division of Transit Services:

- Provides technical and marketing support to employers;
- Markets transit subsidies and programs for employees;
- Encourages employers to voluntarily submit traffic mitigation plans;
- Consults with the Wheaton Urban District, the Mid-County Regional Services Center and Citizens Advisory Board, and Wheaton-Kensington Chamber of Commerce as advisory bodies for TPPA activities;
- Distributes, tabulates, and analyzes annual commuter surveys; and
- Produces periodic reports which include the status of transportation projects and services, parking supply and utilization, traffic counts at key intersections, and employee commute characteristics.

Transportation demand management activities in the Wheaton TPPA are funded with revenue from the County’s Mass Transit Fund and a transfer from the Wheaton Parking Lot District Fund.

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18 Resolution 14-1511
Exhibit 3-1:
North Bethesda Transportation Management District
Exhibit 3-2:
Bethesda Transportation Management District
Exhibit 3-3:
Friendship Heights Transportation Management District
Exhibit 3-4:
Silver Spring Transportation Management District
Exhibit 3-5:
Wheaton Transportation Planning and Policy Area
C. County Transportation Demand Management Policies and Programs

This section describes the transportation demand management policies and programs put in place by the County.

1. Master Plans and Growth Policy

The County’s transportation demand management strategies in urban areas are guided by area master and sector plans and the Growth Policy. Master and sector plans establish County policy regarding the location and type of growth. These policy documents seek to manage travel demand by concentrating development in urban areas served well by transit. Growth policy transportation review standards (for both Policy Area Mobility Review and Local Area Transportation Review) allow greater levels of congestion in transit-served areas and the reduction of transportation impact tax rates in Metro Station Policy Areas.

Master and sector plans establish goals for “non-auto driver mode share,” or a percentage of commuters who travel by a method other than single-occupancy vehicles. These goals are carried over to the Growth Policy, which is revised on a biannual basis. The table below shows the mode share goals for each TMD. The 1989 Wheaton CBD Sector Plan does not include a mode share goal.

<table>
<thead>
<tr>
<th>TMD</th>
<th>Adoption Date</th>
<th>Non-Auto Driver Mode Share Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Bethesda</td>
<td>1994</td>
<td>39%</td>
</tr>
<tr>
<td>Bethesda</td>
<td>1994</td>
<td>37%</td>
</tr>
<tr>
<td>Friendship Heights</td>
<td>1998</td>
<td>39%</td>
</tr>
<tr>
<td>Silver Spring</td>
<td>2000</td>
<td>50% - new nonresidential development, 46% - employers with 25 or more employees</td>
</tr>
</tbody>
</table>

Source: County Council Resolution 16-376, 2007-2009 Growth Policy

In Bethesda, mode share achievement levels control the staging of development approvals. For example, before moving from Stage One development to Stage Two development under the 1994 Bethesda CBD sector plan, downtown Bethesda had to achieve a mode share of 32 percent.

2. Transit Network

The County’s transit network consists of inter-related systems: MTA Commuter Buses, MARC Train, Metrorail, Metrobus, and Ride On Bus. The Maryland Transit Administration (MTA) operates MTA Commuter Buses and MARC and the Washington Metropolitan Area Transit Authority manages Metrobus and Metrorail. The County Department of Transportation operates the Ride On Bus system.
MTA Commuter Buses: The Maryland Transit Administration operates three commuter buses that serve Montgomery County. Two of the buses travel the Route 29 corridor with stops in Burtonsville and Silver Spring. The third bus travels the I-270 corridor with stops at Shady Grove Metro station and several stops in the Rock Springs Business Park in the North Bethesda TMD. Buses primarily travel southbound during the morning commute and northbound in the afternoon and evening.

MARC Train: The MARC train Brunswick Line serves Montgomery County with 11 stations, including a stop in Silver Spring. During the morning commute, nine trains run southbound to Washington, DC only. One afternoon train runs northbound only, and nine trains run northbound only in the evening. Trains do not run on weekends. Trains do not stop at all stations on each run.

Metrorail: The Metrorail red line serves Montgomery County at 12 stations along the MD 355 and MD 97 corridors, including stations in North Bethesda (Twinbrook, White Flint, and Grosvenor) and in the Bethesda, Friendship Heights, Silver Spring, and Wheaton Central Business Districts. During peak commute times (weekdays 5 a.m. - 9:30 a.m. and 3 - 7 p.m.) trains run between Shady Grove and Glenmont with five minute headways and between Silver Spring and Grosvenor with 2.5 minute headways.

DOT reports that on an average weekday, about 85,000 people board Metrorail in Montgomery County. Stations with the most boardings are Silver Spring and Shady Grove (about 15,000 each) followed by Bethesda and Friendship Heights (about 10,000 each).

Metrobus: WMATA operates 21 bus routes in Montgomery County. At least 20 of these routes serve the four TMDs and the Wheaton TPPA during peak hours. Headways on these routes vary from three to 30 minutes. WMATA reported a 2.4 percent ridership increase for Montgomery County routes in FY08.19

Ride On Bus: The County Department of Transportation operates the Ride On Bus system. Ride on operates 77 weekday routes, 42 Saturday routes, and 33 Sunday routes. Also, Ride On operates three Metrobus routes on the weekends. During peak periods, Ride On operates 77 routes with headways ranging from 30 minutes to less than 10 minutes. 37 of these routes serve TMDs or the Wheaton TPPA.

Ride On reports that for peak period bus service, 79 percent of the County's population lives within a ¼ mile from a Ride On bus route and 89 percent of employment in the County is within ¼ mile from a bus route.20

Over the last four years, Ride On reports that ridership has increased by 28 percent. In FY08, overall ridership increased by 5.1 percent from FY07. In comparing weekday trips in June 2007 and June 2008, Ride On found an increase of 6.2 percent. Ride On also reported a decrease in schedule adherence from FY07 to FY08, with 82.1 percent of trips running on time in FY07 compared to 79.3 percent in FY08.
Ride On routinely collects route-specific ridership data and gathers additional information when they receive reports of overcrowding or schedule adherence problems. Ride On reports that 12 - 15 routes currently reach capacity during peak hours on regular basis. As a result, many buses must pass bus stops without picking up passengers for lack of space. When possible, Ride On redistributes resources from underutilized routes to stronger performing routes.

Table 3-3 summarizes the level of rail and bus transit service available to County commuters.

<table>
<thead>
<tr>
<th>Area</th>
<th>MTA Commuter Bus</th>
<th>MARC Stations</th>
<th>Metrorail Stations</th>
<th>Metrobus Routes</th>
<th>Ride On Bus Routes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countywide</td>
<td>3 routes</td>
<td>11 stations</td>
<td>12 stations</td>
<td>21 routes</td>
<td>77 routes</td>
</tr>
<tr>
<td></td>
<td>Headways vary</td>
<td>Headways vary</td>
<td>2.5 and 5 min.</td>
<td>3-30 min.</td>
<td>4-30 min. headways</td>
</tr>
<tr>
<td>TMDs/TPPA</td>
<td>3 routes</td>
<td>1 station</td>
<td>7 stations</td>
<td>20 routes</td>
<td>37 routes</td>
</tr>
<tr>
<td></td>
<td>Headways vary</td>
<td>Headways vary</td>
<td>2.5 and 5 min.</td>
<td>3-30 min.</td>
<td>8-30 min. headways</td>
</tr>
</tbody>
</table>

### 3. Bicycle Facilities and Pedestrian Facilities

The presence of a well developed bicycle and pedestrian network assists some commuters’ travel to urban centers and provides mobility options within an urban center for employees who do not travel by automobile.

#### a. Bikeways

The County ‘s 2005 Countywide Bikeways Functional Master Plan includes bikeways throughout the County that connect “major activity centers: municipalities, central business districts, town centers, transit stations, major employment hubs, countywide park trails and regional parks.”

In all, the plan includes about 200 existing and proposed bikeways (about 500 miles). The table below provides a brief summary of the number of existing, partially completed, and proposed bikeways that connected directly to urban centers as of 2005. As shown in Table 3-4, the majority of planned urban center bikeways are unbuilt.

<table>
<thead>
<tr>
<th>TMD/TPPA</th>
<th>Existing</th>
<th>Partially Completed</th>
<th>Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Bethesda</td>
<td>4</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Bethesda</td>
<td>3</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Friendship Heights</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Silver Spring</td>
<td>1</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Wheaton</td>
<td>0</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>8</strong></td>
<td><strong>8</strong></td>
<td><strong>46</strong></td>
</tr>
</tbody>
</table>

Source: 2005 Countywide Bikeways Functional Master Plan

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21 2005 Countywide Bikeways Functional Master Plan, p. 1
Bikeway planning, design, and construction may be funded by the County, State, Federal Government, or private developers.

**Montgomery County:** Bikeway construction may be included in capital improvement projects for road improvements, intersection improvements, the annual bikeway program, the annual sidewalk program, independent sidewalk projects, streetscape projects, and independent bikeway projects. The County’s FY09-FY14 Capital Improvements Program (CIP) includes an Annual Bikeway Program that “plans, designs, and constructs bikeways and trails throughout the County.” The CIP allocates about $3 million over six years to this project and specifies that facilities constructed under this project “will cost less than $300,000 each.” The current CIP also includes four independent bikeway projects, including one in the Silver Spring TMD.

**State of Maryland:** Bikeways on or alongside State highways may be constructed with funding from the State of Maryland’s consolidated Transportation Program. This program receives funding from vehicle titling and registration fees, gas taxes, corporate income taxes, and Federal funding.

**Federal Government:** The State receives annual Federal transportation funding that may be used for bikeway construction. For example, the State used Federal funding to support construction of the Capital Crescent Trail.

**Private Developers:** Developers may be required to construct or improve bikeways as a condition of development approval.22

In FY08, the Council approved a budget of $100,000 for bikeway maintenance. In FY09, this amount increased to $250,000.

### b. Bicycles and Transit

Metrobus, Metrorail, and Ride On Bus provide bicycle accommodations for people who combine bicycling and transit. MTA Commuter buses do not permit riders to bring bicycles. Specifically,

**Metrorail:** Metro provides bicycle storage facilities, including lockers and bike racks at Metro stations. Table 3-5 on the next page presents data on storage facilities in the four TMDs and in the Wheaton TPPA. Bicycles are not permitted on trains during peak hours.

**Metrobus:** All Metrobuses are equipped with bike racks that hold up to two bikes.

**Ride On Bus:** All Ride On buses are equipped with bike racks that hold up to two bikes.

---

22 2005 Countywide Bikeways Functional Master Plan, pp. 80-81
Table 3-5: Bike Storage Facilities in TMDs/TPPA, 2003

<table>
<thead>
<tr>
<th>TMD/TPPA</th>
<th>Metro Station</th>
<th>Bike Lockers</th>
<th>Bike Racks</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Bethesda</td>
<td>Twinbrook</td>
<td>26</td>
<td>68</td>
<td>Lockers – 20% Racks - moderate</td>
</tr>
<tr>
<td></td>
<td>White Flint</td>
<td>20</td>
<td>32</td>
<td>Lockers and racks – less than 50%</td>
</tr>
<tr>
<td></td>
<td>Grosvenor</td>
<td>30</td>
<td>40</td>
<td>Both moderate</td>
</tr>
<tr>
<td>Bethesda</td>
<td>Bethesda</td>
<td>44</td>
<td>60</td>
<td>Both near capacity</td>
</tr>
<tr>
<td>Friendship Heights</td>
<td>Friendship Heights</td>
<td>22</td>
<td>32</td>
<td>Both near capacity</td>
</tr>
<tr>
<td>Silver Spring</td>
<td>Silver Spring</td>
<td>30</td>
<td>40</td>
<td>Lockers – 50% Racks – moderate</td>
</tr>
<tr>
<td>Wheaton</td>
<td>Wheaton</td>
<td>20</td>
<td>40</td>
<td>Lockers – 50% Racks – light</td>
</tr>
</tbody>
</table>

Source: 2005 Countywide Bikeways Functional Master Plan

c. Pedestrian Facilities

The County does not have a Countywide functional master plan for pedestrian facilities. The master plans for North Bethesda and the Bethesda, Friendship Heights, and Silver Spring Central Business Districts recommend pedestrian-friendly features such as wider sidewalks on busier streets, streetscaping, mid-block signals for pedestrian crossings, and restrictions on allowing drivers to turn right on red.

DOT maintains sidewalks and makes upgrades such as installing pedestrian countdown signals at crosswalks. DOT also administers Countywide contracts for crosswalk and lighting maintenance. The County makes sidewalk improvements through the Capital Improvements Program. Projects with pedestrian improvements include road projects, independent sidewalk projects, and the Annual Sidewalk Program. The Annual Sidewalk Program primarily targets residential areas and the projects are smaller in scope than independent sidewalk projects. Additionally, the Planning Board may require developers to make pedestrian improvements as part of their development approval.

23 In downtown Bethesda, the Bethesda Urban Partnership maintains sidewalks within the Bethesda Urban District, which is part of the TMD.
4. Share-a-Ride Districts

County Code Chapter 42A establishes share-a-ride districts in the Silver Spring and Bethesda Central Business Districts. The purpose of share-a-ride districts is to encourage carpooling, vanpooling, and transit ridership. Within these districts, the Code requires the County Executive to establish ridesharing programs that include promoting carpooling/vanpooling and transit, providing personalized ride matching, and promoting incentives such as discounted transit passes.

The Code authorizes the County Executive to establish additional share-a-ride districts in employment areas with large concentrations of office space. The Executive also may establish share-a-ride outreach areas in areas with lower concentrations of office space. The County Executive has designated share-a-ride districts in North Bethesda and Friendship Heights. The Executive has not created any share-a-ride outreach districts.

Within a share-a-ride district, the Code also allows a development to obtain a reduction in its minimum parking requirements from the Planning Board if the developer agrees to participate in a County-operated share-a-ride program, provide ridesharing incentives, and pay an annual fee to the County ’s ridesharing account (part of the Mass Transit Facilities Fund). The County uses ridesharing account revenue to:

- Operate a program that promotes carpooling, vanpooling, and transit use;
- Provide personalized matching for applicants for carpools or vanpools; and
- Promote ridesharing incentives (e.g., preferential carpool parking or discounted transit passes).

Because all current share-a-ride districts are located in TMDs, DOT offers participation in the parking reduction provisions of share-a-ride districts as one tool for developers to use to meet traffic mitigation requirements (see Section 5, below). The Department of Planning reports that, at present, only nine developments participate in this option.

5. Developer and Employer Traffic Mitigation Measures

Developer Traffic Mitigation Agreements: Chapter 42A of the County Code requires all applicants for subdivision or optional method development within a TMD to complete a traffic mitigation agreement “to ensure that public transportation will be adequate to meet commuting goals set in the Annual Growth Policy.” The law also permits the County to require developers outside of a TMD to complete a traffic mitigation agreement. Agreements may include measures that limit parking, incentivize carpooling or vanpooling, or subsidize transit. Outside of TMDs, traffic mitigation agreements typically require developments to comply with trip generation limits. Within TMDs, measures included in traffic mitigation agreements must contribute to meeting the area mode share goal established in the Growth Policy.

24 MCC §42A-5.
25 MCC §42A-6.
26 MCC §42A-25.
DOT’s Division of Transit Services and M-NCPPC’s Department of Planning work with developers to draft traffic mitigation agreements. For the North Bethesda and Bethesda TMDs, the County contractors who operate the TMDs also comment on proposed traffic mitigation measures. Typically, agreements are submitted with the preliminary plan during the development approval process and finalized with the certified site plan.

The Department of Planning’s Division of Transportation Planning monitors traffic mitigation agreement implementation outside of TMDs. DOT monitors implementation within TMDs.

Table 3-6 shows traffic mitigation agreement measures that are either required or suggested by County Code, DOT, or the Planning Board. Appendix A provides a sample agreement.

Table 3-6: Developer Traffic Mitigation Agreement Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>County Code</th>
<th>DOT/Planning Board*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact person designated to receive and distribute information</td>
<td>S**</td>
<td>R</td>
</tr>
<tr>
<td>Permanent display area for transportation information</td>
<td>S</td>
<td>R</td>
</tr>
<tr>
<td>Providing periodic space for marketing activities of the district</td>
<td>S</td>
<td>R</td>
</tr>
<tr>
<td>Financial or other participation in building or operating on- or off-site transportation facilities or systems</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Limits on parking spaces</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Peak period/Single occupancy vehicle parking charges</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Preferential parking for carpoools/vanpools</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Subsidized transit</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>ADA information provided (transportation services for people with disabilities)</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Annual Commuter Survey distributed to employees (supplied by TMD)</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Compile information on yearly activities and submit Annual Report</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Guaranteed Ride Home Promotion (regional program offering emergency rides)</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Information on transit/pooling/other commute alternatives distributed/posted regularly</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Carpool/vanpool incentives (e.g., ride matching, reduced-rate parking)</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Car sharing incentives</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Facilitate TMD staff presentations to employees and HR/Administrative staff on commuter information/alternatives on periodic basis</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Transit/bicycle/pedestrian amenities (e.g., bus benches, bike racks, showers)</td>
<td>S</td>
<td></td>
</tr>
</tbody>
</table>

*Required elements are sometimes adapted to allow for specific circumstances for developers and employers

**Required by law for traffic mitigation agreements outside of TMDs

Employer Traffic Mitigation Plans: County Code Chapter 42A also requires employers in a TMD who have 25 or more employees to submit a traffic mitigation plan to the Department of Transportation. In some cases, DOT may require the owner of a multi-family residential building to submit a plan. Employers submit annual reports on plan implementation to the DOT Division of Transit Services. The Division of Transit Services reports that it aims to make direct contact with employers two to three times per year to assist them with plan implementation.

Table 3-7 lists suggested and required measures that may be included in employer traffic mitigation plans. See Appendix B for a sample traffic mitigation plan.

<table>
<thead>
<tr>
<th>Measure</th>
<th>County Code</th>
<th>DOT/Planning Board*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative work hours</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Carpools/vanpools incentives (e.g., preferential parking location, ride matching, free or reduced-rate parking)</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Peak period/SOV parking charges</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Subsidized transit</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Telework</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Transit/Bicycle/pedestrian amenities (e.g., bus benches, bike racks, showers)</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>ADA information provided (transportation services for people with disabilities)</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Annual Commuter Survey distributed to employees (supplied by TMD)</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Contact person designated to receive and distribute information</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Compile information on yearly activities and submit Annual Report</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Facilitate presentations to employees and HR/Administrative staff on commute information/alternatives on periodic basis</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Guaranteed Ride Home Promotion (regional program offering emergency rides)</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Information on transit/pooling/other commute alternatives distributed/ posted regularly</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Permanent display area for TMD-provided bus schedules and other transportation information</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Car sharing incentives</td>
<td>S</td>
<td></td>
</tr>
</tbody>
</table>

*Required elements are sometimes adapted to allow for specific circumstances for developers and employers

**Active Traffic Mitigation Agreements and Plans** Table 3-8 shows the active number of traffic mitigation agreements and plans in place both within and outside the transportation management districts.

**Table 3-8: Number of Active Traffic Mitigation Agreements and Plans, November 2008**

<table>
<thead>
<tr>
<th>Area</th>
<th>Number of Developer Agreements</th>
<th>Number of Employer Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Bethesda</td>
<td>18</td>
<td>160</td>
</tr>
<tr>
<td>Downtown Bethesda</td>
<td>16</td>
<td>130</td>
</tr>
<tr>
<td>Friendship Heights</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>Silver Spring</td>
<td>15</td>
<td>80</td>
</tr>
<tr>
<td>All other areas</td>
<td>31</td>
<td>50*</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>83</strong></td>
<td><strong>450</strong></td>
</tr>
</tbody>
</table>

*Voluntary plans outside of TMDs
Source: Department of Planning and DOT Transit Services

**Other Traffic Mitigation Efforts:** Although the County does not have jurisdiction over Federal campuses in Montgomery County, the Planning Board and Planning Department provide advisory comments regarding traffic mitigation to the National Capital Planning Commission for specific Federal projects. In addition, DOT's Division of Transit services has worked with Federal agencies to provide employees with information on transportation alternatives. The Division of Transit Services also conducts an annual commuter survey at Federal agencies.

### 6. County Transit Subsidies

The County Government provides financial assistance to employers throughout the County who offer transit subsidies to their employees. Under Federal law, employers may offer up to $115 per month to employees as a tax free benefit. The County has two transit subsidy programs: Fare Share and Super Fare Share. Under these programs, the County pays a portion of employers’ costs for their employees’ transit subsidy.

Fare Share is a three-year subsidy offered to employers throughout the County, while Super Fare Share is a nine-year subsidy available only to employers in TMDs. For each program, the County’s share of the employer subsidy declines over time. At the end of the program term, employers are encouraged, but not required, to continue providing the subsidy. Table 3-9, on the next page, shows the County and employer subsidy contributions for each year of the programs.
**Table 3-9: County and Employer Contributions to Fare Share and Super Fare Share Programs**

<table>
<thead>
<tr>
<th>Year</th>
<th>Fare Share</th>
<th>Super Fare Share</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>County</td>
<td>Employer</td>
</tr>
<tr>
<td>1</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>2</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>3</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>No County contribution</td>
<td>No mandatory employer contribution</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: DOT, Division of Transit Services

In Wheaton, the County offers a hybrid program. For the first six months the County will pay up to $114 per employee with the employer paying $1 per month. After the first six months, the program follows the Fare Share schedule.

7. Promoting Alternate Modes of Transportation

The DOT Division of Transit Services Commuter Services Section promotes the use of alternative modes of transportation and implements transportation demand management programs. The responsibilities of the Commuter Services Section include:

- Marketing alternate transportation options to workers and residents in the County;
- Encouraging employers to promote alternate transportation options for their workers;
- Promoting and implementing programs such as Fare Share and Super Fare Share;
- Providing personalized rideshare matching for carpools and vanpools; and
- Overseeing the County’s transportation management districts.

The Commuter Services Section implements Countywide outreach and programs and directly manages the Silver Spring and Friendship Heights TMDs and the Wheaton TPPA. For the North Bethesda and downtown Bethesda TMDs, the Commuter Services Section manages contracts with private organizations that provide transportation demand management services.

DOT uses direct mail, advertising, the County website, and special events to reach employers and employees. While DOT offers transportation demand management services and programs to employers in all areas of the County, the Department dedicates the majority of commuter service resources to programs in the transportation management districts.
The table below describes programs and incentives provided or promoted by DOT to encourage commuters to use alternative modes of transportation.

**Table 3-10: Transportation Demand Management Programs Provided or Promoted by DOT**

<table>
<thead>
<tr>
<th>Program or Incentive</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>For Employers</strong></td>
<td></td>
</tr>
<tr>
<td>Maryland Commuter Choice Tax Credit</td>
<td>Offers Maryland employers, including 501c(3) or (4) organizations, a tax credit for 50% of the eligible costs of providing commuter benefits, up to a maximum of $50 per participating employee per month.</td>
</tr>
<tr>
<td>SmartBenefits Program</td>
<td>Allows employers to load a transit subsidy directly onto an employee's SmarTrip Card, which can be used on Metrorail, Metrobus, and Ride On buses.</td>
</tr>
<tr>
<td>Fare Share and Super Fare Share Programs</td>
<td>Provides County funding to help employers provide transit subsidies</td>
</tr>
<tr>
<td>Telework</td>
<td>Employers allow employees to work off-site (e.g., at home) for one or more days per week.</td>
</tr>
<tr>
<td>Alternate work schedules</td>
<td>Provides methods for employers to reduce peak travel time trips by offering employees flextime, compressed work week, and job sharing opportunities.</td>
</tr>
<tr>
<td><strong>For Employees</strong></td>
<td></td>
</tr>
<tr>
<td>Commuter Information Days</td>
<td>Present information to employees at their worksites about alternative transportation</td>
</tr>
<tr>
<td>Transit Information</td>
<td>Provide information about routes and fares for public transit</td>
</tr>
<tr>
<td>Customized trip planning</td>
<td>Assist employees to plan a commute trip using the public transit system. Information is available online, by email, and by phone.</td>
</tr>
<tr>
<td>Carpool and Vanpool</td>
<td>Personalized rideshare matching for joining or forming a carpool or vanpool</td>
</tr>
<tr>
<td>Park-and-Ride Lots</td>
<td>Provide information about free or reduced-price parking for carpool or vanpool vehicles. Authorizes free or reduce-price parking permits for carpools or vanpools</td>
</tr>
<tr>
<td>Car Sharing</td>
<td>Short-term car rentals (e.g., Zipcar)</td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>Provides commuters who regularly (twice a week) carpool, vanpool, bike, walk, or take transit to work with a free ride home for unexpected emergencies or for unscheduled, mandated overtime. May be used four times per year. Run by Commuter Connections, Washington Metropolitan Council of Governments.</td>
</tr>
<tr>
<td>Biking Information</td>
<td>Provide information on the County's bikeway program, including bike maps and safety tips</td>
</tr>
<tr>
<td>TRIPS Commuter Stores</td>
<td>Walk-in location for purchasing fare media, obtaining information about alternative modes of travel, and receiving ride matching assistance</td>
</tr>
</tbody>
</table>

Source: Department of Transportation
CHAPTER IV: COUNTY PARKING POLICIES AND COMMUTER CHOICE

This chapter discusses how County policies on the supply and cost of parking in urban centers influences commuters’ choice of travel mode.

Section A, Zoning Ordinance Parking Requirements, describes the Zoning Ordinance requirements for providing parking for new developments;

Section B, Parking Lot Districts, describes the purpose of County parking lot districts and the supply and pricing of parking spaces in those districts; and

Section C, Other Publicly Managed Parking Spaces, discusses publicly provided parking outside of the parking lot districts.

A. Zoning Ordinance Parking Requirements

The County Zoning Ordinance establishes minimum parking requirements for different types of land uses. For the most part, these requirements are identical for similar uses throughout the County. However, two provisions lower the number of parking spaces required for office buildings in certain urban centers.

Metro Station Proximity Parking Reduction: The Zoning Ordinance allows for reduction of the minimum parking requirement for office buildings in close proximity to Metro stations. The reduction in office parking requirements varies by geographic area of the County. The urban centers studied in this report are located either in the “southern” or “south central” areas of the County as delineated in the Zoning Ordinance. An office building in one of these centers would qualify for a reduced parking requirement based on its proximity to a Metro station. Table 4-1 shows the minimum parking requirements for office buildings in the “southern” or “south central” areas of the County and the reductions allowed for developments located within 800 feet and 1,600 feet of a Metro station.

<table>
<thead>
<tr>
<th>Proximity to Metro Station</th>
<th>Southern County (includes Bethesda, Friendship Heights, and Silver Spring)</th>
<th>South Central County (includes North Bethesda and Wheaton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 800’</td>
<td>1.9</td>
<td>2.3</td>
</tr>
<tr>
<td>800’ – 1600’</td>
<td>2.1</td>
<td>2.4</td>
</tr>
<tr>
<td>More than 1600’</td>
<td>2.4</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Table 4-1: Office Building Parking Requirements
(Parking Spaces per 1,000 Gross Square Feet)

The Zoning Ordinance does not grant a parking space reduction for office developments located more than 1,600 feet from a Metrorail station (about one-third of a mile) even if the building is on a route served by Metrobus or Ride On bus.¹ Instead, office buildings in urban centers that

¹ Unless the building is located in a share-a-ride district and the property owner enters into a share-a-ride agreement.
are served by bus transit but located more than a third of a mile from a Metrorail station must provide the same amount of parking as offices located in any other part of the County.

The parking space reductions for developments near Metro stations do not correspond with the commuting goals established in the Growth Policy for these areas. (Growth Policy commuting goals are the target percentage of non-driving workers that commute to an area of the County.) For example, a development in Silver Spring built immediately adjacent to Metro must provide 26 percent fewer parking spaces than a similar development located elsewhere in the County. However, this parking space reduction falls well below the 46 percent non-driver commuting goal for Silver Spring set in the Growth Policy. Table 4-2 compares parking reductions and commuting goals for Silver Spring and North Bethesda. In each case, the Metro proximity parking reduction is substantially less than the target commuting goal. County parking requirements assume that some commuters will travel by alternative means. Therefore, a parking reduction percentage need not be identical to the commuting goal percentage to achieve the same overall modal split.

### Table 4-2: Comparison of Metro Proximity Parking Reductions and Growth Policy Commuting Goals

<table>
<thead>
<tr>
<th></th>
<th>Silver Spring</th>
<th>North Bethesda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Metro Proximity Parking Reduction</td>
<td>26%</td>
<td>17%</td>
</tr>
<tr>
<td>Growth Policy Commuting Goal</td>
<td>46%</td>
<td>39%</td>
</tr>
</tbody>
</table>

**Share-A-Ride District Parking Reduction:** The Zoning Ordinance allows a parking reduction of 15 percent for office buildings in certain areas of the County that are designated as share-a-ride districts. Developers who receive the parking reduction pay an annual fee to the County’s ridesharing account, participate in a County-operated share-a-ride program, and provide ridesharing incentives. A development may not receive both the share-a-ride and the Metro proximity parking reduction.

### B. Parking Lot Districts

The County Government is a major supplier of parking spaces in urban centers. The DOT Division of Parking Management oversees County-operated parking facilities.

#### 1. Location and Purpose of Parking Lot Districts

Chapter 60 of the County Code establishes the following four parking lot districts in the County:

1. Bethesda Parking Lot District;
2. Silver Spring Parking Lot District;
3. Wheaton Parking Lot District; and

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2 An office within 800 feet of a Metro must provide 1.9 parking spaces per 1,000 gross square feet (gsf) compared to the 2.4 space per 1,000 gsf required for offices more than 1,600 feet from the Metro. The difference of 0.5 parking spaces per 1,000 gsf is 26% lower than the base parking requirement of 2.4 spaces per 1,000 gsf.

3 MCC § 59-E-3.31
The Code defines the boundaries of each parking lot district (PLD). Since the Montgomery Hills area does not meet the criteria for an “urban center” as defined in Chapter III, this report focuses primarily on the Silver Spring, Bethesda, and Wheaton Parking Lot Districts.

The County created the parking lot districts in the late 1940s and early 1950s. The purpose of these districts is to give property owners an off-site alternative to satisfying the on-site parking requirements of the Zoning Ordinance. In lieu of providing parking on-site, non-residential property owners in a parking lot district (PLD) may opt to pay an annual ad valorem tax to fund the construction and maintenance of public parking facilities.

2. Parking Lot District Capacity and Occupancy Rates

As shown in Table 4-3, PLDs provide more than 20,000 parking spaces in Bethesda, Silver Spring, and Wheaton.

<table>
<thead>
<tr>
<th></th>
<th>Bethesda</th>
<th>Silver Spring</th>
<th>Wheaton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot Spaces</td>
<td>877</td>
<td>430</td>
<td>427</td>
</tr>
<tr>
<td>Garage Spaces</td>
<td>5,822</td>
<td>10,590</td>
<td>628</td>
</tr>
<tr>
<td>On-Street Spaces</td>
<td>802</td>
<td>1,046</td>
<td>409</td>
</tr>
<tr>
<td><strong>Total spaces</strong></td>
<td><strong>7,501</strong></td>
<td><strong>12,066</strong></td>
<td><strong>1,464</strong></td>
</tr>
</tbody>
</table>

Source: Department of Transportation

In each PLD, the County designates spaces for short-term or long-term use. Short-term parking (less than three hours) is primarily intended for customers and clients of area businesses. Long-term parking (three or more hours) is available for drivers who work in the area or who switch to transit to complete their commute.

DOT periodically adjusts the mix of short-term and long-term parking spaces based on parking space vacancy rate surveys and input from parkers and businesses. As shown in Table 4-4 on the following page, DOT allocates the majority of PLD parking spaces for long-term parkers; however, short-term visitors often will park in long-term spaces. Since current land use patterns in Silver Spring require more parking for full-day employees, the Silver Spring PLD has the largest percentage of long-term spaces (84%). By comparison, in Wheaton, where a higher percentage of parkers are customers of retail establishments, DOT has designated a relatively high percentage (37%) of PLD space for short-term parking.
Table 4-4: Mix of Short-Term and Long-Term Parking Spaces (June 2008)

<table>
<thead>
<tr>
<th></th>
<th>Bethesda</th>
<th>Silver Spring</th>
<th>Wheaton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Term Spaces</td>
<td>24%</td>
<td>10%</td>
<td>37%</td>
</tr>
<tr>
<td>Long-Term Spaces *</td>
<td>72%</td>
<td>84%</td>
<td>61%</td>
</tr>
<tr>
<td>Other Spaces **</td>
<td>4%</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Total spaces</strong></td>
<td>7,501</td>
<td>12,066</td>
<td>1,464</td>
</tr>
</tbody>
</table>

Source: Department of Transportation
* Long-term spaces include carpool and permit spaces.
** Other spaces consist of handicapped parking and spaces reserved for government vehicles.

Parking space peak hour occupancy rates also vary among the PLDs. DOT conducts monthly surveys of parking facility occupancy rates during peak usage hours (weekdays from 10 a.m. to 2 p.m.). As shown in Table 4-5, in FY08, about 84 percent of Bethesda PLD spaces were occupied during peak hours. Silver Spring and Wheaton occupancy rates were both near 60 percent. In all PLDs, occupancy rates were significantly higher for long-term spaces than for short-term spaces.

Table 4-5: Parking Lot District Occupancy Rates (Peak Hours, FY08)

<table>
<thead>
<tr>
<th></th>
<th>Bethesda</th>
<th>Silver Spring</th>
<th>Wheaton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Term Spaces</td>
<td>78%</td>
<td>49%</td>
<td>57%</td>
</tr>
<tr>
<td>Long-Term Spaces *</td>
<td>86%</td>
<td>61%</td>
<td>62%</td>
</tr>
<tr>
<td>All Spaces</td>
<td>84%</td>
<td>60%</td>
<td>61%</td>
</tr>
</tbody>
</table>

Source: Department of Transportation
* Long-term spaces include carpool and permit spaces.
2. Parking Lot District Rates

The Council establishes parking rates for each PLD by resolution. PLD parking rates include different rates for short-term parking (less than three hours), long-term parking (three or more hours), daily permits, and monthly permits. Table 4-6 shows the PLD parking rates approved by the Council to take effect on July 1, 2008.4

Table 4-6: Parking Lot District Parking Rates – Effective July 1, 2008

<table>
<thead>
<tr>
<th></th>
<th>Bethesda</th>
<th>Silver Spring</th>
<th>Wheaton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term rate (up to 3 hours)</td>
<td>$0.75 / hour</td>
<td>$0.75 / hour</td>
<td>$0.50 / hour</td>
</tr>
<tr>
<td>Long-term rate (3 or more hours)</td>
<td>$0.50 / hour</td>
<td>$0.50 / hour</td>
<td>$0.50 / hour</td>
</tr>
<tr>
<td>Daily permit rate</td>
<td>$8.25 / day</td>
<td>$6.00 / day</td>
<td>Not available</td>
</tr>
<tr>
<td>Monthly permit rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-occupant vehicle</td>
<td>$95.00 / month</td>
<td>$95.00 / month</td>
<td>$95.00 / month</td>
</tr>
<tr>
<td>2 person carpool</td>
<td>$70.00 / month</td>
<td>$65.00 / month</td>
<td>Not available</td>
</tr>
<tr>
<td>3 or 4 person carpool</td>
<td>$40.00 / month</td>
<td>$35.00 / month</td>
<td>Not available</td>
</tr>
<tr>
<td>5 or more person carpool</td>
<td>$10.00 / month</td>
<td>$5.00 / month</td>
<td>Not available</td>
</tr>
</tbody>
</table>

Source: Department of Transportation

Short-Term versus Long-Term Parking Rates: As seen in Table 4-6, the short-term hourly rate is $0.25 higher than the long-term hourly rate in the Bethesda and Silver Spring PLDs. In the Wheaton PLD, the short-term and long-term hourly rates are the same.

Daily Parking Permit Rates: The Bethesda and Silver Spring PLDs offer daily parking permits. At $8.25 per day, the permit fee in Bethesda is 38 percent higher than the Silver Spring permit fee of $6.00 per day.

Monthly Permits: At $95 per month, the cost of a monthly parking permit is identical in the Bethesda, Silver Spring and Wheaton PLDs.

Carpool Discounts: In the Bethesda and Silver Spring PLDs, the County discounts the $95 monthly parking permit for carpools. In Bethesda, a monthly parking permit for a two-person carpool is $70 (a 26% discount) and a permit for a five-person carpool is $10 (an 89% discount). The carpool discounts in the Silver Spring PLD are even higher. The County does not offer discounted rates for carpools in the Wheaton PLD.

In many urban centers around the country, commercial entities control the majority of paid parking spaces. In communities such as these, the private sector sets parking prices based on market demand. Commercial parking facilities in urban centers must raise revenue to cover the cost of facility construction and operations. While the Council must set PLD rates to meet

As a result, PLD parking rates in some areas fall well below rates charged in privately-operated commercial facilities. For example, while the County charges $95 for a monthly PLD permit, a monthly pass in a commercial facility in the Bethesda Central Business District currently costs between $120 and $145 according to a recent DOT pricing survey.

C. Other Publicly Managed Parking Spaces

The five urban centers that are the focus of this report include two areas that do not have parking lot districts: North Bethesda and Friendship Heights. Even without a formal parking lot district, a supply of public parking exists in these two areas. In North Bethesda, the County manages over 1,000 parking spaces. On-street spaces are paid, while parking lot spaces are free. As shown in Table 4-7, a majority of these spaces are designated for short-term parking.

<table>
<thead>
<tr>
<th>Parking Duration</th>
<th>Parking Spot Location</th>
<th>Total spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Term Metered Spaces</td>
<td>On-Street Spaces</td>
<td>632</td>
</tr>
<tr>
<td>Long-Term Metered Spaces</td>
<td></td>
<td>257</td>
</tr>
<tr>
<td>Non-Metered Spaces</td>
<td>Parking Lot Spaces</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total spaces</strong></td>
<td><strong>Total spaces</strong></td>
<td><strong>1,089</strong></td>
</tr>
</tbody>
</table>

Source: Department of Transportation

In the Friendship Heights Transportation Management District, the Village of Friendship Heights manages 200 short-term on-street parking spaces.
CHAPTER V: TRANSIT AND TRANSPORTATION DEMAND MANAGEMENT FUNDING

Transportation infrastructure, including rail and bus systems, bikeways, and pedestrian facilities are funded through multiple County and non-County sources. This chapter describes the major sources of funding for County transit and transportation demand management programs in four sections:

Section A, **Transit System Funding**, identifies the funding sources for transit systems serving the County.

Section B, **County Transportation Demand Management Program Funding**, identifies the funding sources for County transportation demand management programs.

Section C, **State and County Transportation Funds**, describes two transportation funds that are major sources of transit and transportation demand management funding.

Section D, **County Special District Revenue**, presents information on the sources and uses of revenue collected in County transportation management and parking lot districts.

A. Transit System Funding

As detailed in Chapter III, multiple public transit systems serve Montgomery County. Each system receives funding from different sources.

1. WMATA Funding

The Washington Metropolitan Transit Authority (WMATA) operates the Metrorail and Metrobus systems. WMATA receives most of its operating revenue from passenger fares, parking and advertising fees, and payments from state and local governments. WMATA funds its capital program primarily through Federal grants and contributions from state and local governments. The State of Maryland uses revenue from the Maryland Transportation Trust Fund to pay Montgomery and Prince George’s Counties’ obligations to WMATA. (See page 42 for a discussion of the Maryland Transportation Trust Fund revenue sources.) In FY08, the Maryland contribution to WMATA for Montgomery County was $118.9 million.

2. Ride On Funding

The Department of Transportation operates the Ride On Bus system. Funding for the Ride On system comes from the County’s Mass Transit Fund. In FY08, the operating budget for Ride On was $94.9 million. (See page 42 for a discussion of the Mass Transit Fund revenue sources.)

3. MTA Commuter Bus and MARC Train Funding

The Maryland Transit Administration (MTA) manages commuter bus services and the MARC commuter rail service through contracts with private organizations. The Maryland Transportation Trust Fund is the funding source for MARC train service and MTA Commuter Buses.
B. County Transportation Demand Management Program Funding

Multiple revenue sources fund County transportation demand management programs.

1. Transportation Management District (TMD) Activities

The Department of Transportation manages the Friendship Heights and Silver Spring Transportation Management Districts and contracts with private organizations for the management of the Bethesda and North Bethesda Transportation Management Districts. As detailed in Chapter III, TMD personnel manage and promote a series of programs to encourage alternative commuting modes. TMD staffing and programs are funded from transportation management fee revenue (see pages 42-43) and from the County Mass Transit Fund. Some TMDs also receive a transfer of parking revenue collected in the district (see page 43). Table 5-1 summarizes the FY08 funding sources for each TMD.

<table>
<thead>
<tr>
<th></th>
<th>North Bethesda</th>
<th>Downtown Bethesda</th>
<th>Friendship Heights</th>
<th>Silver Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Revenue</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>TMD Fees</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>**</td>
</tr>
<tr>
<td>Mass Transit Fund</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

*Use of Silver Spring parking revenue is authorized in County Code, and in FY09 the budget assumes that PLD revenue will support the Super Fare Share program in Silver Spring.

**DOT expects to collect TMD fees in FY09.

Although there is no TMD in Wheaton, the County uses Parking Lot District Fund and Mass Transit Fund revenue to support transportation demand management activities in Wheaton.

2. Commuter Services

The Commuter Services Section of the DOT Division of Transit Services implements and promotes programs to encourage alternative commuting modes (see Chapter III). In FY08, the annual budget for the Commuter Services Section was $5,514,060. The Montgomery County Mass Transit Fund is the primary funding source for the Commuter Services Section. Commuter Services also receives funding from TMD fees, share-a-ride parking reduction fees, parking revenue, and grants from the Maryland Transit Administration and the Metropolitan Washington Council of Governments.

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1 The FY08 Commuter Services Section budget included $671,840 for operation of the Bethesda Circulator shuttle bus. This item was transferred to the budget of the Bethesda Regional Services Center in FY09.
C. State and County Transportation Funds

As mentioned earlier in this chapter, two special transportation funds are major sources of transit and transportation demand management funding.

1. Maryland Transportation Trust Fund

The Maryland Transportation Trust Fund is a dedicated fund supporting the programs and activities of the Maryland Department of Transportation. The Transportation Trust Fund finances Department operating, capital, and debt service expenses, including the State’s contribution to WMATA and the operation of MARC trains and MTA Commuter Buses. The largest revenue sources for the Transportation Trust Fund are a State gas tax and motor vehicle taxes and fees. Although the Fund receives dedicated revenue, Fund resources are subject to appropriation by elected officials and are not earmarked for specific programs such as transit.

2. Montgomery County Mass Transit Fund

The County’s Mass Transit Fund finances the planning, development, and implementation of transit programs and facilities. More specifically, the Mass Transit Fund supports operation of the Ride On bus system, transportation demand management programs, and other activities of the DOT Division of Transit Services. As illustrated in Table 5-2, Mass Transit property tax revenue contributes about two-thirds of all Mass Transit Fund resources. Other large contributors to the Mass Transit Fund are State aid and Ride On fare revenue.

Table 5-2: FY08 Mass Transit Fund Sources of Revenue

<table>
<thead>
<tr>
<th>Revenue Source</th>
<th>FY08 Amount</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass Transit Property Tax</td>
<td>$87,469,710</td>
<td>66.5%</td>
</tr>
<tr>
<td>State Aid</td>
<td>$25,092,540</td>
<td>19.1%</td>
</tr>
<tr>
<td>Ride On Fare Revenue</td>
<td>$13,470,470</td>
<td>10.2%</td>
</tr>
<tr>
<td>Other</td>
<td>$5,523,980</td>
<td>4.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$131,556,700</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Source: Office of Budget and Management

D. County Special District Revenue

The County’s transportation management districts (TMDs) and parking lot districts (PLDs) each collect revenue that support County transportation demand management activities.

1. Transportation Management District Revenue

The County Code authorizes the County to charge a fee in TMDs to fund transportation demand management activities, including TMD administration and implementation of traffic mitigation plans and agreements. Transportation management fee revenue must be used in the district in which the development or property subject to the fee is located.

2 MCC § 42A-29.
The current transportation management fee for all County TMDs is $0.10 per square foot of gross floor area in commercial properties. The fee applies only to commercial properties either occupied after June 2006 or subject to a TMD fee as a condition of subdivision or optional method approval in June 2006 or earlier. In FY08, the County collected a total of about $270,000 in transportation management district fee revenue from the Bethesda, North Bethesda, and Friendship Heights TMDs. In FY08, the County did not receive any TMD revenue from Silver Spring because no developments required to pay the fee had been completed. DOT expects to begin collecting TMD fees in Silver Spring in FY09.

2. Parking Lot District Revenue

As detailed in Chapter 4, the County constructs and maintains public parking in the Bethesda, Silver Spring, and Wheaton Parking Lot Districts. PLDs receive revenue from a special district tax, parking fees, and parking fines.

**Special District Tax**: The County Code established each PLD as a special taxing district. Within these districts, the Code authorizes the County to collect an annual ad valorem tax from non-residential property owners who opt not to provide on-site parking. The Code exempts property owners of buildings that meet their entire off-street parking requirement from paying the special district tax.

The Council sets PLD real property and personal property tax rates by resolution annually. The County Code limits the PLD special tax rate to no more than:

- $1.00 per $100 of assessed value for improved real property; and
- $1.00 per $100 of assessed value for personal property.

Table 5-3 shows the Council-approved PLD special tax rates for improved properties for FY08.

<table>
<thead>
<tr>
<th></th>
<th>Bethesda</th>
<th>Silver Spring</th>
<th>Wheaton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Real Property</td>
<td>$0.28</td>
<td>$0.28</td>
<td>$0.24</td>
</tr>
<tr>
<td>Personal Property</td>
<td>$0.70</td>
<td>$0.70</td>
<td>$0.60</td>
</tr>
</tbody>
</table>

Source: Department of Finance

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4 MCC § 60-1.
5 MCC § 60-3.
6 The exemption applies only to the building but not to the land on which it stands.
7 MCC § 60-3(a).
8 The rates for unimproved properties are one-half the rates for improved properties.
Other PLD Revenue: PLDs also receive revenue from parking fees, parking fines, and investment income. However, for each PLD, parking fees and special district taxes are the largest sources of revenue. Table 5-4, below, shows estimated FY08 PLD revenue by source.

<table>
<thead>
<tr>
<th>Source of Revenue</th>
<th>Bethesda</th>
<th>Silver Spring</th>
<th>Wheaton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special District Taxes</td>
<td>$5,162,550</td>
<td>$5,402,120</td>
<td>$497,570</td>
</tr>
<tr>
<td>Parking Fees</td>
<td>$8,745,000</td>
<td>$7,804,610</td>
<td>$725,000</td>
</tr>
<tr>
<td>Parking Fines</td>
<td>$4,700,000</td>
<td>$2,400,000</td>
<td>$493,120</td>
</tr>
<tr>
<td>Investment Income</td>
<td>$932,400</td>
<td>$329,000</td>
<td>$58,800</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td><strong>$19,539,950</strong></td>
<td><strong>$15,935,730</strong></td>
<td><strong>$1,774,490</strong></td>
</tr>
</tbody>
</table>

Source: Approved FY09 Operating and Capital Budgets, Schedule C-3.

The County Code restricts spending taxes and fees collected in a PLD to uses within that PLD. The Code states that the primary use of PLD revenue is to acquire, build, restore, improve, maintain, and operate off-street parking facilities. In addition, the Code allows the Council to transfer parking fee revenue from a PLD for the following uses:

1. Funding an urban district;
2. Supporting the activities of a transportation management district;
3. Implementing transit and ridesharing incentive programs; and
4. Establishing public-private partnerships to increase ridesharing and transit usage.

No legal requirement exists to direct parking fine revenue to any special fund. Nonetheless, County practice is to allocate $25 of each fine to the Mass Transit Fund to support transportation demand management activities in the district where the parking violation occurred and to allocate the remaining fine revenue to the PLD fund where the parking violation occurred.

In recent years, the Council has approved a transfer of funds from the Bethesda, Silver Spring, and Wheaton PLDs to their respective urban districts. In addition, relatively small amounts of revenue from each PLD were transferred to the General Fund to cover parking district overhead costs.

In each year from FY04 – 08, the County transferred Bethesda PLD revenue to support the Bethesda TMD. During those same years, the Silver Spring PLD provided no funds to the Silver Spring TMD. As mentioned above, the County annually transfers funds from the Wheaton PLD to pay for transportation demand management activities in Wheaton.

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9 MCC § 60-16.
10 In FY09, the budget assumes a transfer of about $200,000 for the Silver Spring PLD to support the Super Fare Share program in Silver Spring.
Table 5-5 shows the FY08 estimated PLD expenditures and transfers to other funds.

Table 5-5: Estimated FY08 Parking Lot District Expenditures and Transfers

<table>
<thead>
<tr>
<th></th>
<th>Bethesda</th>
<th>Silver Spring</th>
<th>Wheaton</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLD Expenditures</td>
<td>$19,137,350</td>
<td>$12,983,270</td>
<td>$1,465,050</td>
</tr>
<tr>
<td>Operating Budget</td>
<td>$9,387,370</td>
<td>$9,973,250</td>
<td>$1,181,050</td>
</tr>
<tr>
<td>Capital Projects (incl. debt service)</td>
<td>$9,749,980</td>
<td>$3,010,020</td>
<td>$284,000</td>
</tr>
<tr>
<td>Transfers to Other Funds</td>
<td>$6,263,380</td>
<td>$1,948,370</td>
<td>$814,240</td>
</tr>
<tr>
<td>to Urban District</td>
<td>$2,065,900</td>
<td>$1,718,700</td>
<td>$373,700</td>
</tr>
<tr>
<td>to TMD</td>
<td>$1,745,810</td>
<td>$0</td>
<td>$0*</td>
</tr>
<tr>
<td>to Mass Transit Fund</td>
<td>$2,236,780</td>
<td>$0</td>
<td>$408,110*</td>
</tr>
<tr>
<td>to General Fund</td>
<td>$214,890</td>
<td>$229,670</td>
<td>$32,430</td>
</tr>
<tr>
<td>Total Expenditures + Transfers</td>
<td>$25,400,730</td>
<td>$14,931,640</td>
<td>$2,279,290</td>
</tr>
</tbody>
</table>

Source: Approved FY09 – 14 Public Services Program: Fiscal Plan

* The Wheaton PLD provides funds to the Mass Transit Fund to pay for transportation demand management activities in Wheaton. In FY08, the amount of this transfer was $195,260 and is included in the total transfer from the Wheaton PLD to the Mass Transit Fund in the table.

Although the County has not established a parking lot district in North Bethesda, as described in Chapter IV the County provides public parking lots and on-street parking within the North Bethesda TMD. In FY08, the County collected about $975,000 in North Bethesda parking fees and fines.
CHAPTER VI: TRANSPORTATION DEMAND MANAGEMENT IN OTHER COMMUNITIES

This chapter summarizes the current transportation demand management (TDM) practices in Montgomery County, identifies additional or alternative TDM practices, and discusses the potential applicability of these additional or alternative practices to the County. This chapter has five sections:

Section A, Dedicated Funding Sources for Transit, presents methods used in other jurisdictions to dedicate funding for transit.

Section B, Economic Incentives, describes incentive programs to encourage commuting by transit and other alternative modes.

Section C, Driving Disincentives, describes strategies used in other communities to make driving alone less attractive than other commuting options.

Section D, Location and Design of Transportation Network, discusses how some jurisdictions have altered transportation networks to promote efficient commuting practices.

Section E, Centrally Managed System Governance, describes transportation demand management systems that consolidate a wide range of services into one integrated, centrally-managed program.

A. Dedicated Funding Sources for Transit

Most major transit systems in the United States receive a substantial portion of their capital and/or operating resources from a dedicated revenue source. The Federal Government defines the three characteristics of a dedicated funding source for transit:

- Funding must come from a specific designated revenue source;
- Revenue from the designated source must be provided directly to a transit agency; and
- Designated revenue must not be subject to appropriation.\(^1\)

According to the United States General Accountability Office (GAO), 23 of the 25 largest transit agencies in the country receive funds from dedicated revenue sources.\(^2\) The Washington Metropolitan Area Transit Authority (WMATA) is one of the two largest systems that do not receive dedicated funding. While the County’s Mass Transit property tax is dedicated to funding transit programs, the tax rate has fluctuated significantly in recent years thereby reducing the stability of this revenue source.

WMATA receives most of its operating revenue from passenger fares, parking and advertising fees, and payments from state and local governments. WMATA funds its capital program primarily through Federal grants and contributions from state and local governments. The State of Maryland uses revenue from the Maryland Transportation Trust Fund to pay Montgomery and

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\(^2\) Ibid.
Prince George’s Counties’ obligations to WMATA. Major revenue sources for the Maryland Transportation Trust Fund include the State’s gas tax, motor vehicle taxes, and Motor Vehicle Administration fees.

The County’s Mass Transit Fund supports operation of the County's Ride On bus system and other transit related activities. The three largest contributors to the Mass Transit Fund are property tax revenue, State aid, and Ride On fares.

The County Code authorizes the County to charge a fee in transportation management districts (TMDs) to fund transportation demand management activities including TMD activities and implementation of traffic mitigation plans and agreements.\(^3\) Revenue from transportation management district fees must be used in the district where the development or property subject to the fee is located. While this fee supports transportation demand management programs, it does not directly fund transit system operating or capital costs.

1. **Sales Taxes**

Sales tax revenue is the most common dedicated revenue source for transit systems in the country. According to the GAO, 15 of the 23 largest transit agencies with dedicated funding received a portion of their revenue from sales taxes.\(^4\) Table 6-1 lists examples of metropolitan transit systems that receive dedicated sales tax revenue.

<table>
<thead>
<tr>
<th>Area / Transit System</th>
<th>Sales Tax Revenue Dedicated to Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta / Metro Atlanta Rapid Transit Authority (MARTA)</td>
<td>All revenue from a 1% sales tax levied in the region</td>
</tr>
<tr>
<td>Boston / Massachusetts Bay Transit Authority (MBTA)</td>
<td>20% of revenue from a 5% sales tax levied in the region</td>
</tr>
<tr>
<td>Dallas / Dallas Area Rapid Transit (DART)</td>
<td>All revenue from a 1% sales tax levied in the transit district</td>
</tr>
<tr>
<td>New York / Metropolitan Transit Authority (MTA)</td>
<td>All revenue from a 3/8% sales tax levied in the region</td>
</tr>
<tr>
<td>San Francisco Bay / Bay Area Rapid Transit (BART)</td>
<td>75% of revenue from a 1/2% sales tax levied in the transit district</td>
</tr>
<tr>
<td>Seattle / Sound Transit (ST)</td>
<td>All revenue from a 4/10% sales tax levied in the region</td>
</tr>
</tbody>
</table>

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\(^3\) MCC § 42A-29.  
**Applicability to Montgomery County:** Maryland law prohibits counties from imposing sales taxes. Legislation was introduced in the 2007 session of the Maryland General Assembly which would have dedicated a percentage of State sales tax revenue for transit operating and capital programs. The bill received an unfavorable report from the Senate Budget and Taxation Committee and was never acted upon by the full State Senate.

2. **Transportation Improvement Districts**

“Transportation improvement districts” (also known as “transportation development districts” or “community improvement districts”) are special taxing districts designed to raise revenue for transportation improvements in a specific area. Several states allow the creation of transportation improvement districts as separate governmental entities authorized to levy taxes and issue bonds.

The laws of some states require a majority of property owners within the proposed boundary of the district to vote in favor of creating a district. In addition, in some states, transportation improvement districts may cross municipal boundaries. However, the establishment of a transportation improvement district does not exempt developments from complying with municipal zoning requirements and transportation infrastructure plans.

Most transportation improvement districts levy a property tax assessment on commercial properties within the district. Some districts impose an additional charge on new development projects to cover all or a portion of the cost of transportation improvements needed to accommodate the new trips generated by that development (a type of “impact tax”). Transportation improvement district tax revenue most commonly supports roadway infrastructure improvements. However, in many districts, revenue also funds transit system capital or operating expenses.

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5 Annotated Code of Maryland, Tax-General Article, § 11-102 (c).
6 SB 167.
Case Study: Transportation Improvement District Funding for Dulles Rail Transportation Improvement District, Virginia

In March 2001, the Virginia General Assembly passed legislation to establish the Dulles Rail Transportation Improvement District as a special taxing district within Fairfax County and the Town of Herndon. The purpose of the District is to provide funding for the construction of a 23-mile extension of the Metrorail system from the West Falls Church station through the Tysons Corner area to Dulles Airport. The Virginia law stipulated that the District would be created upon receipt of a petition from property owners of at least 51 percent of the assessed commercial and industrial properties in the District. In 2004, property owners representing 64 percent of assessed property values petitioned Fairfax County to establish the District. That same year, Fairfax County began to levy a charge of 22 cents per $100 of assessed value on commercial and industrial property owners in the District.

The Dulles Rail Transportation Improvement District is not the sole dedicated source of revenue for construction of the Metrorail extension. In 2005, the Commonwealth of Virginia Transportation Board approved a fee structure for the Dulles Toll Road that sets aside revenue for this transit project. The Transportation Board requires that no less than 85 percent of “existing surplus net revenue” must be dedicated to the Dulles Corridor rail project. (The term, “existing surplus net revenue” refers to revenue remaining after payment of toll road operating and debt service obligations.) Moreover, the Board committed to adjust toll rates in the future as necessary to raise sufficient revenue to fund the capital cost of the rail project.

Sources: Metropolitan Washington Airports Authority; Commonwealth of Virginia Transportation Board

Applicability to Montgomery County: The County could establish a type of transportation improvement district through creation of a special taxing district or an impact tax district. Maryland law permits the County to establish special taxing districts for the purpose of assessing a property tax to support any function allowed under its home rule authority. However, revenue from special taxing district property taxes would be subject to the Charter limit on property tax revenue. The State also permits the County to assess impact taxes on new development. Impact tax revenue would not be subject to the Charter limit. (In contrast to the case study from Fairfax, the County does not have authority to charge roadway tolls as detailed on page 50).

3. Other Dedicated Tax and Fee Revenue

While sales and property taxes are the most common dedicated revenue source for transit systems, some jurisdictions set aside revenue from other types of taxes and fees to support transit. Examples of these dedicated revenue sources include:

- As noted above, the State of Virginia has dedicated a portion of revenue from the Dulles Toll Road to support the construction of a transit line in the Tysons-Dulles corridor.
- The Metropolitan Transit Authority (New York) receives dedicated revenue from automobile registration fees.

8 State law as codified in MCC § 52-17.
Transportation Demand Management Implementation, Funding, and Governance

- The Southeast Pennsylvania Transit Authority (SEPTA) receives dedicated revenue from automobile leasing and rental fees.
- All revenue from the London, England, “congestion charging” program is required by law to be invested in improving Greater London bus operations (see page 62).
- The City of Redmond, Washington imposes a “Business Tax/Transportation Improvement” (BTTI) tax on employers to fund transportation improvements including transit programs (see case study below).

| Case Study: Per Employee Transportation Tax |
| Redmond, Washington |

The City of Redmond, Washington funds its transportation demand management program through revenue raised by a “Business Tax/Transportation Improvement (BTTI)” tax. Redmond levies the BTTI as a per employee tax on all employers in the City. The current BTTI rate is $55 per employee per year.

BTTI revenue funds a variety of transportation improvements including roadway capital projects and programs to encourage alternatives to the single-occupant automobile. About ten percent of BTTI revenue support commuting alternatives. For example, BTTI funds have been used to:

- Administer the city’s transportation demand management program;
- Fund transit and ridesharing incentives and rewards;
- Fund the operation of a shuttle bus service;
- Operate parking management programs; and
- Fund the construction of a “bike station” at a transit center.

The City first imposed the tax in 1997 as a temporary four-year measure. In 2001, with the support of the business community, Redmond established the BTTI as an on-going revenue stream. BTTI revenue is directed to a special fund dedicated exclusively for transportation related projects.

Source: City of Redmond, Washington

*Applicability to Montgomery County.* Maryland law prohibits the County from raising revenue from roadway tolls, automobile registration fees, or taxes on car rentals.9

The County Code allows the County to charge a “transportation management” fee on optional method developments in an established transportation management district (TMD).10 The County currently funds TMD activities and programs in part from revenue raised by the transportation management fee. The Code permits the County to use transportation

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9 Sources: Annotated Code of Maryland, Transportation Article, §25-101(b)(1) and (2).
10 MCC § 42A-29.
management fee revenue for a variety of additional purposes including adopting traffic and parking control measures, providing transportation-related capital projects, and creating public-private programs to increase ridesharing and transit use.\textsuperscript{11}

4. Parking Space Tax

In Australia and Canada, several municipalities have implemented special taxes on non-residential parking spaces. The goal of this type of tax is to create an economic disincentive for driving alone and, in some cases, to raise revenue for transportation projects. This taxing strategy also encourages developers and property owners to reduce the number of parking spaces constructed or made available for use.

Communities levy parking space taxes based either on the number of parking spaces or the size of the parking area at a property. Some communities limit the imposition of this tax to free or subsidized parking spaces and facilities. Implementation of a tax on parking spaces requires the municipality to maintain an accurate inventory of surface and in-structure parking spaces in local land records.

<table>
<thead>
<tr>
<th>Case Study: Parking Space Taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney, Melbourne, and Perth, Australia</td>
</tr>
</tbody>
</table>

Three Australian cities tax non-residential parking in urban areas.

- Sydney charges a parking space levy for each privately owned non-residential off-street parking space. The annual levy is $800 Australian dollars (US$660) per space in the central business district and $400 (US$330) per space in other business districts. Revenue from the parking space levy is dedicated to fund transportation capital projects.

- Melbourne charges a “long stay car park levy” for long-term and leased parking spaces in commercial facilities in the central business district. This levy is intended to encourage parking facilities to convert long-term spaces used by commuters into short-term spaces used by shoppers and visitors. The annual levy is $800 (US$660) per space.

- Perth charges a “parking license fee” for commercial parking spaces in the central business district. The fee varies depending on the type of space (short- or long-term) and the number of days the space is actually used. The annual fee is $169 (US$140) for short-term parking and $195 (US$160) for long-term parking.

Source: Todd Litman, Parking Taxes: Evaluating Options and Impacts, Victoria Transport Policy Institute, 2006

\textsuperscript{11} MCC § 42A-29 and 42A-23(b).
Applicability to Montgomery County: In 1990, Senior Legislative Attorney Michael Faden wrote a memorandum concluding that the Council has the authority to enact an excise tax on parking spaces. That same year, the Council approved an excise tax on non-residential parking spaces. However, County Executive Kramer vetoed the legislation and the parking space tax never took effect.

In October 2007, the Working Group on Infrastructure Financing for County Government Facilities issued a report that, among other things, recommended that the County enact an excise tax on non-residential commuter parking spaces.

5. Revenue from Market Rate Public Parking

It is extremely uncommon for public parking revenue to support transit or transportation demand management. Montgomery County stands out as one of the few communities that use parking revenue to fund transportation demand management programs.

Most commonly, public parking prices are set at a uniform (and often below market) rates throughout a parking district. Surplus parking revenue in most communities feeds into the general fund or support the activities of a business improvement district (similar to an urban district in Montgomery County). Some communities (such as San Francisco and Pasadena, California) have implemented market rate pricing by charging higher hourly rates for parking spaces in the greatest demand and lower rates for less attractive spaces. However, even in communities with market rate parking fees, rates are set so as to maintain an adequate supply of available spaces throughout the day rather than to raise revenue for transit or to create a financial disincentive to drive.

One noteworthy exception in public parking rate setting and revenue policy has been put in place by the University of Washington at its Seattle campus. When it implemented a comprehensive transportation demand management program in 1991, the University raised single-occupant vehicle parking rates by 50 percent. Single-occupant vehicle drivers pay parking fees that are significantly higher than both transit fares and parking costs for carpool drivers. At present, full day parking for a single-occupancy vehicle at a University parking facility is $12.00.

Parking fee revenue supports a range of transit and transportation demand management activities known as the “U-Pass” program (see page 68). Parking revenue contributes about one-third of the operating costs of the U-Pass program.12

Applicability to Montgomery County: The County Code does not indicate any particular method or basis for setting parking rates. Rather, the Council sets public parking rates by resolution based on whatever criteria it sees fit. Under all pricing strategies, the County has an obligation to raise sufficient funds to cover PLD operating costs and to repay facility revenue bonds. Otherwise, the Council has the prerogative to keep rates low to minimize the cost to drivers or to set the rates high to serve as a disincentive to driving.

12 U-Pass 2007 Annual Report, University of Washington Office of Commuter Services
The County Code limits the use of Parking Lot District revenue to certain purposes; these include the construction, maintenance, and operation of parking facilities; funding urban districts and transportation management districts; and implementing transit and ridesharing incentive programs. An amendment to County law would be necessary to allow Parking Lot District revenue to directly fund transit system operating and capital costs.

B. Economic Incentives

As discussed in Chapter II, the relative cost of driving versus alternative transportation modes is an important factor in determining individual commuter choices. Economic incentives are a proven means of convincing some commuters to switch to transit or other alternative modes. As detailed in Chapter III, the County reimburses some employers for a portion of the cost of transit subsidies offered to employees.

1. Employer-Based Transit Benefits (“EcoPass” Programs)

The most common form of transit benefit is a direct contribution from an employer to individual employees who ride transit regularly (an “employee-based” benefit). In contrast, in an “employer-based” approach, a transit agency uses an employer as an intermediary to provide transit benefits to all employees of an organization as a group. Under an employer-based program, a transit agency sells an employer passes for all of its employees to ride public transit for free.

Traditional transit agency pricing for individual monthly and annual passes assumes that users will ride transit almost daily. Under employer-based programs, a transit agency can price passes at a highly discounted rate because an employer pays for all employees regardless of how often they ride transit. Table 6-2 shows a hypothetical example comparing the costs of transit benefit that is employee-based with a transit benefit that is employer-based. The example assumes an organization of 100 employees (consisting of 80 single-occupant vehicle commuters and 20 transit commuters).

<table>
<thead>
<tr>
<th>Assumptions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Employees: 100</td>
</tr>
<tr>
<td>Number of Regular Transit Commuters: 20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Per Employee Benefit</th>
<th>Employer-Based Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual per User Cost Paid by Employer</td>
<td>$300</td>
<td>$60</td>
</tr>
<tr>
<td>Number of Employees Receiving Benefit</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Total Annual Cost to Employer</td>
<td>$300 x 20 = $6,000</td>
<td>$60 x 100 = $6,000</td>
</tr>
<tr>
<td>Total Revenue to Transit Agency</td>
<td>$6,000</td>
<td>$6,000</td>
</tr>
</tbody>
</table>
This example shows an employer-based transit pass pricing program can be cost neutral for the transit agency and the employer, and yield increased benefits for some employees. All regular transit commuters retain their full transit benefit under employer-based pricing. However, under this pricing model, employees who have the ability to take the bus or train on occasion can ride transit at no cost on days that they do not need to drive.

Transit systems in the Dallas, Denver/Boulder, Portland, Salt Lake City, San Jose, and Seattle areas offer employer-based transit passes. These programs, known as “EcoPass” programs, have increased transit usage by offering all employees — particularly commuters who do not need to drive every day — an incentive to ride transit on occasion. A study of EcoPass programs found that employer-based transit benefits reduce commuter parking demand by as much as 19 percent.13

<table>
<thead>
<tr>
<th>Case Study: Employer-Based Transit Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Transportation District (Denver/Boulder)</td>
</tr>
</tbody>
</table>

The Regional Transportation District (RTD) serving the Denver and Boulder, Colorado area provides employer-based transit passes. RTD sells employers EcoPasses that enable all employees to ride transit for a year at no cost. In addition, employers who participate in the EcoPass program also make their employees eligible for a free guaranteed ride home in case of an emergency. The City of Boulder also arranges discounts at local merchants for EcoPass-eligible employees of businesses in the City.

RTD sets EcoPass prices based on two factors: the location of the employer and the number of employees. For 2008, the lowest annual EcoPass charge is $38 per employee for employers with 2000 or more employees located in outer suburbs with limited transit service. The highest annual EcoPass charge is $344 per employee for employers with 20 or fewer employees located near the airport. In contrast, purchasing monthly RTD passes would cost $1,584 per year.

Last year, almost 1.1 million employees received the RTD EcoPass benefit. These employees made about 9.8 million transit boardings during the year.

Source: Regional Transportation District

Applicability to Montgomery County: The County could incorporate employer-based transit passes as a component of Ride On system pricing. However, Ride On is only one element of the County’s transit network. Employer-based transit passes likely would be most successful if the passes were accepted by all transit providers. WMATA would have to approve this type of pricing for the Metro system while the State would have to approve it for MARC.

2. Parking Parity

Many employers offer free or below market-rate parking as an employee benefit. As described in Chapter II, free or low-cost parking serves as an incentive for commuters to drive to work alone. The term “parking parity” refers to efforts to offer other benefits as an alternative to free or low-cost parking. Parking parity seeks to establish equity between benefits provided drivers and benefits provided employees who choose alternative commuting modes. In the case study that follows, the State of California requires many employers that provide parking subsidies to their employees to concurrently offer a cash allowance as an alternative to the parking subsidy.

<table>
<thead>
<tr>
<th>Case Study: Parking Cash-Out Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>State of California</td>
</tr>
</tbody>
</table>

In 1992, the California legislature created a “parking cash-out” program that requires some employers to offer employees the option to choose cash in lieu of a parking subsidy. For the purpose of the cash-out law, the term “parking subsidy” means the difference between the out-of-pocket amount paid by an employer to secure an employee parking space and the price, if any, charged to an employee for use of that space. Employees that commute by transit, carpool, or vanpool and telecommuters, walkers, and bikers are eligible for the parking cash-out if a subsidized parking space for a single-occupancy vehicle is available to them.

The California “Parking Cash-Out Program” only applies to employers with 50 or more employees in designated air quality non-attainment areas. The law does not apply to employer-owned parking spaces.

A study reviewing the effects of the California cash-out requirement found that the program reduced the number of commuters who drove alone by 17 percent; increased carpooling by 64 percent; and increased transit ridership by 50 percent. All told, the shift in commuter choices resulting from the cash-out program reduced total vehicle miles traveled by employees by 12 percent.14

Source: California Environmental Protection Agency Air Resources Board

**Applicability to Montgomery County:** The County encourages employers to voluntarily provide alternative benefits to commuters who decline a free or reduced price parking space. The County could mandate a cash-out program similar to the one in California under its general police powers authority. However, as the County does not have a large supply of private commercial parking facilities, a cash-out mandate that applied solely to commercial parking benefits likely would have limited impact on trip generation.

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3. Employer/Commuter Rewards Programs

Economic incentives may be used to entice employers to promote and support alternative commuting modes. Through the Fare Share and Super Fare Share programs, Montgomery County covers a portion of employer transit subsidy costs for up to nine years. Other communities offer employers performance-based incentives for trip reduction. For example, the City of Redmond, Washington, has piloted a program to provide businesses a $300 per year reward for each commuter trip reduced below an initial baseline level.

In some jurisdictions, community organizations provide direct monetary incentives to commuters who choose not to drive alone. These programs offer rewards for first switching to— as well as for continuing to use — an alternative commuting mode. These rewards are separate from transit subsidies and other benefits offered by an employer.

### Case Study: Commuter Rewards

**Cumberland Community Improvement District (Suburban Atlanta)**

The Cumberland Community Improvement District (CID) is a public-private partnership charged with improving transportation access to a commercial area northwest of Atlanta known as Cumberland Galleria. In addition to working to finance roadway and infrastructure improvements, the District also manages the Cumberland “Commuter Club” that provides support and assistance to promote transit use, carpooling, vanpooling, and telework.

Among other services, the Commuter Club offers a commuter rewards program. The rewards program offers several incentives for commuters to give up driving alone in favor of transit, ridesharing, and telework. New program participants earn $3 per day for three months for taking an alternative transportation mode. Carpoolers receive free monthly gas cards ($40 per month for three person carpools and $60 per month for four-person carpools). All Commuter Club participants are eligible for drawings for gift cards of $25 or more. Funding for the rewards comes from a commercial property tax that pays for all activities of the Cumberland CID.

Source: Cumberland Community Improvement District

**Applicability to Montgomery County**: The County already provides funding to offset some employer transit subsidy costs. Commuter or employer reward programs are another way to incentivize alternatives to driving alone. Of course, the success of these programs is dependent on the availability of resources to fund rewards that are large enough to affect commuter and business behavior.

4. Enhancement of Federal and State Incentive Programs

Many County employers offer transit subsidies to their employees. For 2008, the Internal Revenue Service allows employers to provide workers with up to $115 per month in tax-free transit and vanpool benefits. Any transit subsidy above $115 per month is considered taxable income under Federal law. Assuming 20 work days per month, the maximum tax-free subsidy of $115 per month equates to $5.75 per day benefit. As shown in Table 6-3, this subsidy amount covers only a portion of daily transit commuting costs for some County residents.

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15 The U.S. Internal Revenue Service announced that it will increase the limit on non-taxable transit benefits to $120 per month in January 2009.
Table 6-3: Two Examples of Total Daily Metrorail Commuting Costs
(assumes 20 work days per month)

<table>
<thead>
<tr>
<th></th>
<th>Glenmont to Silver Spring</th>
<th>Shady Grove to Bethesda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro Station Parking</td>
<td>$4.75</td>
<td>$4.75</td>
</tr>
<tr>
<td>Round-Trip Metrorail Fare (Peak Hour)</td>
<td>$4.30</td>
<td>$6.90</td>
</tr>
<tr>
<td>Total Daily Commuting Cost</td>
<td>$9.05</td>
<td>$11.65</td>
</tr>
<tr>
<td>Percent of Daily Commuting Cost Covered by Maximum Subsidy</td>
<td>64%</td>
<td>49%</td>
</tr>
</tbody>
</table>

Source: WMATA

The financial “bailout” bill approved by Congress and signed by the President in October included a new Federal benefit for bicycle commuters. Beginning in January 2009, employees who use a bicycle as their primary commuting vehicle will be eligible for a $20-a-month, tax-free reimbursement from their employers for bicycle-related expenses. Employers will be able to deduct the reimbursement expense from their Federal taxes.

The State of Maryland offers an income tax credit to employers who provide benefits that support alternative modes of commuting. Employers are eligible to receive a tax credit for 50 percent of the cost of providing transit and vanpooling subsidies, guaranteed ride home programs, and cash benefits in lieu of parking. The maximum tax credit is $50 per participating employee per month. DOT reports that many eligible employers do not take advantage of this tax credit.

**Applicability to Montgomery County:** The County could team with transit advocacy groups and other local and state governments to persuade Congress to raise the maximum tax-free transit benefit amount. Similarly, the County could work with other Maryland counties to push for expansion of the State tax credit.

C. Driving Disincentives

Many commuters find that traveling alone in their car has a cost, time, and convenience advantage over transit and other alternative modes. Several communities have adopted strategies to make driving alone less attractive than other commuting options. Limiting the supply of parking in urban centers is a commonly used measure to discourage driving.

The County Code authorizes DOT to regulate or limit public parking as a means of managing transportation demand within TMDs. 16  In practice, however, the County has not used its authority to limit public parking. Moreover, County Zoning Ordinance requires private developers to provide significant amounts of parking in urban centers.

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16 MCC § 42A-23(b)(a).
1. **Zoning Code Parking Requirements**

The most common type of parking standard in local zoning codes is the establishment of minimum parking requirements for different land uses. Zoning codes mandate a minimum number of parking spaces that must be provided for each specific land use type based on a measure of the intensity of use (gross floor area, number of bedrooms, number of employees, seating capacity, etc.). Typically, communities base minimum parking requirements on parking generation studies that estimate peak parking occupancy rates for different types of land use. Montgomery County has adopted this minimum parking requirement approach in its Zoning Ordinance.

In recent years, some urban planners have begun to question the soundness of demanding minimum parking requirements, particularly in urbanized areas served by transit. Most notably, these critics contend that transportation engineers and planners do not consider the price of parking and the availability of transit as variables in estimating parking generation rates. Several jurisdictions have adopted separate parking requirements designed specifically for urban areas with relatively high levels of transit service and traffic congestion.

**Variable Minimum Parking Requirements:** Many communities adjust minimum parking requirements for certain geographic areas. Communities that have adopted variable minimum parking requirements take into account factors such as traffic congestion, transit availability, and parking supply in setting specific parking requirements. Most commonly, these communities establish lower minimum parking requirements in urban centers that are served well by transit.

The Montgomery County Zoning Ordinance allows for reduction of the minimum parking requirement for office buildings in close proximity to Metro stations. In addition, the Ordinance allows for a parking reduction of 15 percent for office buildings in certain areas of the County that pay into the County’s share-a-ride account to support ridesharing programs.

**Maximum Parking Limits:** As an alternative to minimum parking requirements, some communities have established upper limits on parking supply. In these communities, the zoning code specifies the maximum amount of parking permitted at a specific site or within a specific district. Jurisdictions have applied maximum parking limits for both residential and non-residential development in high density areas served well by transit. Some communities set both minimum and maximum parking requirements, effectively establishing a range of parking spaces required in a development. In addition, some zoning code parking space limitations offer exemptions such as for short-term, shared, or paid parking spaces.

Portland, Oregon has created a system of transferable parking entitlements. Under this system, developers receive the right to build a maximum number of parking spaces at a property. A developer either may build the maximum allotment of spaces or may sell the entitlement for unbuilt spaces within a defined district.

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18 MCC § 59-E-3.2
19 MCC § 59-E-3.31
Table 6-4 shows examples of parking limits from the zoning ordinances of four communities.

**Table 6-4: Examples of Zoning Ordinance Maximum Parking Limits**

<table>
<thead>
<tr>
<th>City</th>
<th>Area of City</th>
<th>Land Use</th>
<th>Parking Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portland, Oregon</td>
<td>Northwest District</td>
<td>All Commercial</td>
<td>No more than 800 commercial parking spaces may be approved in the district²⁰</td>
</tr>
<tr>
<td>Redmond, Washington</td>
<td>Commercial Districts</td>
<td>All Commercial</td>
<td>No less than four and no more than five parking spaces per 1000 square feet of gross floor area²¹</td>
</tr>
<tr>
<td>San Francisco, California</td>
<td>Downtown and Transit District Zones</td>
<td>Office</td>
<td>Parking area limited to no more than seven percent of total gross floor area²²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Residential</td>
<td>No more than one-quarter to one parking space per dwelling unit (depending on zone)⁷</td>
</tr>
<tr>
<td>Seattle, Washington</td>
<td>Stadium Transition Area Overlay District</td>
<td>All uses (unless excepted)</td>
<td>No more than one parking space per 650 square feet of gross floor area²³</td>
</tr>
</tbody>
</table>

Some urban planners see a downside to the strategy of setting upper limits on parking. Once a building is built, it is often very difficult to add parking if needed, particularly in an urban environment. Critics of mandated parking limits also cite concerns that these restrictions negatively impact the marketability of a project and could jeopardize the developer's ability to secure financing.

**Applicability to Montgomery County:** The Council has the authority to amend parking requirements in the Zoning Ordinance. On November 25, 2008, the Council approved an amendment to the Transit Mixed Use (TMX) zone that reduced minimum parking requirements. The Council’s Planning, Housing, and Economic Development (PHED) Committee has indicated that it plans to consider reducing minimum parking requirement or establishing maximum parking requirements in other high density zones.

The County has implemented a parking supply limit for one urban center. The approved Growth Policy sets a limit of 17,500 public and private long-term parking spaces that may be built in the Silver Spring CBD.

²⁰ City of Portland Zoning Code, 33.562.130.
²¹ City of Redmond Municipal Code, 20D.130.10-020.
²² City and County of San Francisco, Municipal Planning Code, § 151.1
²³ Seattle Municipal Code, 23.74.010 A.1.b.
2. Control of Public Parking Supply and Pricing

Some communities have created disincentives to driving alone through control of parking supply and pricing. The following four strategies use parking policy as a tool to change commuting practices:

**Limiting Parking Supply:** A community may constrain parking supply in areas well served by transit to compel a certain percentage of commuters to travel by means other than single occupant vehicle. Under this strategy, parking could be constrained by limiting the total number of available spaces or by converting long-term general use spaces to short-term or carpool spaces. As an example, Portland, Oregon, has placed a cap on the total number of parking spaces allowed in certain commercial areas (see pages 58-59).

**Raising Parking Prices:** A community may raise the cost of driving alone by charging higher parking rates. As mentioned above, the University of Washington raised parking prices by 50 percent at its Seattle campus when it implemented a comprehensive transportation demand management program in 1991.

**Differentiated Parking Pricing — Time of Day:** As discussed on the next page, the strategy known as “congestion pricing” charges an additional cost for commuting during peak traffic hours. For example, this approach could involve charging a premium for parking during certain hours or for entering or exiting a parking facility during peak congestion hours.

**Differentiated Parking Pricing — Location:** Some communities charge a premium for high demand parking spaces (such as those located closest to major employment or commercial centers). For example, Pasadena, California set lower hourly parking rates at the periphery of the commercial district than in the center of the district in order to deter price sensitive drivers from the highest demand locations.

**Applicability to Montgomery County:** As discussed in Chapter IV, the County established parking lot districts in Bethesda, Silver Spring, and Wheaton to provide property owners an alternative to meeting the on-site parking requirements of the Zoning Ordinance. In addition the County manages on- and off-street parking meters in North Bethesda. Altogether, the County controls more than 21,000 parking spaces in urban centers.

By controlling a large number of parking spaces in urban centers, the County plays an important role in influencing commuter choices. County policies regarding parking supply and pricing affect the relative cost and convenience of driving alone compared to alternative modes. Currently, the County provides ample, relatively low cost parking in major urban centers.

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24 The County also has established a parking lot district in the Montgomery Hills area. This report does not address Montgomery Hills as the area does not meet the criteria as an “urban center” as defined in Chapter III.
As detailed in Chapter IV:

- More than three-quarters of parking lot district spaces are available for long-term parkers;
- PLD-wide long-term parking vacancy rates range from 14 percent (in Bethesda) to 39 percent (in Silver Spring);
- Single-occupant vehicle parking rates are uniform in all PLD garages and lots;
- The hourly rate for long-term parking in PLDs ($0.50/hour) is 33 percent lower than the hourly rate for short-term parking ($0.75/hour); and
- In the Bethesda and Silver Spring PLDs, carpoolers receive a substantial parking discount.

The County could leverage its control of parking in urban centers to discourage commuters from driving alone. To achieve this end, the County could reduce the supply of long-term (non-carpool) parking, increase general rates for long-term parking, charge a premium for entering or exiting a parking facility during peak hours, and/or increase the rates for the highest demand parking spaces.

3. Limiting Commercial Parking Facilities

An urban area with constrained parking supply cannot accommodate predominantly single-occupant vehicle commuters. As mentioned in Chapter IV, the County Zoning Ordinance allows commercial parking facilities as a permitted use for optional method developments in central business district zones. The County could limit the supply of commercial parking facilities in urban centers through zoning restrictions.

Applicability to Montgomery County: The Council could amend the Zoning Ordinance to limit the zones in which commercial parking facilities are permitted.

4. Congestion Pricing

The term “congestion pricing” refers to a practice of adjusting transportation related charges (such as road tolls or parking fees) by time of day or by location. Congestion pricing creates an economic disincentive against adding traffic in the most congested areas of a city and/or the most congested periods of the day. Pricing models include:

- Imposing a new fee for use of a type of public facility that is free of charge in other locations or at other times of day; and,
- Charging a higher fee for use of a public facility than is charged in other locations or at other times of day.
Alternative methods exist for collecting congestion pricing fees. Drivers may pay a one-time entry fee at a toll booth or may purchase weekly, monthly, or annual passes. In addition, congestion fees may be assessed by means of a vehicle-mounted transponder that electronically charges a pre-existing account (similar to the “E-Z Pass” system). A municipality may charge congestion pricing fees at the entrance to different types of facilities, including:

- Major transportation facilities with a single point of entry (such as a bridge or tunnel toll station);
- Segments of the roadway network with multiple points of entry (such as entrances to a limited access highway);
- All roadways crossing a cordon surrounding a geographic area (such as a central business district or transportation corridor); and,
- Entrances or exits of public parking facilities.

Congestion pricing has been implemented in several cities outside the United States including London, Stockholm, and Singapore. Last year, the Federal Highway Administration awarded a grant to the City of San Francisco to study the feasibility of charging motorists a user fee to access specific areas of the City during peak periods of congestion. In contrast, earlier this year, the New York State Legislature defeated a proposal to impose an $8 charge on private automobiles entering Manhattan (south of 60th Street) during peak hours.

**Case Study: Congestion Pricing**

**London, England**

London introduced a “congestion charging” program in the central city in 2003. Drivers of vehicles that cross into the “charging zone” must pay an eight pound (US$12) charge. Taxis, emergency services vehicles, motorcycles, bicycles, and alternative energy vehicles are exempt from the charge. Residents of the central city pay a discounted fee for driving within or re-entering the charging zone.

Drivers may purchase daily, weekly, monthly, or annual passes. The congestion charge is in effect weekdays from 7:00 am through 6:00 pm. London enforces the fee by means of street cameras that read vehicle license plates and feed that information into a database of paid users.

Last fiscal year, the London congestion charging program raised 137 million pounds (US$205 million). By law, all revenue from the congestion fees is directed to support bus operations in Greater London.

Source: Transport for London

The creation of high-occupancy toll (HOT) lanes is another form of congestion pricing. In HOT lanes, carpools, vanpools, and buses travel for free, while drivers of single-occupant vehicles pay a toll. Several states currently have HOT lanes, including California, Colorado, Minnesota, and Texas.
5. Road Space Rationing

Several large cities in other countries control peak period vehicle trips through a measure known as “road space rationing.” Large cities including Athens, Mexico City, and São Paulo limit the total number of vehicles permitted to enter the center city each day. Road space rationing is implemented by various methods. One method involves the distribution of a finite supply of daily entry passes to residents who can either use a daily pass or sell it to other commuters. Other road space rationing methods include limiting entry to the central city based on vehicle license plate number and the day of the week.

Applicability to Montgomery County: Road space rationing is an extreme measure used primarily in urban centers with significantly worse traffic congestion and air quality conditions than exist in Montgomery County. As County urban centers are all served by State highways, the County would require State approval to enforce road space rationing.

D. Location and Design of Transportation Network

As mentioned in Chapter II, the physical layout of transportation facilities in an urban area may influence commuting choices. The design of transportation systems affect how people get to work. Some jurisdictions have altered their transportation networks to promote efficient commuting practices.

1. Remote Parking

Remote parking is a land use strategy that locates parking on relatively inexpensive land at the periphery of a major destination such as a central business district. Remote parking intercepts drivers before they enter the more congested area at the center of the district, thereby reducing traffic where density is the greatest. Commuters are attracted to the remote parking either by low-priced parking rates or by limited supply of long-term parking in the district’s center. Frequent shuttle bus service transports parkers to their job site or other final destination.

Remote parking is a common strategy found at U.S. airports. At many airports, relatively low cost, long-term parking is located on the periphery of the airport property (or off-site) but is easily accessed via major transportation routes. Users of these parking facilities rely on frequent and reliable shuttle buses to complete their trip to the airport terminal.

Applicability to Montgomery County: The County could adopt a remote parking strategy where land for new parking facilities is available. As the availability and cost of land is an important consideration, remote parking may be better suited to newly emerging urban centers than it would be as a “retrofit” to developed urban centers. In addition, to make remote parking a viable option for commuters, the County would need to set aside sufficient funding for frequent shuttle bus service between the parking facilities and the urban center.

2. Bus Rapid Transit

The term “bus rapid transit” refers to a transit system that includes dedicated rights-of-way or roadway lanes used by frequent, high-capacity public commuter buses. In contrast to rail transit, bus rapid transit routing may be adjusted to respond to changes in land use patterns including shifts in employment and housing.

Bus rapid transit may run in:

- A dedicated right-of-way;
- A dedicated lane of an existing roadway;
- The median of an existing roadway; or
- A non-road right-of-way (such as a railroad right-of-way).

In some instances, bus rapid transit systems share rights-of-way or lanes with private buses, vanpools, carpools, and other high-occupancy vehicles.

Advanced bus rapid transit systems include features similar to rail transit systems including pre-paid fare collection, enclosed stations, and integrated fare systems that permit transfers between routes and modes. A report by the U.S. General Accountability Office notes that bus rapid transit systems often must deliver high levels of service and amenities similar to rail systems in order to overcome the poor public image of commuting by bus.26

To implement a bus rapid transit system, the transit provider will need to make significant investments in right-of-way acquisition or conversion, purchase and maintenance of vehicles, and construction and up-keep of facilities. Nonetheless, bus rapid transit often is more affordable to construct than light rail transit systems.27 Construction and operation of bus rapid transit systems require the cooperative efforts of local planning agencies and transit service providers. As noted by the Victoria Transport Policy Institute, successful bus rapid transit requires that bus transit be given increased priority in transportation planning and budgeting, roadway management, and land use decision-making.28

Several metropolitan transit authorities have built bus rapid transit lines. Table 6-5, on the next page, shows information on bus rapid transit lines constructed in Boston, Cleveland, Las Vegas, Los Angeles, and Pittsburgh.

26 United States General Accounting Office, Bus Rapid Transit Shows Promise, GAO-01-984, September 2001
27 Ibid.
### Table 6-5: Examples of Bus Rapid Transit Lines

<table>
<thead>
<tr>
<th>City/Route</th>
<th>Distance</th>
<th>Right-of-Way</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston/“Silver Line”</td>
<td>7.0 miles</td>
<td>Dedicated bus lanes on arterial highways; downtown bus tunnel</td>
<td>From Roxbury to Downtown Boston and from South Boston to Logan Airport</td>
</tr>
<tr>
<td>Cleveland “Silver Line”</td>
<td>7.1 miles</td>
<td>Dedicated bus lane on median of arterial highway</td>
<td>Along Euclid Ave. from Downtown Cleveland to East Cleveland</td>
</tr>
<tr>
<td>Las Vegas/“Max Line”</td>
<td>7.5 miles</td>
<td>Dedicated bus lane on arterial highway</td>
<td>Along Las Vegas Blvd. from Nellis Air Force Base to Downtown Las Vegas</td>
</tr>
<tr>
<td>Los Angeles “Purple Line”</td>
<td>14 miles</td>
<td>Bus lane in railroad right-of-way</td>
<td>From North Hollywood to Woodland Hills</td>
</tr>
<tr>
<td>Pittsburgh “MLK East Busway”</td>
<td>9.1 miles</td>
<td>Bus lane in railroad right-of-way</td>
<td>From Downtown Pittsburgh to eastern suburb of Swissvale</td>
</tr>
</tbody>
</table>

**Applicability to Montgomery County**: County master plans and other planning documents identify possible bus rapid transit rights-of-way including the Corridor Cities Transitway, the Purple Line, in the Georgia Avenue corridor, and along Veirs Mill Road. Construction and operation of bus rapid transit would require the County to identify significant new funding sources. As a point of reference, the seven-mile bus rapid transit line in Cleveland which is being built primarily in existing rights-of-way is estimated to cost about $168 million to construct. The County also would require State approval if it chose to use State owned rights-of-way for bus rapid transit.

3. **Transit Signal Priority / High Occupancy Vehicle Lanes**

Transit signal priority refers to a traffic management strategy that gives precedence to transit vehicles at signal controlled intersections. Transit signal priority allows public buses (as well as street-cars and light rail lines) to avoid many intersection delays, thereby increasing the reliability of transit schedules. By improving the reliability and reducing the time of travel by transit, signal prioritization makes transit a more competitive alternative to the single-occupant automobile. A traffic management system may also offer signal priority to certain non-transit vehicles such as vanpools, carpools, and emergency response vehicles.
A common method of transit signal prioritization is the installation of “queue jump” lanes. A queue jump lane is a short bus lane leading to a signalized intersection. When a transit bus approaches an intersection, a signal priority system provides an early green light to the bus that permits the vehicle to by-pass the intersection queue.

As detailed in a 2005 study funded by the U.S. Department of Transportation, a transit signal priority system requires four technological components:

- A detection system that identifies the location of transit vehicles;
- A priority request generator that alerts the traffic control system that a transit vehicle would like to receive priority;
- Software that processes the request and decides whether and how to grant priority based on priority control strategies; and
- Software that manages the system, collects data, and generates reports. 29

Several communities have installed signal prioritization on dedicated transit or high-occupancy vehicle (HOV) lanes to maximize the efficiency of the roadway network. HOV lanes give priority to transit buses, vanpools, and carpools. In some communities, motorcycles and alternative fuel vehicles also are allowed access to HOV lanes. HOV lanes may be created at the construction of a new roadway or may be retrofitted into existing facilities by converting regular travel lanes to HOV lanes.

Multiple communities have instituted the use of transit signal prioritization including Chicago, Illinois; Fairfax County, Virginia; King County, Washington; Los Angeles, California; Portland, Oregon; and Tacoma, Washington. Evaluations of transit signal prioritization systems found that their effectiveness in reducing transit travel times varies depending on the level of congestion, the frequency of bus service, and the degree of prioritization the system gives both in intersections and on travel lanes. For example, signal prioritization in Tacoma, Washington resulted in a 40 percent reduction in transit vehicle intersection delays. In contrast, a study of transit signal prioritization in Fairfax County, Virginia found only minimal improvements in transit vehicle intersection delays during peak congestion periods (see case study on the next page).

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Case Study: Transit Signal Priority
Fairfax, Virginia

Fairfax County has installed a transit signal priority system covering 25 intersections of Richmond Highway (Route 1). Buses travel the Richmond Highway corridor on lanes shared with other vehicles. Working with the Virginia Department of Transportation and WMATA, Fairfax installed a signalization system that extends a green light when a bus approaches an intersection during the last 10 seconds of the green phase. At present, the highway does not include any bus lanes or queue jump lanes.

The cost for procuring and installing prioritization technology at 25 intersections and 12 buses was approximately $220,000. Fairfax originally installed the signal prioritization system to accommodate emergency vehicles. With financial assistance from the Metropolitan Washington Council of Governments, Fairfax expanded the signal prioritization system to include commuter buses including express buses traveling from Fort Belvoir to the Huntington and King Street Metrorail stations.

The Virginia Department of Transportation commissioned Virginia Tech to evaluate the impact of the transit prioritization system on transit travel times. The Virginia Tech study found the benefits of the program were highly dependent on the level of congestion. During periods of low to moderate levels of congestion, the system reduced intersection delays for transit vehicles by as much as 23 percent. However, during the most congested peak hours, the study found only a marginal improvement (about 2.5 percent) in transit travel times.


Applicability to Montgomery County: The Department of Transportation operates the County’s Advanced Transportation Management System (ATMS). ATMS is a computer system designed to monitor and control traffic signals in real-time to reduce traffic congestion, travel time, and accidents. Several years ago, DOT conducted a limited demonstration of transit signal prioritization for Ride On buses. DOT found transit signal prioritization generally feasible but refrained from implementing the system pending completion of the current multi-year replacement of major ATMS technology. Transit signal prioritization is in the long-term scope of ATMS and could be accommodated by the next generation of ATMS technology. As State roads serve as the major commuting corridors to County urban centers, the County would require State approval to adjust signals and change lane configurations. WMATA approval would also be necessary to equip Metrobuses with signal prioritization technology.

The State of Maryland has dedicated certain lanes on I-270 for high occupancy vehicles during weekday rush hours.

E. Centrally Managed System Governance

In most metropolitan areas, a combination of entities governs transportation demand management programs. State and local governments, regional organizations, transit systems, and parking authorities often provide different transportation demand services. In many cases, these services are loosely connected and not comprehensively managed.
Some communities in the country, most notably universities, have developed transportation demand systems that consolidate a wide range of services into one centrally-managed program. In these consolidated programs, a single entity promotes alternative commuting modes, offers transit incentives, operates local shuttle services, and sets parking pricing and supply policies. For example, the University of Washington “U-Pass” program provides a package of transportation services for faculty, staff, and students that includes free transit, a free campus shuttle, and discounts for vanpooling, carpooling, bicycling, and car-sharing (see case study below).

| Case Study: U-Pass Program  
University of Washington |
|---------------------------|

The University of Washington U-Pass program is a consolidated transportation demand system that offers a wide range of services. Commuters pay a quarterly user fee to join the U-Pass program. For $70 per quarter ($50 for students), U-Pass members receive a range of benefits including:

- Unlimited free rides on public bus and train systems in the Seattle region;
- Discounted vanpool fares;
- Discounted carpool parking;
- Discounted parking for commuters who drive two days per week or less;
- Free nighttime van service serving the campus and nearby neighborhoods;
- Ridesharing matching programs;
- Free guaranteed emergency ride home;
- Discounted car sharing (“Zipcar”) services;
- Discounts on the purchase of bicycle helmets, lights, parts, and accessories; and
- Discounts on general purchases at over 40 local and national merchants.

Program users and single-occupant drivers furnish nearly all of U-Pass operating resources. The University sets parking prices at a rate high enough to create an incentive for some commuters to convert to alternative modes but low enough to attract sufficient customers to generate desired revenue. As mentioned above, parking fees and fines supplied 33 percent of program operating costs in 2007. Membership fees contributed about 59 percent of the operating revenue for the U-Pass program. Other University sources provided the remaining 8 percent of operating resources.\(^{30}\)

In the 18 years since the inception of the U-Pass program, the employee and student population in the University District of Seattle has grown by 24 percent. During the same period, the number of peak hour trips to the area decreased by more than 10 percent. Currently, more than three-quarters of the campus population commutes by a method other than driving alone.

Source: University of Washington

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\(^{30}\) U-Pass 2007 Annual Report, University of Washington Office of Commuter Services
Applicability to Montgomery County. Governance of transportation demand management in Montgomery County is decentralized and shared among multiple County and non-County entities. The County could establish a new transportation demand management governance structure that oversees policies relating to transit financing, commuting incentive programs, infrastructure development and maintenance, zoning and land use requirements, parking policy, and other County policies, programs, and factors that influence commuting patterns.

The County has entered into an agreement with Montgomery College to provide a transit benefit to students enrolled in the College. Under the County’s “U-Pass” program, Montgomery College students ride for free on Ride On buses by showing a current student identification card. The College pays the County $550,000 annually for this benefit.
CHAPTER VII: FINDINGS

The report responds to the Council’s request for the Office of Legislative Oversight (OLO) to study transportation demand management in Montgomery County and other communities. “Transportation demand management” refers to a set of public policy strategies and programs aimed at increasing the efficiency of a region’s transportation resources by providing convenient and affordable alternatives to the single-occupant vehicle.

This chapter summarizes OLO’s findings about the implementation, funding, and governance of transportation demand management strategies in three subject areas:

A. General Findings about Transportation Demand Management
B. Montgomery County’s Approach to Transportation Demand Management
C. Funding for Transit and Transportation Demand Management
D. Transportation Demand Management Strategies in Other Communities

A. GENERAL FINDINGS ABOUT TRANSPORTATION DEMAND MANAGEMENT

Transportation demand management programs are designed to change individuals’ travel behavior by providing convenient and affordable alternatives to the single-occupant vehicle. Findings #1 through #3 discuss factors that influence a commuter’s travel choices. These transportation demand management concepts apply in Montgomery County as well as in other urban communities.

Finding #1: In choosing how to travel, commuters weigh the relative cost, time, and convenience of driving alone against alternative modes of travel.

Commuters to urban centers can choose to drive alone or take an alternative transportation mode (e.g., bus, rail, or carpool). Interviews with transportation demand management professionals and a review of the literature indicate that three dominant factors influence an individual’s commuting choices:

- **Cost** – the relative expense of commuting by alternative modes;
- **Time** – the time needed to commute by one mode compared to another; and
- **Convenience** – the ease, comfort, and reliability of commuting by alternative modes.

Finding #2: A range of conditions influence the cost, time, and convenience of commuting. Only some of these conditions fall within the County’s influence or control.

County land use decisions, transit programs, parking policies, and other actions affect the relative cost, time, and convenience of commuting patterns. For example:

- The County’s Zoning Ordinance establishes minimum parking requirements that determine the supply of parking in new developments.
The County’s Ride On Bus system operates 77 peak hour routes; this network includes 37 routes that serve the Bethesda, Friendship Heights, North Bethesda, Silver Spring, and Wheaton urban centers.

The County controls much of the parking supply in Bethesda, Silver Spring, and Wheaton. The County establishes the pricing structure for this supply and determines the mix of parking space uses (such as the number of spaces designated for short-term, long-term, and carpool use).

Several factors that affect a commuter’s travel choice are beyond the direct control of either County Government or County residents. External factors such as energy costs, housing market conditions, and workplace policies affect commuter decisions. Specifically:

- Rising fuel prices make transit, carpooling, and bicycling more cost competitive with driving alone.
- When housing costs spiked earlier this decade, many people who work in the County decided to live in distant communities, resulting in longer commutes and fewer options for alternative modes of travel.
- Employers that permit employees to work flexible schedules or to telework affect a reduction in peak hour commuting trips.

Finding #3: Successfully increasing the percentage of commuters using alternative modes of travel generates a need for additional investment in transit, bikeway, and pedestrian infrastructure.

Sufficient and reliable funding for transit and other alternative commuting modes is a necessary prerequisite to sustaining high mode shares (i.e., a high percentage of commuters using alternative modes of transportation). If transportation demand management techniques successfully persuade a large number of commuters to abandon driving alone, then cost competitive, timely, and convenient alternatives must be available to serve these commuters.

Transit systems in Montgomery County have experienced increased ridership in recent years. Recent data from Ride On demonstrates that buses during peak hours are regularly at capacity and have had to pass bus stops without picking up passengers due to lack of space. If ridership continues to increase, transit systems will not be able to accommodate this growth without adding new capacity.

Similarly, if a change in travel behavior leads to large increases in the number of people traveling to and within urban centers by bicycle or by foot, bikeway and pedestrian improvements may be needed. This would generate demand for more capital investment. A failure to fund capacity increases that keep pace with demand for alternative transportation modes could result in frustrated commuters choosing to return to driving alone.
B. MONTGOMERY COUNTY’S APPROACH TO TRANSPORTATION DEMAND MANAGEMENT

The County has chosen to focus transportation demand management efforts on “urban centers,” defined in this report as areas with high concentrations of employment that are well served by transit. 1 Specifically, OLO studied North Bethesda and the Central Business Districts of Bethesda, Friendship Heights, Silver Spring, and Wheaton. Findings #4 through #11 address Montgomery County’s approach to transportation demand management governance and implementation in these urban centers and in the County as a whole.

Finding #4: Governance of transportation demand management in Montgomery County is decentralized and shaped by multiple County and non-County entities.

Governance of transportation demand management in Montgomery County is decentralized and shared among multiple County and non-County entities. Within the County, the County Council, County Executive, Department of Transportation, and the Maryland-National Capital Park and Planning Commission (M-NCPPC) each have transportation demand management roles. For example:

- The County Council approves the operating and capital budgets that fund the County’s transportation demand management programs and transit operations and facilities. The Council also enacts laws, approves land use policies, and sets parking rates that affect transportation demand management.
- The County Executive sets transportation demand management policies and priorities in preparing and recommending an annual operating budget and biannual capital improvements program.
- The Department of Transportation implements County transportation policies, including operating Ride On, providing commuter services, and operating County parking facilities.
- M-NCPCC develops and recommends master plans and the Growth Policy. In addition, the Planning Department participates in drafting and enforcing traffic mitigation measures required by the Planning Board as part of the development approval process.

Since Montgomery County is part of a metropolitan region where transit services cross jurisdictional lines, the County must also work closely with the State of Maryland, District of Columbia, State of Virginia, the Washington Metropolitan Area Transit Authority (WMATA), Metropolitan Washington Council of Governments, and the Federal government to achieve County and regional transit goals.

1 As this report addresses TDM strategies implemented by the County Government, the report does not discuss Federal Government employment centers or urban centers located within municipalities.
Finding #5: In addition to the roadway network, Montgomery County’s current transportation infrastructure includes rail and bus transit systems, bikeways, and pedestrian facilities.

The County’s current alternative transportation infrastructure includes:

- The Metrorail, Metrobus, Ride On, MARC Train, and MTA Commuter Bus transit systems;
- A limited network of bikeways; and
- Pedestrian facilities (e.g., sidewalks and crosswalks) that improve mobility within urban centers.

Much of this infrastructure is focused on the County’s urban centers, specifically North Bethesda, and the Bethesda, Friendship Heights, Silver Spring, and Wheaton Central Business Districts.

Transit Systems: Table 7-1 lists the number of rail stations Countywide and in urban centers, and the parallel number of bus routes that provide service during peak commuting hours.

<table>
<thead>
<tr>
<th>Area</th>
<th>Commuter Bus Routes</th>
<th>MARC Stations</th>
<th>Metrorail Stations</th>
<th>Metrobus Routes</th>
<th>Ride On Bus Routes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countywide</td>
<td>3 routes</td>
<td>11 stations</td>
<td>12 stations</td>
<td>21 routes</td>
<td>77 routes</td>
</tr>
<tr>
<td>Urban Centers</td>
<td>3 routes</td>
<td>1 station</td>
<td>7 stations</td>
<td>20 routes</td>
<td>37 routes</td>
</tr>
</tbody>
</table>

Bikeways: Currently, three of the five urban centers (Bethesda, North Bethesda, and Silver Spring) are served by eight bikeways. The County’s Master Plan of Bikeways calls for a significant expansion of the current bikeway system. The plan includes a total of about 200 bikeways (500 miles) throughout the County, including 62 bikeways that serve urban centers. Since many of the planned bikeways are in State highway rights-of-way, the County would require State cooperation to build these facilities.

Pedestrian Facilities: The County’s pedestrian facilities include sidewalks, crosswalks, countdown crosswalk signals, and lighting. The County’s Department of Transportation maintains these facilities and installs upgrades. The master plans for North Bethesda and the Bethesda, Friendship Heights, and Silver Spring Central Business Districts also recommend pedestrian-friendly features such as wider sidewalks on busier streets, streetscaping, mid-block signals for pedestrian crossings, and restrictions on allowing drivers to turn right on red.
Finding #6: The County actively promotes transit and other alternative commuting modes.

The County’s strategies for promoting transit and other alternative commuting modes include: requiring developers and employers to decrease commuter trips; providing County funding for transit subsidies; and offering general transit promotion programs.

**Developer and Employer Traffic Mitigation Measures:** County Code (Chapter 42A, Ridesharing and Transportation Management), requires certain developers and employers to implement traffic mitigation measures, such as limited parking, carpooling or vanpooling incentives, or transit subsidies.

**County Transit Subsidies:** The County’s Fare Share program (offered Countywide) and Super Fare Share Program (offered in the County’s transportation management districts) provide financial assistance to employers who offer transit subsidies to their employees.

**DOT Outreach and Programs:** The Commuter Services Section in the Department of Transportation’s Division of Transit Services implements Countywide outreach and programs, including:

- Marketing alternate transportation options to workers and residents in the County, with a focus on transportation management districts;
- Encouraging employers to promote alternate transportation options for their workers;
- Promoting and implementing programs such as Fare Share and Super Fare Share;
- Providing personalized rideshare matching for carpools and vanpools; and
- Overseeing the County’s transportation management districts.

**Share-a-Ride Districts:** In a share-a-ride district, an office development may obtain a reduction in its minimum parking requirements if the property owner participates in a County-operated share-a-ride program, provides ridesharing incentives, and pays an annual fee to the County’s ridesharing account (part of the Mass Transit Fund) to support transportation demand management activities.

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2 See Chapter 3 for a complete description of transportation management districts.
Finding #7: The County Government focuses transportation demand management programs and resources on urban centers.

The Department of Transportation engages in transportation demand management activities throughout the County. However, County policies and practices focus transportation demand management programs and resources on certain urban centers.

County Code Chapter 42A, Ridesharing and Transportation Management, states that the County desires to “focus new development in high transit-service areas” but that “limited transportation infrastructure, traffic congestion, pedestrian access, and safety issues impede the County’s land use and economic development objectives.” As such, the Code authorizes the Council to establish transportation management districts to:

- “Provide sufficient transportation capacity to achieve County land use objectives and permit further economic development;
- Reduce the demand for road capacity, and promote traffic safety and pedestrian access; and
- Help reduce vehicular emissions, energy consumption, and noise levels.”

The Council has established transportation management districts (TMDs) in North Bethesda, downtown Bethesda, Friendship Heights, Silver Spring, and Shady Grove. The Shady Grove TMD, although established in 2006, remains unfunded and inactive.

In addition to the transportation management districts, DOT has designated the Wheaton CBD as a “Transportation Planning and Policy Area” and dedicates additional resources to this area for transportation demand management activities.

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3 MCC §42A-22 (a) and (b).
4 MCC §42A-22 (c).
Finding #8: The County's approach to managing and financing transportation demand management activities varies among urban centers.

Table 7-2 shows how the County manages and funds transportation demand management differently in each of the five urban centers. Differences among the urban centers reflect the uniqueness of each area, diverse constituent interests, and different practices that existed when the transportation management district or transportation planning and policy area was established.

Table 7-2: Comparison of County Transportation Management Districts and the Wheaton Transportation Planning and Policy Area

<table>
<thead>
<tr>
<th>Date Established</th>
<th>North Bethesda</th>
<th>Bethesda</th>
<th>Friendship Heights</th>
<th>Silver Spring</th>
<th>Wheaton TPPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Established</td>
<td>1995</td>
<td>1998</td>
<td>1999</td>
<td>1987</td>
<td>1993</td>
</tr>
</tbody>
</table>

### Management

<table>
<thead>
<tr>
<th>Manager</th>
<th>Transportation Action Partnership</th>
<th>Bethesda Urban Partnership</th>
<th>Department of Transportation</th>
<th>Department of Transportation</th>
<th>Department of Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advisory Committee</td>
<td>12-18 voting members</td>
<td>11 voting members</td>
<td>14 voting members</td>
<td>12 voting members</td>
<td>None</td>
</tr>
<tr>
<td>Appointment of Committee Members</td>
<td>Transportation Action Partnership</td>
<td>Bethesda Urban Partnership</td>
<td>Executive appoints, Council confirms</td>
<td>Executive appoints, Council confirms</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

### Public Parking

<table>
<thead>
<tr>
<th>Number of County Spaces</th>
<th>North Bethesda</th>
<th>Bethesda</th>
<th>Friendship Heights</th>
<th>Silver Spring</th>
<th>Wheaton TPPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Lot District</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### FY08 Funding Sources

<table>
<thead>
<tr>
<th>Parking Revenue</th>
<th>North Bethesda</th>
<th>Bethesda</th>
<th>Friendship Heights</th>
<th>Silver Spring</th>
<th>Wheaton TPPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMD Fees</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>**</td>
<td>N/A</td>
</tr>
<tr>
<td>Mass Transit Fund</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*While no Silver Spring parking revenue was transferred to the Silver Spring TMD in FY08, the FY09 budget assumes a transfer of about $200,000 to support the Super Fare Share program in Silver Spring.

**Fees are authorized but no developments required to pay have been completed. DOT expects to collect fees in FY09.
Finding #9:  The supply of spaces in County parking lot districts exceeds the current parking demand of single-occupant commuters.

In the 1940s and 1950s, the County established parking lot districts (PLDs) in some urban centers to give property owners an alternative way to comply with the Zoning Ordinance's parking requirements. Today, County-managed PLDs provide more than 21,000 parking spaces located in the Bethesda, Silver Spring, and Wheaton Parking Lot Districts; more than three-quarters of these spaces are available to long-term, non-carpool parkers.

At present, although a few parking facilities fill during peak hours, the overall supply of parking in each district exceeds demand. Long-term parking vacancy rates, which vary by district, range from 39 percent (in Silver Spring) to 14 percent (in Bethesda).

Finding #10: County parking policies work at cross purposes to County transportation demand management objectives.

The County promotes alternative commuting modes while it simultaneously implements policies that provide single-occupant drivers easy access to parking. The presence of plentiful, low-cost, conveniently located parking, which serves as a strong incentive to driving alone, undercuts efforts to encourage commuters to choose alternative travel modes.

The following parking-related policies and practices promote single-occupant vehicle driving into the County’s urban centers:

- Under current zoning regulations, the County requires developers in urban centers to provide nearly the same amount of parking (for similar uses) as is required in less densely built parts of the County that lack transit service. These minimum parking requirements were established when the County was more suburban in character and do not fully account for more urban conditions, such as the availability of transit and traffic congestion.

- The County’s parking lot districts provide large supplies of long-term parking in three of the five urban centers. As explained in Finding #9, at present, although a few parking facilities fill during peak hours, the overall supply of parking in each district exceeds demand.

- Parking rates for public parking spaces in County facilities are relatively inexpensive, particularly compared to private parking rates. According to a recent DOT pricing survey, in Bethesda, a monthly parking pass at a County-owned facility costs $95; the cost of a comparable pass at a commercial facility ranges between $115 and $165.
Finding #11: Since the County controls a large share of urban center parking spaces, the County has an opportunity to use parking availability and pricing to influence commuters’ travel choices.

Since the County manages a large share of the parking supply in three urban centers, it plays an important role in influencing commuter travel choices. County policies regarding parking supply and pricing affect the relative cost and convenience of driving alone compared to alternative modes.

As reviewed earlier, the County currently provides ample, relatively low-cost, long-term parking in urban centers. However, the County could use its control of parking in urban centers to influence commuter choices. Examples of changes that can discourage commuters from driving alone include: reducing the supply of long-term parking; increasing general rates for long-term parking; charging a premium for entering or exiting a parking facility during peak hours; and/or increasing the rates for the highest demand parking spaces.

C. FUNDING FOR TRANSIT AND TRANSPORTATION DEMAND MANAGEMENT

Transportation infrastructure, including rail and bus systems, bikeways, and pedestrian facilities are funded through multiple County and non-County sources. Findings #12 and #13 describe major sources of transit and transportation demand management funding in Montgomery County.

Finding #12: The State’s Transportation Trust Fund and the County’s Mass Transit Fund support transit and transportation demand management services.

Two special transportation funds are major sources of funding for transit and transportation demand management services in Montgomery County.

*Maryland Transportation Trust Fund*: The Maryland Transportation Trust Fund supports the programs and activities of the Maryland Department of Transportation. The Fund finances Department operating, capital, and debt service expenses, including the State’s contribution to WMATA and the operation of MTA Commuter Buses and MARC trains. State gas tax and motor vehicle taxes are the Fund’s largest revenue sources. Although the Fund receives dedicated revenue, its resources are subject to annual budget appropriations and are not earmarked for specific programs such as transit.

*Montgomery County Mass Transit Fund*: The County’s Mass Transit Fund supports operation of the Ride On bus system, transportation demand management programs, and other activities of the DOT Division of Transit Services. Mass Transit Property Tax revenue contributes about two-thirds of all Mass Transit Fund resources. Other large contributors to the Mass Transit Fund are State aid and Ride On fare revenue.
Finding #13: Revenue from two special taxing districts supports County transportation demand management activities.

The County’s transportation management districts and parking lot districts each collect revenue that supports County transportation demand management activities.

*Transportation Management District Fee*: The County Code authorizes the County to charge a fee to certain property owners in transportation management districts (TMDs) to fund transportation demand management activities. The Code requires transportation management fee revenue to be used in the district in which the property subject to the fee is located. In FY08, the County collected $1.3 million in transportation management district fee revenue.

*Parking Lot District Revenue*: The County Code establishes parking lot districts (PLDs) as special taxing districts. Within these districts, the County collects an annual ad valorem property tax from non-residential property owners who opt not to provide on-site parking. PLDs also receive revenue from parking fees, parking fines, and investment income. As shown in the Table 7-3, for each PLD, parking fees and special district taxes are the largest sources of revenue.

<table>
<thead>
<tr>
<th>Source of Revenue</th>
<th>Bethesda</th>
<th>Silver Spring</th>
<th>Wheaton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special District Taxes</td>
<td>$5,162,550</td>
<td>$5,402,120</td>
<td>$497,570</td>
</tr>
<tr>
<td>Parking Fees</td>
<td>$8,745,000</td>
<td>$7,804,610</td>
<td>$725,000</td>
</tr>
<tr>
<td>Parking Fines</td>
<td>$4,700,000</td>
<td>$2,400,000</td>
<td>$493,120</td>
</tr>
<tr>
<td>Investment Income</td>
<td>$932,400</td>
<td>$329,000</td>
<td>$58,800</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td><strong>$19,539,950</strong></td>
<td><strong>$15,935,730</strong></td>
<td><strong>$1,774,490</strong></td>
</tr>
</tbody>
</table>

Source: Approved FY09 Operating and Capital Budgets, Schedule C-3.

By law, PLD revenue must be spent within that PLD. The Code states that the primary purpose of PLD revenue is to acquire, build, restore, improve, maintain, and operate off-street parking facilities; the Code also authorizes the use of PLD revenue for:

1. Funding an urban district in the same PLD;
2. Supporting the activities of a transportation management district;
3. Implementing transit and ridesharing incentive programs; and
4. Establishing public-private partnerships to increase ridesharing and transit usage.
OLO researched transportation demand management funding, policies, programs, and governance strategies used in other communities. Findings #14 through #18 discuss these strategies and their potential applicability to Montgomery County.

Finding #14: Most large transit systems in the country are funded in part by revenue from a dedicated funding source. State law limits the County’s options for funding transit with a dedicated funding source.

Most major transit systems in the United States receive a substantial portion of their capital and/or operating resources from a dedicated revenue source. Montgomery County would need to seek State approval to implement the most common strategies for dedicating a revenue source to fund transit services.  

*Sales Tax:* Sales tax revenue is the most common dedicated revenue source for transit systems in the country. Maryland law prohibits counties from imposing sales taxes. Legislation failed during the 2007 General Assembly session that would have dedicated a percent of State sales tax revenue for transit programs.

*Automobile Taxes and Fees:* Some jurisdictions dedicate revenue from gas taxes and automobile registration and licensing fees for transit programs. Maryland law prohibits counties from raising revenue from gas taxes or automobile fees. While the Maryland Transportation Trust Fund receives revenue from State gas taxes and automobile fees, transit must compete with other transportation programs through the annual appropriations process for these resources.

*Tolls:* Some jurisdictions dedicate roadway toll revenue for transit. Maryland law prohibits counties from raising toll revenue.

However, the County currently does have the authority to implement some of the transit funding strategies used in other communities.

*Transportation Improvement Districts:* “Transportation improvement districts” are special taxing districts designed to raise revenue for transportation improvements in a specific area. Property tax revenue in the Dulles Rail Transportation Improvement District helps fund the construction of the extension of Metrorail from West Falls Church to Dulles Airport.

Montgomery County has the authority to create a special taxing district to raise property tax revenue to support transit.

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5 While the County’s Mass Transit property tax is dedicated to funding transit programs, the tax rate has fluctuated significantly in recent years thereby reducing the stability of this revenue source.
**Per Employee Tax**: The City of Redmond, Washington charges employers a “Business Tax/Transportation Improvement” (BTTI) tax of $55 per employee to fund transportation improvements including transit programs. The County has the authority to charge a similar fee.

**Parking Space Tax**: In Australia and Canada, several municipalities have implemented special taxes on non-residential parking spaces. These communities levy the tax based either on the number of parking spaces or the size of the parking area at a property.

Montgomery County has the authority to charge an excise tax on parking spaces. In 1990, the Council approved an excise tax on non-residential parking spaces; however, the County Executive vetoed the legislation. Last year, the Working Group on Infrastructure Financing for County Government Facilities issued a report that, among other things, recommended that the County enact an excise tax on non-residential commuter parking spaces.

**Market Rate Public Parking**: Some communities, most notably urban university campuses, set parking rates based on market demand and use the revenue to support a variety of transit-related programs.

As part of the annual budget process, the Executive recommends and the Council approves parking lot district (PLD) rates. PLD rates in some areas fall well below rates charged in privately-operated commercial facilities. Given the limits the Code places on use of PLD revenue, a Code amendment would be necessary to allow the use of this revenue for transit system operating and capital costs.

**Finding #15**: The County could offer additional or alternative types of economic incentives to encourage commuters to switch to transit or other alternative modes.

Economic incentives are a common tool to convince commuters to switch to transit or other alternative modes. The County’s Fare Share and Super Fare Share programs reimburse employers for a portion of the cost of providing employee transit subsidies. Elsewhere in the country, communities have developed additional types of alternative commuting economic incentives.

**Employer-Based Transit Benefits**: Transit systems in Dallas, Denver/Boulder, Portland, San Jose, and elsewhere offer employer-based transit passes. In these programs, the transit agency sells discounted transit passes for use by all workers in the organization. These programs offer all employees – particularly commuters who do not need to drive every day – an incentive to ride transit occasionally.

Montgomery County could incorporate employer-based transit passes as a component of Ride On system pricing but would need approval from WMATA and the State to extend the program to the Metro and MARC systems, respectively.
Parking Parity: “Parking parity” laws require an employer to offer cash benefits as an alternative to free or low-cost parking. California requires many employers that provide parking subsidies to concurrently offer a cash allowance as an alternative to the parking subsidy. The County encourages employers to voluntarily provide alternative benefits to commuters who decline a free or reduced price parking space.

Montgomery County could mandate a cash out program similar to the one in California under its general police powers authority.

Employer/Commuter Rewards Programs: Economic incentives may be used to entice employers to promote and support alternative commuting modes. Redmond, Washington, has piloted a program to provide businesses a $300 per year reward for each commuter trip reduced below an initial baseline level. In other jurisdictions, community organizations provide direct monetary incentives to commuters who choose not to drive alone.

Montgomery County could supplement its existing transit subsidy reimbursement programs by providing financial rewards to employers who reach trip reduction goals or to commuters who use alternative modes.

Finding #16: Some communities have put policies and programs in place to create a disincentive to driving alone.

Many commuters find that traveling alone in their car has a cost, time, and convenience advantage over transit and other alternative modes. Several communities have adopted strategies to make driving alone less attractive than other commuting options.

Zoning Code Parking Requirements: Local zoning codes commonly set minimum parking requirements for different land uses. In recent years, some urban planners have critiqued minimum parking requirements because they frequently are based on studies that do not factor in the price of parking and the availability of transit. Some jurisdictions have adopted separate parking requirements designed specifically for urban areas with relatively high levels of transit service and traffic congestion. Alternatively, some communities set maximum limits on the amount of parking permitted at a specific site or within a specific district.

The County Council has the authority to amend parking requirements in the County’s Zoning Ordinance.

Control of Public Parking Supply and Pricing: Communities may create disincentives to driving alone through control of parking supply and pricing. A community may constrain parking supply to compel some commuters to travel by alternative modes. In addition, local governments may increase parking rates to raise the cost of driving alone.

Montgomery County has the authority to use public parking pricing to discourage commuters from driving alone.

Congestion Pricing: The term “congestion pricing” refers to a practice of adjusting transportation related charges (such as road tolls or parking fees) by time of day or by location.
Congestion pricing creates an economic disincentive for driving to the most congested areas of a city and/or during the most congested periods of the day. Congestion pricing has been implemented in several cities outside the United States including London, Stockholm, and Singapore. The creation of high-occupancy toll (HOT) lanes is another form of congestion pricing. In HOT lanes, carpools, vanpools, and buses travel for free, while drivers of single-occupant vehicles pay a toll.

Congestion pricing on roadways is a form of toll payment. State law prohibits Montgomery County from imposing roadway tolls. Nonetheless, the County could impose a surcharge for drivers that enter or exit County operated parking facilities during peak hours.

**Finding #17: Some communities employ land use and transportation network design to promote alternative commuting modes.**

The physical layout of an urban area may influence commuting choices. Land use patterns and the design of transportation networks affect how people get to work. Some jurisdictions have altered their land use patterns and transportation networks to promote efficient commuting practices.

**Remote Parking:** Remote parking is a land use strategy that locates parking at the periphery of a central business district to intercept drivers before they enter congested areas. Commuters are attracted to the remote parking either by low-priced parking rates or by limited supply of long-term parking in the district’s center. Frequent shuttle bus service transports parkers to their job site or other final destination.

Montgomery County could adopt a remote parking strategy where land for new parking facilities is available. As the availability and cost of land is an important consideration, remote parking may be better suited to newly emerging urban centers than it would be as a “retrofit” to developed urban centers.

**Bus Rapid Transit:** The term “bus rapid transit” refers to a transit system that includes dedicated rights-of-way or roadway lanes used by frequent, high-capacity public commuter buses. Advanced systems (such as those built in Boston, Cleveland, and Las Vegas) include features similar to rail transit systems, such as pre-paid fare collection, enclosed stations, and integrated fare systems that permit transfers between routes and modes.

Montgomery County would require significant additional funding to construct and operate a bus rapid transit line(s) and would need State approval to use State rights-of-way.
Transportation Demand Management Implementation, Funding, and Governance

Transit Signal Priority: Transit signal priority refers to a traffic management strategy used by several jurisdictions that gives precedence to transit vehicles at signal controlled intersections. Transit signal priority allows public buses to avoid many intersection delays, thereby increasing the reliability of transit schedules. For example, upon approach of a transit bus to the intersection, a signal priority system provides an early green light to the bus permitting the vehicle to by-pass the intersection queue.

As State roads serve as the major commuting corridors to County urban centers, Montgomery County would require State approval to adjust signals and change lane configurations. WMATA approval would also be necessary to equip Metrobuses with signal prioritization technology.

Finding #18: University campuses offer models of centralized administration of commuter services, transit incentives, shuttle bus operation, and parking supply and pricing policies.

In most metropolitan areas, a combination of entities governs transportation demand programs. State and local governments, regional organizations, transit systems, and parking authorities often provide different transportation demand services. In many cases, these services are loosely connected and not comprehensively managed.

Some communities in the country, most notably universities, have developed transportation demand management systems that consolidate a wide range of services into one integrated, centrally-managed program. In these consolidated programs, a single entity promotes alternative commuting modes, offers transit incentives, operates local shuttle services, and sets parking pricing and supply policies.

Montgomery County could establish a new transportation demand management governance structure that oversees policies relating to transit financing, commuting incentive programs, infrastructure development and maintenance, zoning and land use requirements, parking policy, and other policies and programs that influence commuting patterns.
CHAPTER VIII: RECOMMENDATIONS

Transportation demand management programs in urban centers are designed to change travel behavior by providing convenient and affordable alternatives to the single-occupant vehicle. As reviewed in the previous chapter, while the County actively promotes transit and other alternative commuting modes, some County policies work at cross purposes to these goals. This chapter offers four recommendations for Council action to improve the consistency and coherence of the County’s transportation demand management policies and practices.

Recommendation #1: Establish parking policies that are consistent with the County's transportation demand management goals.

County parking policies work at cross purposes to County transportation demand management objectives. Although the County actively promotes alternative commuting modes, it simultaneously offers single-occupant drivers easy access to parking in urban centers. OLO recommends the Council review and revise current parking policies to better align them with the transportation demand management goals established in approved master plans and the Growth Policy. The Council should examine two aspects of County parking policy.

1.a. Establish a policy governing urban center parking requirements.

The County Zoning Ordinance regulates the minimum number of parking spaces required for specific land uses. Current requirements only partially account for the availability of transit and traffic congestion in the County’s urban centers. As a result, the County requires nearly the same amount of parking (for similar uses) in these urban centers as it requires in less densely developed areas that lack transit service.

In consultation with the Planning Board, the County Council should assess whether current Zoning Ordinance parking requirements are appropriate for urban centers served by transit. The Council should consider the following questions:

- Do the current Zoning Ordinance minimum parking reductions for proximity to Metrorail and share-a-ride participation adequately take into account current conditions in County urban centers?
- Should the Council amend the Zoning Ordinance to make parking reductions for developments served by Metrorail available to developments served by Metrobus and Ride On?
- Should the Council amend the Zoning Ordinance to replace minimum parking requirements with maximum parking requirements in urban centers served by transit?
- What should be the relationship between Zoning Ordinance parking requirements and master plan commuting goals?
1.b. Establish a policy on public parking supply and pricing.

The availability and cost of parking impacts the County’s ability to achieve both transportation and economic development policy objectives in urban areas. On the one hand, plentiful, low-cost parking serves as an incentive for commuters to drive alone, while limited or high-cost parking provides an incentive to commute by alternative modes. On the other hand, businesses perceive limited or high-cost parking as detrimental to County economic and business development objectives.

In consultation with the Executive Branch, the County Council should adopt a policy resolution that establishes criteria for determining the supply and pricing of County-owned parking spaces. The policy should address the following questions:

- In parking lot districts, what formula should be used to determine how many parking spaces the County should build to accommodate current and future development? Should the County set a cap on the total number of parking spaces in a parking lot district?
- Should the County manipulate the mix of short-term, long-term, and carpool parking spaces in parking lot districts to encourage use of alternative commuting modes?
- Should the County raise long-term parking rates to encourage use of alternative commuting modes?
- Should the County impose a surcharge for drivers that enter or exit County-operated parking facilities during peak hours?
- Should the County charge a premium for high demand parking locations?

Recommendation #2: Ask the Executive and the Planning Board to report annually on progress made toward achieving master plan commuting goals.

Council-approved master plans establish County goals for the percentage of commuters who travel by a method other than single-occupancy vehicles. Master plans for many areas of the County (including most urban centers) include commuting goals. Realizing these goals requires an implementation plan that coordinates multiple County policies and programs including:

- Land use decisions;
- Transit services and policies;
- Transit promotion and subsidy programs;
- Zoning Ordinance parking requirements;
- Parking supply and pricing policies; and,
- Bicycle and pedestrian facility planning and implementation.
The Council is the sole entity with the authority to align all of these policies and programs. To properly oversee the County’s progress in achieving its commuting goals, the Council requires periodic updates from the County Government and the Planning Board on current modal split levels and the effectiveness of existing strategies designed to increase modal splits.

OLO recommends that the Council ask the Executive and the Planning Board to report annually on progress made toward achieving master plan commuting goals. In the report to the Council, the Executive and the Planning Board should identify whether new measures to achieve the commuting goals (such as increasing transit capacity or raising parking prices) are warranted. Based on the input from the Executive and Planning Board, the Council would determine whether any changes should be made to County transportation or land use policies and programs that affect commuting decisions.

**Recommendation #3: Ask the Executive to evaluate transportation demand management practices used in other jurisdictions and to report to the Council on their potential applicability in Montgomery County.**

While the County has implemented a broad series of measures to promote alternative commuting modes, some practices from other jurisdictions merit further evaluation to assess their potential viability in Montgomery County. The Council should ask the Executive to evaluate transportation demand management practices that could supplement the current array of County programs.

Specific items that OLO believes merit Executive review include:

- The feasibility of implementing an “EcoPass” or similar employer-based transit benefit program in the County or in all areas served by WMATA (see page 53);
- The implementation steps and funding needed to pilot transit signal prioritization for Ride On and Metrobuses on State and County roads (see page 65); and
- The effectiveness of employer and commuter reward programs in adjusting commuting behavior (see page 56).

The Council should ask for a written response from the Executive by the summer of 2009.

**Recommendation #4: Discuss the Council's long-term vision for creating an efficient and sustainable alternative commuting infrastructure and the funding sources needed to realize the vision.**

The County seeks to persuade a large number of workers to commute by alternative modes. A large scale shift in commuting practices would generate new demand for facilities and services to accommodate workers who no longer commute by single-occupant vehicle. To sustain high mode splits, the County will need to identify funding for transit, bicycle, and pedestrian network capacity increases to keep pace with increases in demand.
OLO recommends that the Council discuss its long-term vision for building transportation infrastructure and for securing the funding needed to realize that vision. For example, the viability of developing major new transit capacity, such as a new bus rapid transit line, depends on the availability of sufficient funding to bring the initiative to fruition.

As it contemplates what the County’s transportation network will look like in 10 or 20 years, the Council should assess whether it expects future improvements to be built using existing revenue sources or whether new resources could be secured for major new initiatives. Any ambitious plan to greatly expand transit (and other alternative mode) capacity should also incorporate a long-term strategy to pursue Federal aid, State aid, and possibly new County- or State-authorized dedicated funding sources to help make the vision happen.
CHAPTER IX: AGENCY COMMENTS

The Office of Legislative Oversight circulated a final draft of this report to the Chief Administrative Officer for Montgomery County and to the Montgomery County Planning Board. OLO appreciates the time taken by agency representatives to review the draft report and provide feedback. OLO’s final report incorporates technical comments and corrections provided by County Government and Planning Department staff.

Written comments from the Chief Administrative Officer on the final draft report begin on the next page. Written comments from the Planning Director on the final draft report begin on page 95.
MEMORANDUM

December 04, 2008

TO: Aron Trombka, Senior Legislative Analyst
Office of Legislative Oversight

Jennifer Renkema, Research Associate
Office of Legislative Oversight

FROM: Timothy L. Firestone, Chief Administrative Officer

SUBJECT: Draft OLO Report 2009-6, Transportation Demand Management Implementation, Funding, and Governance

Thank you for the opportunity to comment on Draft OLO Report 2009-6 regarding Transportation Demand Management Implementation, Funding, and Governance. The report was compiled in response to the County Council’s request for an examination of the County’s Transportation Demand Management (TDM) strategies and a comparison with approaches used in other communities.

The report is a very comprehensive and well-organized review of existing TDM efforts and related policies and programs in the County’s urban centers. It highlights the many successful strategies the County is pursuing to reduce single occupant vehicle use in order to control traffic congestion, decrease energy consumption, and improve air quality. It also points out some of the challenges inherent in trying to optimize these efforts while at the same time addressing other County goals, such as promoting further investment in our urban centers, meeting the diverse needs of our residents and businesses, maintaining a healthy economy, and conducting fiscally-responsible government. We look forward to engaging with OLO and the County Council in a discussion of the actions the County can take to further our multiple objectives in this regard. Below are our comments on the recommendations contained in the report.
Recommendation #1: Establish parking policies that are consistent with [the] County’s transportation demand management goals.

There are several references to the number of County owned public parking spaces and their utilization rates in the Silver Spring and Bethesda Parking Lot Districts (PLDs). The statistics quoted are accurate. They are provided, however, with no background context as to the history of their construction and past utilization rates, near term projections of future parking demand (within 5 years), or explanation of the policy behind their allocation as short-term or long-term spaces. The lack of background may erroneously indicate, to some readers, that the number of spaces in each PLD were constructed on an arbitrary basis and their short or long term allocation may be similarly arbitrary. A brief explanation of each of these issues may be helpful.

Recommendation #1.a.: Establish a policy governing urban center parking requirements.

The recommendation, in part, suggests the County Council should consider the following question: Should the Council amend the Zoning Ordinance to replace minimum parking requirements with maximum parking requirements in urban centers served by transit?

The overall reading of the report would indicate that the PLDs should be considered “urban centers served by transit.” Other parts of the report highlight the importance of the parking Ad Valorem tax in the overall revenue structure of the PLDs. We suggest the report should acknowledge that such a radical change in the Code requirements for parking could invalidate the basis for the collection of this tax. Any limitation on the amount of parking should be structured in the framework of existing public and private parking spaces and outstanding obligations of any affected PLD, and with a clear understanding of market needs. We note that similar caveats have been provided for some of OLO’S other recommendations.

Recommendation #1.b.: Establish a policy on public parking supply and pricing.

The report suggests a number of possible actions may be taken including:

1. A cap on the total number of parking spaces in a PLD. Again, a concern is what affect this may have on the basis for the collection of the Ad Valorem tax and the outstanding obligations of a PLD.

2. The imposition of a surcharge for drivers that enter or exit County-operated parking facilities during peak hours. This concept is referred to in a number of places in the report. Although the idea may be technologically feasible, we are not aware of its implementation anywhere in the country. Parking is traditionally priced based on
duration of use of the facility rather than time of exit. We are not aware of any revenue collection system configured in this manner. If it is possible, the implementation of such a system may have significant capital and operating cost implications as well as adverse customer service effects.

3. Two other courses of action separately discuss variable pricing based on premium location and space duration. Currently, short-term spaces are priced higher than long-term spaces based on their premium location and customer service issues. Making long-term parking more expensive than short-term parking (by hour) may be inherently contrary to the concept of making premium spaces more expensive than non-premium spaces.

**Recommendation #2: Ask the Executive and the Planning Board to report annually on progress made toward achieving master plan commuting goals.**

The Executive Branch would be happy to report annually on progress toward achieving master plan commuting goals. Annual commuter surveys are conducted each year which provide insight into progress. Advisory committees in each TMD are kept apprised of progress throughout the year. Summary reports are prepared on a regular basis for the TMDs. These and other materials can be made available to the Council.

**Recommendation #3: Ask the Executive to evaluate transportation demand management practices used in other jurisdictions and to report to the Council on their potential applicability in Montgomery County.**

The Executive Branch has no problem in principle evaluating the examples of TDM practices used in other jurisdictions. In some cases work already has been done or is about to be done on programs of these types. Those which OLO has selected as having particular merit include:

- **The feasibility of implementing an “EcoPass” or similar employer-based transit benefit program in the County or in all areas served by WMATA.**

The County tried several years ago to launch such an employer-based pass program. As OLO aptly notes on page 54 of their report, Ride On is only one element of the County’s transit network, yet these employer-based transit passes are most successful if they are accepted by all transit providers. At the time the County attempted to implement this type of pass program earlier, efforts to obtain WMATA’s participation were unsuccessful. Discussions with employers indicated the program would be unappealing without WMATA’s participation, so it was abandoned.
However, a successful effort of a similar nature was undertaken with the Montgomery College U-Pass program. That program works because many students are able to use Ride On exclusively for their transportation to and from campus. The college collects $2 from every student in their activity fee, which yields approximately $550,000 annually paid to Ride On. In return, all Montgomery College students have unlimited use of Ride On by showing their current student ID card.

- **The implementation steps and funding needed to pilot transit signal prioritization for Ride On and Metrobuses.**

  Transit signal prioritization is encompassed within the traffic signal system modernization project recently approved for deployment beginning in FY09 and scheduled to run through FY14. It will be coordinated with Ride On’s new CAD/AVL (Computer Aided Dispatch/Automated Vehicle Locator) system, equipment which should be on all Ride On buses by the end of the calendar year. Transit signal prioritization will be implemented over time as the core signal system is replaced.

- **The effectiveness of employer and commuter reward programs in adjusting commuting behavior.**

  The Executive Branch is willing to evaluate other approaches to providing economic incentives for employers and employees to use alternative modes. However, it should be noted that the “seed money” approach taken with the County’s current Fare Share/Super Fare Share transit subsidy program has the advantage of leveraging employer participation over time, so that the County gradually contributes less to the transit benefits being provided, while the employer contributes more and, ultimately, takes over the entire cost of providing transit benefits to the employees. The approach taken with these programs also has been validated by national research as one of the most effective methods to accomplish mode shifts. In addition, there is benefit to the business community of retaining continuity of programs from the standpoint of planning – and the added challenge and cost of providing information and marketing of new programs to employers and employees also must be evaluated. Finally, as OLO points out, the effectiveness of a rewards program is dependent upon availability of resources to fund rewards that are large enough to affect commuter and business behavior.
Recommendation #4: Discuss the Council’s long-term vision for creating an efficient and sustainable alternative commuting infrastructure and the funding sources needed to realize the vision.

The Executive Branch would be happy to contribute to this discussion in whatever way is considered most constructive. At a minimum, we will provide whatever subject matter expertise is requested.

We appreciate the opportunity to comment on this draft report, congratulate OLO on a very thorough and thought-provoking exploration, and look forward to participating in the Council’s review.

TLF:slbi

cc: Arthur Holmes, Director, Department of Transportation
Carolyn G. Biggins, Chief, Division of Transit Services
Stephen Nash, Chief, Division of Parking Management
Emil J. Wolanin, Chief, Traffic Engineering and Operations
Kathleen Boucher, Assistant Chief Administrative Officer
Diane Schwartz-Jones, Assistant Chief Administrative Officer
Thursday, November 20, 2008

Aron Trombka, Senior Legislative Analyst
Office of Legislative Oversight – Montgomery County
100 Maryland Ave.
Rockville, MD 20850

Dear Mr. Trombka:

RE: OLO DRAFT Report 2009-6
Transportation Demand Management Implementation, Funding, and Governance

We appreciate your coordination with us on the draft study. This study provides a useful compendium of current activities and its recommendations will help further our interest in developing and implementing alternatives to auto travel in the County. The study recommendations are consistent with the objectives in the Board’s 2007 Growth Policy report and will likely mirror recommendations included in the Climate Protection Plan. These separate initiatives have fairly common objectives and research and reporting efforts should be consolidated to the extent possible. We look forward to discussing these recommendations with the County Council in early 2009.

I offer three substantive comments on the report. First, the role of land use planning is included in the table of contents but not described in the text. The development of our urban centers and preservation of our agricultural reserve is the result of some four decades of careful land use planning and growth management. As environmental, economic, and fiscal constraints increase, we need to redouble our efforts on directing mixed-use development into areas best served by transit. These efforts will be prominently featured in our 2009 Growth Policy recommendations.

Second, we concur with the recommendations for focusing on parking policies. As you have noted, the development of a policy on public parking supply and pricing will require analysis similar to that proposed in the 2007 Growth Policy, but not funded. We are evaluating private parking supply in our Zoning Ordinance Revision work program.

Finally, we suggest the County also focus on technology approaches to address commuting and congestion problems. Journey to work strategies should include increased emphasis on both promoting and implementing flex time, telecommuting, and telework programs. Improved mobility analysis tools and traveler information systems
for transit services, parking availability, and roadway congestion can enable smarter commuting patterns that better match consumer demand to available supply on a real-time basis.

Detailed technical comments on the draft staff report are being submitted under separate cover. Please continue to coordinate with Dan Hardy on this effort and let me know if you have any questions.

Sincerely,

Rollin Stanley,
Planning Director
Montgomery County Planning Department
## APPENDICES

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
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<tbody>
<tr>
<td>A</td>
<td>Sample Traffic Mitigation Agreement</td>
<td>A-1</td>
</tr>
<tr>
<td>B</td>
<td>Sample Traffic Mitigation Plan</td>
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</tr>
</tbody>
</table>
TRAFFIC MITIGATION AGREEMENT

THIS TRAFFIC MITIGATION AGREEMENT ("Agreement"), is made this ____ day of ____________, 200__, by and among (a) NAME OF APPLICANT ("Applicant"); (b) MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION ("MCDOT"); and (c) MONTGOMERY COUNTY PLANNING BOARD OF THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION ("Planning Board"), a Maryland public body corporate.

RECEITALS:

This Agreement is entered into on the basis of the following facts, understandings, and intentions of the parties:

A. Applicant is the owner of a certain ___ acre tract of land in the ___ zone, located at the (give geographic location relative to major streets – e.g., "northeast quadrant of X & Y Streets") in City, Montgomery County, Maryland (the "Property").

B. Applicant proposes to redevelop the Property with three buildings consisting of ________ square feet of (describe development – e.g., "research and development, offices, residential condominiums") (the "Project"), which was the subject of an Application for Preliminary Plan of Subdivision that was captioned Preliminary Plan No. _______ (the "Preliminary Plan").

C. The Project is located in the ________ Metro Station Policy Area and in the ________ Transportation Management District.

D. On ____________, 200__ the Planning Board approved Preliminary Plan No. _______ for the Project. Attached hereto as Exhibit "A" is copy of the Planning Board’s Opinion dated _______200__ (the "Opinion").

E. The Opinion contains the following requirement of the Applicant:

Satisfy the master plan recommendation to participate in the ________ Transportation Management District (TMD). Submit a draft Traffic Mitigation Agreement (TMAg) with the Planning Board and MCDOT. The TMAg must be executed prior to release of building permits. The TMAg must include participation in the ________ Transportation Management Organization ("TMO"). The traffic mitigation goals for the master plan are to achieve and maintain:

a. A XX% non-auto-driver mode share for employees.

b. A YY% non-auto-driver mode share for multi-family residents.
NOW, THEREFORE, in consideration of the above Recitals, each of which is made a part of this Agreement, and for other good and valuable consideration, the receipt and sufficiency of which each of the parties hereto acknowledges, and intending to be legally bound thereby, the parties hereby agree to the following in compliance with the above requirements:

1. **Commencement.** The obligations and requirements set forth in this Agreement shall commence upon issuance of the first Use and Occupancy certificate for the first building of the Project. Applicant shall notify DPWT and the Planning Board when receipt of the initial U&O Certificate is estimated to be within six weeks, and again when the U&O is received.

2. **Participation in_____TMO.** Applicant agrees to participate with the _____Transportation Management Organization (the “_____TMO”) to encourage and assist the _____Transportation Management District (the “TMD”) in achieving and maintaining the XX% peak period non-driver mode share goal for residents and the YY% peak period non-driver mode share for employees within the _____Master Plan (the “Master Plan”) and related goals of the TMD.

3. **Appointment of Transportation Benefits Coordinator.** Applicant shall designate in writing to the TMD a Transportation Benefits Coordinator (TBC) who will assist residents and employees in exercising commuting options and serve as a point of contact for TMD staff. Applicant shall arrange for an initial meeting between the TBC and TMD Staff and provide the opportunity for subsequent meetings as needed. The TBC shall plan and coordinate with the TMO staff and monitor achievement of traffic mitigation as anticipated by the Master Plan. On an ongoing basis, the TBC will interact with TMO Staff in promoting ridesharing and other alternative transportation programs in order to maximize the participation of residents and employees at the site in such programs to help the TMD meet its goals. The TBC may be a property manager or other employee with other employment duties. Applicant will ensure the TBC attends periodic meetings and training sessions held by MCDOT and/or other local or regional agencies which are related to performance of these duties and coordination with other traffic mitigation programs. Applicant will promptly notify the TMD in writing of the designated TBC(s) and any subsequent change in the TBC(s) or contact information.

4. **Activities of Transportation Benefits Coordinator.**

   (a) **Promotional Programs.** The TBC will cooperate with staffs from MCDOT and the Planning Board on an ongoing basis to conduct promotional activities and information distribution for all features of the TMD program at the Project; facilitate access to residential and commercial tenants/employers and employees, and residents for purposes of informing and educating about programs and services available in the TMD; and assist with the distribution of “Welcome Packets” with information about commuting alternatives or other materials to be provided by the TMD or the County to new tenants, new employers, and new employees and residents. Applicant will provide the TMD with an updated list of tenants/employers on a semi-annual basis. Upon request, this information will be kept confidential by the TMD. Applicant will insure that all activities required of the TBC will be supported by adequate budgetary allocations so that efforts to help meet trip reduction goals of the TMD are feasible.
Promotional activities will include distribution of TMD and County information to employers and employees, and residents, through the use of displays, bulletins, brochures, notices, and the periodic hosting of ridesharing days and contests, prepared or conducted solely by the Applicant or in concert with the TMD and/or County. Applicant and the TBC will provide and facilitate use of space in the development on a periodic basis (by prior arrangement) for marketing and promotional activities of the TMD. Upon request by the County and/or TMD the TBC will also promote and arrange for the sale of discounted passes, tickets and tokens, including Ride-On passes, Metrorail Fare Cards, Metrobus passes, MARC commuter rail tickets, or other incentive programs provided by public or private institutions.

(b) **Surveys.** The TBC, in cooperation with the TMD and MCDOT, shall facilitate employer/employee participation in the TMD Annual Commuter Survey using a survey instrument provided by the TMD or the County. The survey shall be conducted of the transportation choices of residents and employees and related issues. Applicant and the TBC shall use best efforts to achieve an 80% response return rate from among employees and residents in the development. The TMD will tabulate and analyze this information, and provide results on the aggregate mode share profiles of employers/employees and residents in the Project upon request. [The term “best efforts” shall mean performance of such efforts with all available resources in a diligent and commercially reasonable manner; but, except as generally incident to the business of Applicant and the effort to conduct marketing activities in connection with the survey, nothing herein shall require Applicant to pay any sum of money or other economic consideration to any third party as part of its “best efforts.” *Note: Wording in brackets here was added by one of the attorneys & included in some TMAgs – but is not always included.*]

5. **Displays.** Applicant shall provide a permanent information display in a highly-used location on the Property for commuter information and promotional material on transportation management programs in the TMD, the County and the region. If the Project has different primary access points for visitors and members of the public from those access points for employees and/or residents, a display shall be provided in each of the primary access areas to reach each of these target markets.

6. **Flexible Work Hours.** Applicant will encourage its commercial tenants to maintain a flextime and telework policy for those employers/employees for whom it is feasible, to allow work trips of employees to be shifted out of peak travel periods.

7. **Car/Van Pool Parking.** Applicant shall provide car- and van pool parking spaces in a preferred location within its parking facility and shall take other actions in concert with the TMD to promote use of this commute option. At least ___ such spaces shall be provided initially, with increases as necessary to meet demand.

8. **Employee Parking.** Applicant will make pay parking available to employees working at the Project at price points that are appropriate to discourage the use of single-occupancy-vehicles to commute to the Project. These price points shall be determined based
upon relevant research or a survey of market rates for parking conducted at least once every three years, and will be established in consultation with DOT and M-NCPPC.

[Note: Inclusion of provisions requiring parking charges for employees is not standard at this time, but this type of provision is desirable and has been included in some TMAgs.

Another approach used on occasion is promoting reduced parking demand, including debundling parking from leasing, as in the Wisconsin Place TMAg:

"Engaging in voluntary parking reduction programs for the office component of the development by: (a) charging market rates for parking in the parking facility, (b) encouraging employers of the office component not to pay for parking for those employees who drive to work alone, (c) encouraging office employers to subsidize parking for vanpools and carpools, (d) not requiring that tenant leases commit to a minimum number of parking spaces as a precondition to leasing space in the office building, (e) notifying prospective office tenants of alternatives to monthly parking arrangements for their employees, including information about the availability of government transit subsidy programs and other transportation benefits with the materials provided by the Friendship Heights TMD as referenced in paragraph 3 below and (f) implementing a strategy to help ensure that there will be adequate parking for retail patrons within the parking facility.""

9. **Car Sharing Space.** Applicant shall provide __ car sharing parking spaces in a preferred and highly visible location within its parking facility or in a prominent surface location convenient to the main entrance of the hospital if at all possible. Applicant shall take other actions in concert with the TMD to promote use of car sharing in conjunction with other commute options to accomplish the objectives of the TMD. In the event after __ years no demand for car sharing is evidenced, or a car sharing program is not in place, Applicant will work with MCDOT, M-NCPPC, and the TMO to determine alternative use for these parking spaces in support of the objectives of the TMAg (e.g., car or van pool, or off-peak commuting parking) until such point as a car sharing program is feasible.

10. **Live Near Your Work.** Applicant will implement marketing efforts, in conjunction with MCDOT and other agencies, designed to attract employees working on site to purchase or rent housing within the Project or the nearby residential community, to increase the number of employees able to walk or bike to work, or take a short bus ride.

11. **Bicycle Facilities.** Applicant shall provide a secure weatherproof area in a conveniently-located, well-lit, high traffic part of the parking facility to house bicycles. Bicycle storage shall be provided for the number of bicycle parking facilities specified in Planning Board approvals or sufficient to meet demand in the event demand exceeds the number specified. No charges shall be imposed for bicycle parking.

12. **Shower Facilities.** Applicant shall provide shower facilities in the Project for the use of employees that bicycle or walk to the Property.
13. **Real Time Transit Information Sign(s).** Applicant shall provide the space and necessary electrical and technical infrastructure for (a) Real Time Transit Information signs at (a) highly-used location(s) in the Project to assist employees, residents, and visitors with commuter information. MCDOT will be responsible for installing such sign(s).

   [Note: In some cases provisions have been included requiring Applicant to pay for these signs. eg.: “Applicant will be responsible for installing the necessary equipment, including, but not limited to, conduit and, electrical connections to allow the County to install one (1) real-time transit information sign in the bus shelter and will pay MCDOT $20,000 for the upgrade of MCDOT’s real-time transit information sign program.”]

14. **Countdown Pedestrian Signal.** Applicant will provide a countdown pedestrian signal as part of the renovated intersection of __________________________ for the Project.

15. **Transportation Management Organization Assistance.** The TMO staff shall be available to provide transportation information, technical advice, and other forms of assistance normally provided by the TMO to sites within the __________ area, to the extent feasible within the constraints of staff and fiscal resources.

16. **Annual Report.** Applicant shall provide an annual summary report (1-2 pages) to MCDOT, with a copy of the TMD, on or about the anniversary of this agreement, or at another regular interval as designated by MCDOT. This report will outline the traffic mitigation program and activities conducted with the TMD during the course of the previous year, and will include the name and contact information for the current Transportation Benefits Coordinator.

17. **Fees.** Applicant shall pay all transportation management fees as required by law, without regard to whether this development would be construed as “new” or “existing” development at that time.

18. **Duration.** The provisions of this Agreement shall continue in force in perpetuity or until the Planning Board evaluates, after receipt of recommendations from MCDOT, the progress of the program and determines that components of the program, in whole or in part, are no longer appropriate or necessary.

19. **Enforcement.** If Applicant fails to comply with the terms and conditions of this agreement, MCDOT or the Planning Board shall be entitled to take such enforcement action against Applicant as may be permitted under the Code and other applicable law.

20. **County Information Obligations.** Upon request, and to the extent feasible within the constraints of staff and fiscal resources, MCDOT shall respond to inquiries from the Applicant regarding available transportation systems and facilities and shall provide the Applicant with any existing information, including printed and/or electronic materials, which MCDOT may have concerning Ride On Bus, Metrombus, Metrorail, MARC, Share-A-Ride, and any other public transportation systems or carpool and vanpool matching services now or here-
after serving the Project, in quantities sufficient to allow the Applicant to distribute to its employees, residents, and visitors.

21. **Applicant’s Obligations.** The obligations of Applicant under this Agreement shall apply only during the period when it is the holder of a ground lease for the Property or any part thereof and only to land it leases or owns. At such time as Applicant ceases to hold a ground lease interest in the Property or any part thereof, the obligations and liabilities thereafter accruing (but not any accrued and unperformed obligations and liabilities) shall be the obligations of Applicant’s successors and/or assigns, to the extent permitted by law.

22. **Assignment.** This Agreement is assignable, in whole or in part, by Applicant, without the consent of the Planning Board or Montgomery County. Applicant’s successor(s) in interest or assignee(s) shall sign the Assignment form, attached hereto as Exhibit “B”, indicating their obligation to be bound by the terms and conditions of this Agreement. A copy of the executed Assignment form shall be mailed to the Planning Board, to DPWT, and to the TMD.

23. **Notices.** All notices and other communications required to be given by any party under this Agreement shall be in writing and shall be deemed duly given by Certified Mail, Return Receipt Requested, Postage Prepaid, as follows:

(a) If to Applicant to:

Contact Name  
Applicant/Developer Name  
Street Address  
City, Maryland ZIP

with a copy to:

Attorney’s Name, Esquire  
Law Firm LLP  
Street Address  
City, Maryland ZIP

(b) If to the Planning Board to: Chairman, Montgomery County Planning Board of The Maryland-National Capital Park and Planning Commission, 8787 Georgia Avenue, Silver Spring, Maryland 20910, with a copy to Associate General Counsel, Office of the General Counsel, 8787 Georgia Avenue, Suite 205, Silver Spring, Maryland 20910.

(c) If to the MCDOT to: Director, Montgomery County Department of Transportation, Executive Office Building, 101 Monroe Street, 10th Floor, Rockville, Maryland 20850; with a copy to County Attorney’s Office, 101 Monroe Street, 3rd floor, Rockville, Maryland 20850.
24. Entire Agreement. This Agreement constitutes the entire agreement between the parties and no party is liable to the other or bound in any manner by express or implied warranties, guarantees, promises, statements or representations pertaining to the subject matter hereof unless such warranties, guarantees, promises, statements or representations are expressly and specifically set forth in this Agreement.

25. Counterparts. This Agreement may be executed simultaneously in any number of counterparts, each of which shall be deemed an original but all of which shall constitute one and the same Agreement.

26. Amendments/Modifications. This Agreement can be modified only in writing signed by all the parties hereto, their heirs, successors, assigns or their designees hereunder.

27. Governing Law. This Agreement shall be governed and construed in accordance with the laws of the State of Maryland.

28. Recordation. This Agreement will be recorded in the Land Records of Montgomery County.

IN WITNESS WHEREOF, Applicant, the Planning Board and MCDOT have entered into this Agreement on the day and year first written above.

[SIGNATURE PAGE FOLLOWS ]
Here’s our plan to reduce gridlock in Montgomery County by offering the selected transportation benefits to our employees. In the first column, we’ve placed an E next to the strategies that we already have in place, and N next to the strategies that we will implement with this year’s Traffic Mitigation Plan. In the last column, we’ve described our current or planned efforts.

<table>
<thead>
<tr>
<th>Traffic Mitigation Strategy</th>
<th>Employer Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>* E Contact person designated to receive and distribute information</td>
<td>Ellen Davis, Human Resources Director 301-555-5555; <a href="mailto:edavis@globalsolutions.com">edavis@globalsolutions.com</a> We will notify the TMD in writing of any changes in this information</td>
</tr>
<tr>
<td>* E Information on transit/pooling/other commute alternatives distributed/posted regularly (furnished by TMD)</td>
<td>Information on transportation services is posted in the employee break room.</td>
</tr>
<tr>
<td>* N Facilitate TMD staff presentations to employees and HR/Administrative staff on commute information/alternatives on periodic basis</td>
<td>We hold an annual benefits seminar in the fall. We would like TMD Staff to attend to display information and answer employee questions.</td>
</tr>
<tr>
<td>* N Guaranteed Ride Home Promotion (free regional program offering emergency rides)</td>
<td>We promote the Guaranteed Ride Home program to our employees. We provide brochures to employees with their monthly transit benefit.</td>
</tr>
<tr>
<td>* N Annual Commuter Survey distributed to employees (short survey of transportation – supplied by TMD)</td>
<td>[Please describe your approach to gaining 80 percent participation from your employees] We will distribute survey to our employees via e-mail from our company president. We will also send an e-mail reminder.</td>
</tr>
<tr>
<td>* N ADA information provided (transportation services for people with disabilities)</td>
<td>We will provide disabled employees with information on the regional Metro Access program and Montgomery County’s Same Day Access program.</td>
</tr>
<tr>
<td>* N Permanent display area for TMD-provided bus schedules and other transportation information</td>
<td>We plan to install a transit map and brochure racks in our employee break room.</td>
</tr>
<tr>
<td>* N Compile information on yearly TMP activities and submit Annual Report</td>
<td>We will maintain a file on the promotion and implementation of the strategies selected above and include in our Annual Report to DPWT.</td>
</tr>
<tr>
<td>* N Attendance at free CSS-sponsored meetings/workshops permitted for designated contact person</td>
<td>Ms. Davis will be permitted to attend four such meetings per year.</td>
</tr>
<tr>
<td>E Information on commuting alternatives provided to new employees (TMD can provide materials and/or attend orientations)</td>
<td>We inform new employees of our transit subsidy program and provide Metro pocket guide and Ride On route maps to assist them in transit planning.</td>
</tr>
<tr>
<td>N Free or reduced rate parking for car/vanpools offered to employees</td>
<td></td>
</tr>
</tbody>
</table>
# SAMPLE TRAFFIC MITIGATION PLAN

<table>
<thead>
<tr>
<th>Traffic Mitigation Strategy</th>
<th>Employer Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferred location and/or reserved parking for car/vanpools offered to employees</td>
<td>We provide two car sharing spaces within our surface parking area near the building entrance.</td>
</tr>
<tr>
<td>Provision of car sharing space in highly visible location within on-site parking facility.</td>
<td>We provide paid car sharing membership for all our employees and provide reduced-cost rental fees through an arrangement with the provider. We encourage use of car sharing vehicles when use of transit is not feasible for business or personal appointments.</td>
</tr>
<tr>
<td>Provision of car sharing incentives, including paying part or all of membership costs, rental costs, or similar incentives.</td>
<td>We will arrange to have bike racks installed in our garage.</td>
</tr>
<tr>
<td>Bike amenities at worksite, such as racks, lockers, and showers (TMD may be able to supply)</td>
<td></td>
</tr>
<tr>
<td>Transit/pedestrian amenities at worksite, e.g. sidewalks, benches, etc.</td>
<td></td>
</tr>
<tr>
<td>Carpool matching for employees (as part of free region-wide matching program, or can be on-site only)</td>
<td></td>
</tr>
</tbody>
</table>
| Alternative work schedules:  
  - Flex Time  
  - Jobsharing  
  - Compressed Work Week  
  X Telecommute/Teleworking | We have an informal telework program that allows some employees to telework in special circumstances. We have a formal telework program that started on __________, 2004 and ___ employees currently participate in this program. |
| Tax-free monthly transit subsidies provided to employees, including Super Fare Share, Fare Share and Metrocheck. | Our company participates in the County’s subsidy program. We started our program on __________, 2004 and ___ of our employees are currently participating in this program. The amount of the subsidy is $____ including the County portion. |
| Maryland State Commuter Tax Credit for employers | TMD Staff explained that we qualify for the State’s 50 percent tax credit on our contributions to employees’ commuting costs. This is worth up to $50/month per participant in tax credits. We will apply for the tax credit this tax year. |
| Pre-tax payroll deduction for transit costs offered to employees (Saves employer & employee money) | |
| Transit passes/tokens offered for purchase at worksite (at full or reduced price) | |
| Subsidize employee parking and transit equally (if employee parking is currently subsidized, offer equal subsidy for transit costs) | |
| Ozone Action Days participation (regional program to alert people to dangerous air quality days) | |
| Other: Please Indicate | |

Please attach to cover letter and submit to: Mr. Arthur Holmes, Jr., Director, Montgomery County DPWT c/o Commuter Services 8401 Colesville Road, Suite 150, Silver Spring MD 20910 301-565-5890 (fax)
Pasadena, CA

Masuda, Judi. City of Pasadena Trip Reduction Ordinance. SCAG Compass Blueprint. City of Pasadena, Department of Transportation.
City of Pasadena
Trip Reduction Ordinance

Judi Masuda
TDM/New Mobility/EV Infrastructure
jmasuda@cityofpasadena.net
(626) 744-4111
Introduction to City of Pasadena’s TRO

- Regulations Requirements
- Policies/Process
- Implementation
- Annual Monitoring
- Changes to City’s TRO
  - Include Regulating Residential Developments
    » Assessing a fee for non-compliance
  - Benefits to gaining support for the development of its transportation infrastructure
Introduction

- TDM
- Policies and programs that increase the use of high occupancy vehicles
- Includes activities that shift travel away from congested peak periods
- Design elements to improve
  - Pedestrian-oriented design
  - Transportation Infrastructure
  - Sustainable transport
Purpose

• TDM Strategies in TRO

• Not designed to attain specific performance targets but to compliment other TDM approaches

• AQMD – Rule 2202

• Menu of options to reduce mobile source emissions to comply with Federal Clean Air Act Requirements
• County Congestion Management Program –
• Requires development of a travel demand management element that promotes alternative transportation modes.
  > Carpoools, vanpools, transit, bicycles, walking, flexible work hours and parking management.
• AQMD regulates employers
• TDM/TRO regulates developments
  > TDM design standards are the first step in broadening the options travelers have in getting to and from places.
  > TDM Ordinance addresses the importance of the transit system by requiring that transit system operators be incorporated into the development process (EIR) by linking transit coordination with CEQA-California Environmental Quality Act.
Implement

- Prepare Trip Reduction Ordinance
- City Council Review
- Coordinate with Planning/Business Development Department
- Condition developments during project review process
  > TDM Plan submitted for city approval before a building permit can be issued
  > Meet with responsible parties for an orientation of the TDM plan/site visit
Orientation

- Meet with representative provide:
  - Orientation to TDM Plan
    - Implementation
    - Monitor program
    - Marketing resources
    - Annual Reporting Requirements
    - Evaluate/Audit program goals
    - Recommend new strategies
      - Increase AVR
TDM Plan
Requirements/Setbacks

- Developer ignores TDM condition and does not have anyone on the team who can prepare a TDM plan.
- Developer cannot gain a building permit without TDM plan approval.
  > Provide developer with a list of TDM consultants who can prepare a TDM plan.
  > Without a plan on file, tenant cannot occupy the building.
Amendments to TRO

- Difficult to require compliance without penalties
- 2008 City Council amends TRO to include:
  > Monetary penalties for non-compliance
  > Increased AVRs for TOD’s
  > Regulating residential developments
  > Require attendance at TMA meetings.
TRO Benefits

- Policy required for compliance

- Developments are the audience needed for gaining support and understanding of the City’s goals (examples):
  - EV Infrastructure development
  - Increase AVR
  - Reduce congestion
  - Model city for implementing
    - Integrated Mobility Hubs
    - ITS capability for transforming transportation for future generations
Thank you.

Questions?

Judi Masuda
(626) 744-4111
TRANSPORTATION IMPACT REVIEW
CURRENT PRACTICE & GUIDELINES

Prepared by:

Transportation Planning & Development Division
Department of Transportation
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For comments or additional questions regarding the Department’s transportation review practice, please contact:

Pasadena Department of Transportation
Transportation Planning & Development Division
http://www.cityofpasadena.net/Transportation/

The Department’s current review practice will be periodically updated and posted on:

http://www.cityofpasadena.net/Transportation/Transportation_Impact_Review/
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SECTION 1:

INTRODUCTION, BACKGROUND, AND PROCESS
SECTION 1: BACKGROUND, PURPOSE, & PROCESS

BACKGROUND

The following guidelines support Pasadena’s vision of creating “a community where people can circulate without cars.” The vision relies upon an integrated and multimodal transportation system that provides choices and accessibility for everyone living and working in the City. Key strategies to achieve this vision promote non-auto travel including public transit services, parking strategies, bicycle facilities, and pedestrian components that are well coordinated and connected with a larger regional transportation system.

PURPOSE

The ability of a community to balance and facilitate the different components of its transportation system is important to the creation and preservation of a quality living and business environment. The function of a community’s transportation system is to provide for the movement of people and goods, including pedestrians, bicyclists, transit and other vehicle traffic flows within and through the community.

The Mobility Element of the City’s General Plan sets forth goals and policies to improve overall transportation in Pasadena. The Mobility Element is based on approaches that address the needs of multimodal corridors and streets as well as community neighborhoods that are affected by traffic. These guidelines have been developed to ensure that transportation system improvements necessary to support new development while maintaining quality of life within the community are identified prior to project approval and funded prior to construction.

Transportation impact analyses are an integral part of the environmental review process that is required for all proposed projects that are not categorically exempt under the California Environmental Quality Act (CEQA). Under CEQA, jurisdictions have the right to categorically exempt projects consisting of less than five housing units and non-residential projects with less than 2,500 square feet of floor area (CEQA 15303). Projects exempt under this class are qualified by consideration of where the project is located. If a project may impact an environmental resource or the location may be of critical concern, the project cannot be categorically exempt.
Projects characterized as in-fill development may also be categorically exempt if they meet the conditions described in Section 15332 of the CEQA Guidelines as follows:

1. The project is consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations
2. The proposed development occurs within city limits on a project site of no more than five acres substantially surrounded by urban uses
3. The project site has no value as habitat for endangered, rare, or threatened species
4. Approval of the project would not result in any significant effects relating to traffic, noise, air quality, or water quality
5. The site can be adequately served by all required utilities and public services

These guidelines have been developed to identify projects that may have environmental impacts and to provide step-by-step instructions for preparing a Transportation Assessment and a Transportation Impact Study.

**PROCESS**

Upon submission of an application for discretionary action, the City of Pasadena Department of Transportation (PasDOT) will determine whether or not a transportation review is required relative to the CEQA guidelines and City policy. If a review is required, the following steps describe the process for initiating the process:

1. Applicant selects a consultant from PasDOT’s pre-qualified list of traffic consultants.
2. Applicant shall deposit the City’s Traffic Review Fee based on City’s Current General Fee Schedule.
3. The selected consultant will submit a draft MOU for preparation of the traffic analysis to PasDOT for review and approval prior to proceeding with preparing the traffic analysis.
4. The selected consultant will submit a draft of the traffic analysis to PasDOT for review and approval.

*Thresholds for Determining Transportation Review*

The guidelines apply to all projects that require environmental review in accordance with the California Environmental Quality Act and the City’s established Environmental Policy Guidelines, significance thresholds, and transportation review guidelines.
Significance Thresholds
The thresholds contained herein determine a project’s expected level of impact on the transportation system and identify appropriate types of mitigation.

Traffic Counts
1. Traffic counts, including pedestrian counts, shall be collected by the traffic consultant in accordance with industry standards and established methodologies.
2. Counts should be collected when schools and colleges are in session. Counts collected when schools and/or colleges are not in session shall be approved by the Director of Transportation.
3. Counts should be collected during AM (7 a.m. to 9 a.m.) and PM (4 p.m. to 6 p.m.) peak hours, unless otherwise specified. Midday and Weekend counts may also be required.

Trip Generation and Applicable Credits
Trip generation is determined by one or more of the following:
1. Institute of Transportation Engineers (ITE) Trip Generation, 9th Edition or most current edition.
   A. Rates should be calculated using the weighted average formula when applicable
   B. Special consideration should be given for ITE rates based on antiquated data or a small sample may require additional data collection to determine the appropriate trip generation
2. Counts conducted for existing projects that are relocating or expanding
3. New rates should be generated using community examples for uses not updated or included in the ITE Trip Generation publication
4. Trip credits are given to certain uses located on major corridors and/or within the Transit Oriented District (TOD). The trip discounts are determined on a case by case basis and must be consistent with the City’s current practice
5. For new uses, parking demand should be based on ITE Parking Generation Handbook and/or parking demand analyses conducted for similar uses in the community.
SECTION 2:

THRESHOLDS USED FOR DETERMINING TRANSPORTATION REVIEW OF PROJECTS
SECTION 2: THRESHOLDS

Thresholds for Determining Transportation Review

Pasadena’s current practice for reviewing a project’s traffic begins with the submittal to the Pasadena Planning & Development Department of either a Pre-development Plan Review (PPR), or an application for a discretionary action, including but not limited to a master development plan, planned development, conditional use permit, variance, hillside development permit, design review, and a request to alter the assessor’s map.

PasDOT reviews several types and sizes of projects that could be subject to environmental review under the California Environmental Quality Act, including projects consisting of either five or more dwelling units or generating more than ten PM peak hour trips. The Department has two processes for reviewing a proposed project’s traffic impacts, including a Transportation Assessment (TA) and a Transportation Impact Study (TIS). Generally, projects that will generate less than 20 PM peak hour trips are required to conduct a TA, while larger projects are required to conduct a TIS. The primary difference between the two types of transportation review is the level of detail in the intersection analysis. The following table summarizes the thresholds of determination.

<table>
<thead>
<tr>
<th>TYPE OF PROJECT</th>
<th>EXEMPTION</th>
<th>Category 1: TRANSPORTATION ASSESSMENT</th>
<th>Category 2: TRANSPORTATION IMPACT STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential (based on # of units)</td>
<td>4 units or less (net new)</td>
<td>5 – 25 units (net new)</td>
<td>26+ units (net new)</td>
</tr>
<tr>
<td>Commercial (based on # of net new trips)</td>
<td>Less than 70 daily trips and less than 11 trips in any peak hour</td>
<td>71 – 150 daily trips, or 11 – 20 trips in any peak hour</td>
<td>151+ daily trips, or more than 20 trips in any peak hour</td>
</tr>
</tbody>
</table>
Thresholds for Determining Significant Impacts

The thresholds identified below were developed to measure potential impacts of net new trips resulting from projects that intend to intensify an existing land use or alter existing traffic patterns. The thresholds are designed to capture a project’s anticipated level of impact measured in terms of net new trips versus existing conditions.

Multi-Modal Thresholds for Street Segments and Intersections

Environmental quality of non-vehicular modes must be improved when assessment of project study street segments and intersection reveal less than average conditions.

Thresholds for Street Segments (Increase in Daily Traffic)

The following thresholds measure the relative change in daily traffic resulting from an increase in trips or a change in access that alters existing traffic patterns. A street segment analysis is required for Transportation Assessments and Transportation Impact Studies, unless otherwise determined by PasDOT. A conservative approach is taken when calculating the traffic growth by basing the calculation on the increase relative to existing traffic volumes as follows:

- \[ \text{Percentage of Increase} = \frac{\text{Net New Project Trips}}{\text{Existing Daily Traffic}} \]
Table 2: Street Segment Thresholds

<table>
<thead>
<tr>
<th>Traffic Growth on Street Segment</th>
<th>Required Multi-Modal Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Please refer to pages 16-18 of the Guidelines for Transportation Review of Projects provided in Section 5)</td>
</tr>
<tr>
<td>0.0 - 2.4% Daily Traffic Growth</td>
<td>Staff review and conditions</td>
</tr>
</tbody>
</table>
| 2.5% - 4.9% Daily Traffic Growth| • Initial study required if existing count is greater than 2,000 VPD 
|                                 | • Soft measures required      |
| 5.0% - 7.4% Daily Traffic Growth| • Initial study required      
|                                 | • Soft measures required      
|                                 | • Physical improvements may be required |
| 7.5% + Daily Traffic Growth     | • Initial study required      
|                                 | • Soft measures required      
|                                 | • Extensive physical improvements may be required |
|                                 | • Project alternatives may be considered |

Thresholds for Intersections (Intersection Capacity Analysis)

Transportation Impact Studies must include an intersection analysis; however, Transportation Assessments are generally exempt from this requirement. The significance of project-generated traffic impacts at intersections is determined by calculating the projected volume-to-capacity (V/C) change from Existing and Future Without-Project conditions to Existing and Future With-Project conditions. Lane capacity shall be consistent with the CMP Guidelines for Biennial Highway Monitoring (Appendix A, June 2002) unless otherwise specified. Signalized intersections shall be evaluated using the Intersection Capacity Utilization (ICU) method of analysis; whereas, non-signalized intersections shall be evaluated as signalized intersections using a 60 second cycle length and reduced capacity of 1200 vehicles per lane for the stop-controlled approaches. A project’s traffic impact is considered significant if the change in capacity relative to the level of service (LOS) meets or exceeds the thresholds.
contained in the sliding scale below. The ICU method shall be utilized in order to determine the change in V/C ratios for purposes of defining significant impacts. Significant intersection impacts must be mitigated to a level of insignificance.

Table 3: Intersection Level of Service Thresholds

<table>
<thead>
<tr>
<th>Intersection Level of Service Under Current Conditions</th>
<th>Change in Volume to Capacity (Future w/Project less Future w/o Project)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.060</td>
</tr>
<tr>
<td>B</td>
<td>0.050</td>
</tr>
<tr>
<td>C</td>
<td>0.040</td>
</tr>
<tr>
<td>D</td>
<td>0.030</td>
</tr>
<tr>
<td>E</td>
<td>0.020</td>
</tr>
<tr>
<td>F</td>
<td>0.010</td>
</tr>
</tbody>
</table>

The report should present the intersection analysis in a table form as follows:

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Peak Hour</th>
<th>Existing Year</th>
<th>Existing w/Project</th>
<th>Change in V/C</th>
<th>Future Pre-Project w/Ambient Growth</th>
<th>Future Pre-Project w/Ambient + Related Projects</th>
<th>Future w/Project</th>
<th>Change in V/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/C Delay</td>
<td>LOS</td>
<td>V/C Delay</td>
<td>LOS</td>
<td>V/C Delay</td>
<td>LOS</td>
<td>V/C Delay</td>
<td>V/C Delay</td>
<td>V/C Delay</td>
</tr>
</tbody>
</table>
SECTION 3:

PROCEDURES FOR PREPARING A TRANSPORTATION ASSESSMENT (TA)
SECTION 3: PROCEDURES FOR PREPARING A TRANSPORTATION ASSESSMENT

The following procedures have been established for the preparation of a Transportation Assessment (TA). A TA is intended to focus on an accurate field inventory of existing circulation elements, and provide recommendations for incorporating existing and/or recommended circulation elements into the design of the proposed project to ensure safety and compatibility.

Overall Process of a Transportation Assessment

1. The Department of Transportation reviews applications for Pre-development Plan Review (PPR) and other discretionary approvals to determine if a Transportation Assessment must be prepared in accordance with the City’s established thresholds.

2. Applicant selects a consultant from PasDOT’s pre-qualified list of traffic consultants.

3. Applicant shall deposit the City’s Traffic Review Fee based on City’s Current General Fee Schedule.

4. Based on the project scope provided in the application, the consultant will prepare a draft Memorandum of Understanding (MOU) for the City. The consultant will obtain project-related information directly from the Department of Planning throughout the analysis period, unless otherwise specified by the Department of Transportation.

5. The selected consultant shall develop, examine, and recommend feasible transportation improvements. The recommendations will be incorporated into the report based on their consistency with the Mobility Element, Neighborhood Traffic Management Program, adopted specific plans, and the Capital Improvement Program. The selected consultant shall submit a nearly-complete (90%) report, marked as “working version – internal review only”, preferably via electronic mail, to the Department of Transportation case manager for review.

6. Revisions or comments to the draft submittal will be provided to the selected consultant (not to exceed 2 weeks).

7. Based on Department of Transportation comments or requested changes, the
consultant shall complete the Transportation Assessment, marked as “FINAL” on the cover page and footer of the report and submit three hard copies and one electronic copy as an Adobe Acrobat (PDF) file on a CD. The City will retain two of these copies and forward the other copy along with a notification letter to the applicant.

8. Based on the Transportation Assessment, the Department of Transportation will notify the Department of Planning & Development with a list of transportation conditions pertaining to the proposed project as part of the approval process.

Transportation Assessment - Report Format

Cover Page

A cover page containing the project address and name (if applicable), as well as the date and consultant contact information.

Table of Contents

Section 1: PROJECT DESCRIPTION

1. Type, size, and number of parking spaces
2. Trip generation and general project trip distribution on streets in close proximity to the project
3. Site plan

SECTION 2: FIELD SURVEY, DOCUMENT AND/OR IDENTIFY POTENTIAL IMPROVEMENTS FOR THE FOLLOWING:

1. Digital photo documentary of the project site, key street features, inventory of transportation elements.
2. Existing site (use, access, pedestrian walkways, etc.)
3. Adjacent intersections (both signalized and non-signalized), including lane configurations, type of controls, and any special traffic-related features/conditions (grade, curvature, raised medians, etc.);
4. Neighborhood streets near the project;
5. General land uses on the same and adjacent blocks of the project;
6. On-street parking restrictions and utilization on the adjacent street and nearby street(s);

7. Transit facilities within 800 feet of the project, including the service provider(s) (Pasadena ARTS, MTA, Foothill Transit,) and location, amenities, and condition of existing bus stops;

8. Ingress/egress of proposed use, such as sight visibility, potential need for parking restrictions, location of access gate, etc.;

9. Bicycle facilities, including bike lane/route designations on adjacent streets, existing bike racks/parking on or adjacent to site, and proposed on-site bicycle amenities; and,

10. Pedestrian amenities, such as sidewalk widths adjacent to the project and pedestrian indicators at the nearest signalized intersection.

SECTION 3: IDENTIFY TRAFFIC IMPACTS

1. Conduct a street segment impact analysis using the significance thresholds contained in Section 2 of this document.

2. Summarize traffic counts of the adjacent street and/or nearby streets (please indicate date of collection). Provide raw data as an appendix.

3. Multi-Modal: The Department of Transportation will identify study street segments within the relevant traffic study area of the proposed development.

   a. Study Street Segments
      
      I. Collect data elements that directly impact pedestrians, bicyclists, and transit operations along the street segment(s),

      II. Analyze the project impacts on pedestrians, bicyclists, and transit operations using industry standard methodologies such as PEQI, BEQI and/or 2010 Highway Capacity Manual (HCM) Multi-Modal Level of Service (MMLOS). PasDOT, at its discretion and consistent with industry standards, may change the Multi-Modal methodology for evaluating project impacts on non-vehicular modes.

      III. Require measures to improve the environmental quality of non-vehicular modes when the findings reveal less than average conditions (or exceed thresholds contained in Section 2).
SECTION 4: IDENTIFY SYSTEM DEFICIENCIES

Summarize the system deficiencies based on data collected for Section 3 and recommend prioritization for appropriate improvements that address increases in traffic on analyzed street segments.

SECTION 5: GENERAL PLAN MOBILITY ELEMENT CONSISTENCY CHECK

Identify and incorporate specific transportation-related elements that support the City’s goal of becoming a city where people can circulate without cars. Also identify and incorporate improvements that will protect nearby residential streets by encouraging project-related traffic to utilize multimodal corridors and/or through neighborhood traffic calming measures.

SECTION 6: CONCLUSION & RECOMMENDATIONS

Summarize key findings and elements to be incorporated into the development of the project, such as changes in access and recommended locations for bicycle amenities.

APPENDICES: DATA AND MISCELLANEOUS INFORMATION

Transportation Assessment – MOU
This Memorandum of Understanding (MOU) acknowledges City of Pasadena Department of Transportation requirements of the traffic assessment for the following project.

### Project Name

<table>
<thead>
<tr>
<th>Project Name</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Project Address</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Project Description</th>
<th></th>
</tr>
</thead>
</table>

**Contracted Consultant**

<table>
<thead>
<tr>
<th>Principal Analyst:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Mail:</td>
<td></td>
</tr>
<tr>
<td>Tel/Fax</td>
<td></td>
</tr>
</tbody>
</table>

### PROJECT TRIP GENERATION

**Trip Generation Rate Source:**


<table>
<thead>
<tr>
<th>Project Land Use 1</th>
<th>ITE Land Use Code</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Project Land Use 2</th>
<th>ITE Land Use Code</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Project Land Use 3</th>
<th>ITE Land Use Code</th>
<th></th>
</tr>
</thead>
</table>

**Please provide a detailed trip generation worksheet as an attachment.**

<table>
<thead>
<tr>
<th>Total AM Peak Hour Trips</th>
<th>Total PM Peak Hour Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>In</td>
<td>Out</td>
</tr>
<tr>
<td>---</td>
<td>----</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Trip Credits:** Exact amount of credit subject to acceptance by the Department of Transportation:

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Demand Management (TDM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing Active Land Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous Land Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Trip Capture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pass-by Trip</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### STUDY STREET SEGMENTS (insert more segments if necessary)

*All new traffic counts shall be digitally submitted to the City in Excel or ASCI format.*

<table>
<thead>
<tr>
<th>Indicate type of counts for each street segment:</th>
<th>New</th>
<th>Existing</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TRANSIT

**Location(s) of bus and/or Gold Line stop(s) within 1300 feet of the project**

Provide a detailed description in the report of the existing amenities and conditions of each transit stop listed above, as well as photographs.
### PARKING

- Number of Existing Off-Street Parking Spaces: [ ]
- Number of Parking Spaces Required by Code: [ ]
- Number of Off-Street Parking Spaces Proposed: [ ]

Provide a detailed description in the report of existing on-street parking, including restrictions, prohibitions, and availability.

### PEDESTRIAN/BICYCLE

- Bicycle Parking Spaces Required by Code: [ ]
- Bicycle Parking Spaces Proposed: [ ]

Include a detailed description of existing bikeways, bike signage, and bicycle racks within 1000 feet of the site.

| Signalized intersection(s) within 1300 feet of the site: | (Add rows if necessary) |
| Type of Pedestrian Push Buttons: | (Add rows if necessary) |
| Type of Pedestrian Indicator: | (Add rows if necessary) |
| ADA Compliant Wheelchair Ramps? | (Add rows if necessary) |

### GENERAL PLAN CONSISTENCY

- The Project Site is (check one): [ ]
  - On a Multi-Modal Corridor
  - Near a De-Emphasized Street(s)
  - Near a Residential Neighborhood
  - Near a Private/Public School

### OTHER PROJECT CONSIDERATIONS

- MOU Prepared By (Traffic Consultant):
  - Name: [ ]
  - Title: [ ]
  - Signature: [ ]
  - Date: [ ]

- MOU Approved By (City Representative):
  - Name: [ ]
  - Title: [ ]
  - Signature: [ ]
  - Date: [ ]
SECTION 4:

PROCEDURES FOR PREPARING A TRANSPORTATION IMPACT STUDY (TIS)
SECTION 4: PROCEDURES FOR PREPARING A TRANSPORTATION IMPACT STUDY (TIS)

The Following procedures have been established for the preparation of a Transportation Impact Study (TIS). A TIS includes an accurate field inventory of existing circulation elements as well as analyses of existing and project-related vehicular, transit, pedestrian, and/or bicycle trips. The purpose of the study is to identify potential impacts and recommend appropriate mitigation measures.

Overall Process for Conducting a Transportation Impact Study

1. The Department of Transportation reviews applications for Pre-development Plan Review (PPR) and other discretionary approvals to determine if a Transportation Impact Study must be prepared in accordance with the City’s established thresholds.

2. The applicant selects a consultant from PasDOT’s pre-qualified list of traffic consultants.

3. The applicant shall deposit the City’s Traffic Review Fee based on City’s Current General Fee Schedule.

4. Based on the project scope provided in the application, the consultant will prepare a draft Memorandum of Understanding (MOU) for the City. The selected consultant will obtain project-related information directly from the Department of Planning throughout the analysis period, unless otherwise specified by the Department of Transportation.

5. The selected consultant shall develop, examine, and recommend feasible transportation improvements that are consistent with the Mobility Element, adopted specific plans, the Neighborhood Traffic Management Program, and the Capital Improvement Program. The selected consultant shall submit a near-completion (90%) report, marked as “working version – internal review only”, preferably via electronic mail to the DOT case manager for review.

6. Revisions or comments to the draft submittal will be provided to the selected consultant (not to exceed 2 weeks).

7. Based on the Department of Transportation’s comments or requested changes, the consultant shall complete the Transportation Impact Study, marked as
“FINAL” on the cover page and footer of the report. The final submittal shall consist of three hard copies and one electronic copy as an Adobe Acrobat (PDF) file on a CD. A notification letter with one hard copy of the final report will be forwarded to the applicant (not to exceed 1 week).

8. Based on the Transportation Impact Study, the Department of Transportation will notify the Department of Planning & Development with a list of transportation improvements pertaining to the proposed project as part of the approval process.

Transportation Impact Study - Report Format

Cover Page

1. Project address
2. Project name (if applicable)
3. Date (month/day/year)
4. Consultant contact information
5. Consultant job number (if applicable)

Table of Contents

SECTION 1: PROJECT DESCRIPTION

1. Existing Conditions (trips, land use, size, and parking)
2. Proposed project (trips, land use, size, and parking)
3. Site plan including access, circulation, parking, and loading (identify any changes from existing)

SECTION 2: FIELD SURVEY, DOCUMENT AND/OR IDENTIFY POTENTIAL IMPROVEMENTS FOR THE FOLLOWING:

1. Digital photo documentary of the project site, key street features, inventory of transportation elements.
2. Existing site (use, access, pedestrian walkways, etc.)
3. Adjacent intersections (both signalized and non-signalized), including lane configurations, type of controls, and any special traffic-related features/conditions (grade, curvature, raised medians, etc.);

4. Neighborhood streets near the project;

5. General land uses on the same and adjacent blocks of the project;

6. On-street parking restrictions and utilization on the adjacent street and nearby street(s);

7. Transit facilities within 800 feet of the project, including the service provider(s) (Pasadena ARTS, MTA, Foothill Transit,) and location/amenities of existing bus stops;

8. Ingress/egress of proposed use, such as sight visibility, potential need for parking restrictions, location of access gate, etc.;

9. Bicycle facilities, including bike lane/route designations on adjacent streets and existing bike racks/parking adjacent to or proposed on site; and,

10. Pedestrian amenities, such as sidewalk widths adjacent to the project and pedestrian indicators at the nearest signalized intersection.

SECTION 3: IDENTIFY PROJECT IMPACTS

1. Trip Generation: The Trip Generation Manual, current edition, published by the Institute of Transportation Engineers, is used as the primary document. Other trip production rates can be used if approved by the Department of Transportation. Any adjustments to standard rates, such as for special uses, mixed uses, high transit use, or pass-by trips must be approved by the City Traffic Engineer.

2. Trip Distribution/Traffic Assignment: Distribute project trips (include distributions for each peak hour in percentages and volumes). The traffic distribution is a prediction of the future travel paths of site users. It is generally based on population distribution and significant travel paths in the study area. The trip distribution is to be approved by the Department of Transportation prior to preparation of the report.

3. Traffic Count Data: The Department of Transportation will identify study street segments and intersections within the primary influence area of the proposed development.

   A. The Department of Transportation will require evaluation of all critical time periods based on the proposed uses and site location.
B. Unless otherwise specified, peak hours occur between 7:00 and 9:00 a.m. and between 4:00 and 6:00 p.m. on weekdays

C. Multi-Modal Analysis: Collect data elements that directly impact pedestrians, bicyclists, and transit operations along the street segment(s) and at intersections

4. Study Street Segments
   A. Describe speed limits, traffic control, pedestrian crossings, and parking restrictions
   B. Street segment analysis
   C. Multi-Modal Analysis: Analyze the project impacts on pedestrians, bicyclists, and transit operations using industry standard methodologies such as PEQI, BEQI and/or 2010 Highway Capacity Manual (HCM) Multi-Modal Level of Service (MMLOS). PasDOT, at its discretion and consistent with industry standards, may change the Multi-Modal methodology for evaluating project impacts on non-vehicular modes.
   D. Require measures to improve the environmental quality of non-vehicular modes when the findings reveal less than average conditions (or exceed thresholds contained in Section 2).

5. Study intersections
   A. Describe speed limits, stop control, pedestrian crossings, and parking restrictions, and include a diagram of existing lane configurations
   B. Display existing peak hour traffic volumes
   C. Show existing with project conditions (diagrams of peak hour trip distribution)
   D. Apply an ambient growth rate of 1.5 percent per year to existing volumes, unless otherwise specified
   E. Distribute trips from related projects. The projected travel demand for each development must be based upon approved TIS reports or other recognized, applicable data.
   F. Show future without project conditions (diagrams of peak hour trip distribution)
   G. Show future with project conditions (diagrams of peak hour trip distribution)
   H. Analyze intersection impacts
I. Analyze the project impacts on pedestrians and bicyclists using industry standard methodologies such as PEQI, BEQI and/or 2010 HCM MMLOS. PasDOT, at its discretion and consistent with industry standards, may change the Multi-Modal methodology for evaluating project impacts on non-vehicular modes.

J. Recommend mitigation measures.
   a. Require measures to improve the pedestrians and bicyclists environmental quality when the findings reveal less than average conditions.
   b. Developments must mitigate the increase in traffic caused by their development. Mitigation measures are required when level of service at any study intersection or on any street segment exceeds the thresholds contained in Section 2.
   c. If mitigation reflects trip reductions predicted as a result of implementing required Transportation Demand Management (TDM) measures, an approved report must be submitted substantiating such mitigation.
   d. All proposed roadway mitigation must be illustrated and a preliminary cost estimate provided to show the new intersection configuration, including lane widths, assignments, widenings, and trip reduction attributed to required TDM strategies.

6. **Transit Usage:** Analyze transit use by the project

7. **CMP analysis:** If applicable, conduct an analysis of project impacts to CMP locations

8. **Parking Requirements:** The traffic study should include an analysis of auto and bicycle parking requirements for the proposed project and should also include information regarding how the project will satisfy the parking requirements. Shared parking analysis should also be included if applicable. If off-site parking is proposed, the trip distribution (step 2 above) must reflect the location of the off-site parking.

9. **Construction Impacts:** Identify potential construction impacts.

SECTION 4: GENERAL PLAN MOBILITY ELEMENT CONSISTENCY CHECK

Identify and incorporate specific transportation-related elements that support the City’s goal of becoming a city where people can circulate without cars.
Also identify and incorporate improvements that will protect nearby residential streets by encouraging project-related traffic to utilize multimodal corridors and/or through neighborhood traffic calming measures.

SECTION 5: CONCLUSION & RECOMMENDATIONS

Summarize key findings and elements to be incorporated into the development of the project.

APPENDICES: DATA AND MISCELLANEOUS INFORMATION

Transportation Impact Study – MOU
CITY OF PASADENA
SCOPING FOR A TRANSPORTATION IMPACT STUDY

This Memorandum of Understanding (MOU) acknowledges City of Pasadena Department of Transportation requirements of traffic impact analysis for the following project.

| **Project Name** |  |
| **Project Address** |  |
| **Project Description** |  |
| **Contracted Consultant** | **Principal Analyst:** |
| | **E-Mail:** |
| | **Tel/Fax:** |

### PROJECT TRIP GENERATION

**Trip Generation Rate Source:**

ITE "Trip Generation," 9th Edition

[Others, please specify]

| Project Land Use 1 | ITE Land Use Code |  |
| Project Land Use 2 | ITE Land Use Code |  |
| Project Land Use 3 | ITE Land Use Code |  |

<table>
<thead>
<tr>
<th><strong>Total AM Peak Hour Trips</strong></th>
<th><strong>Total PM Peak Hour Trips</strong></th>
<th><strong>Daily</strong></th>
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**Trip Credits:** Exact amount of credit subject to acceptance by City of Pasadena Department of Transportation

| **Transportation Demand Management (TDM)** | **Yes** | **No** |
| **Existing Active Land Use** |  |
| **Previous Land Use** |  |
| **Internal Trip Capture** |  |
| **Pass-by Trip** |  |

**Exhibit 1:** Detailed trip generation worksheet

**Trip Generation Prepared By (Traffic Consultant):**

| **Name:** |  |
| **Title:** |  |
| **Date:** |  |
| **Signature:** |  |

**Trip Generation Approved By (City Representative):**

| **Name:** |  |
| **Title:** |  |
| **Date:** |  |
| **Signature:** |  |
CITY OF PASADENA
SCOPING FOR A TRANSPORTATION IMPACT STUDY

PROJECT TRIP DISTRIBUTION

Geographic Distribution (%)

<table>
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<tr>
<th>North</th>
<th>South</th>
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<th>East</th>
<th>West</th>
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Attach the following exhibits:

Exhibit 2: Site Plan
Exhibit 3: Project Trip Distribution

Trip Distribution Prepared By (Traffic Consultant):

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Date:

Trip Distribution Approved By (City Representative):

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Date:

PROJECT BUILD-OUT YEAR AND AMBIENT GROWTH RATE

Project Build-Out Year:

Ambient Growth Rate: 1.5%

Project Build-Out Year and Ambient Growth Rate reviewed and accepted by Department of Transportation:

Project Build-Out and Ambient Growth Concurred By (Traffic Consultant):

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Project Build-Out and Ambient Growth Approved By (City Representative):

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Date:
CITY OF PASADENA
SCOPING FOR A TRANSPORTATION IMPACT STUDY

STUDY INTERSECTIONS (insert more intersections if necessary)

** All new traffic counts shall include pedstriam counts and be digitally submitted to the City in Excel or ASCI form.

<table>
<thead>
<tr>
<th>No.</th>
<th>Study Intersections Prepared By (Traffic Consultant):</th>
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**STUDY STREET SEGMENTS** *(insert more segments if necessary)*

**All new traffic counts shall be digitally submitted to the City in Excel or ASCII format.**

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<tr>
<th>No.</th>
<th>Study Street Segments Prepared By (Traffic Consultant):</th>
<th>Study Street Segments Approved By (City Representative):</th>
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Please indicate type of counts for each street segment: New | Available

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CITY OF PASADENA
SCOPING FOR A TRANSPORTATION IMPACT STUDY

**RELATED PROJECTS**

List of Related Projects Source(s)

<table>
<thead>
<tr>
<th>Source(s)</th>
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<tbody>
<tr>
<td>City of Pasadena Planning Department; and other known projects in vicinity of the project site</td>
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Exhibit 4: List of related projects

Related Projects Trip Gen. Source: ITE "Trip Generation," 9th Edition; or other approved studies

**List of Related Projects Prepared By (Traffic Consultant):**

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**List of Related Projects Approved By (City Representative):**

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**TRANSIT**

Location(s) of bus and/or Gold Line stop(s) within 1300 feet of the project

Provide a detailed description in the report of the existing amenities and conditions of each transit stop listed above, as well as photographs.

**List of Transit Stations Prepared By (Traffic Consultant):**

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**List of Transit Stations Approved By (City Representative):**

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## Parking

Number of Existing Off-Street Parking Spaces:  
Number of Parking Spaces Required by Code:  
Number of Off-Street Parking Spaces Proposed:  

Provide a detailed description in the report of existing on-street parking, including restrictions, prohibitions, and availability.

### Parking Data Provided and/or Concurred By (Traffic Consultant):

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### Parking Data Provided and/or Concurred By (City Representative):

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## Pedestrian/Bicycle

Bicycle Parking Spaces Required by Code:  
Bicycle Parking Spaces Proposed:  

Include a detailed description of existing bikeways, bike signage, and bicycle racks within 1000 feet of the site.

<table>
<thead>
<tr>
<th>Signalized intersection(s) within 1300 feet of the site:</th>
<th>(Add rows if necessary)</th>
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<tbody>
<tr>
<td>Type of Pedestrian Push Buttons:</td>
<td>(Add rows if necessary)</td>
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<tr>
<td>Type of Pedestrian Indicator:</td>
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<tr>
<td>ADA Compliant Wheelchair Ramps?</td>
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### Data Provided and/or Concurred By (Traffic Consultant):

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### GENERAL PLAN CONSISTENCY

*The Project Site is (check one):*
- Yes
- No

<table>
<thead>
<tr>
<th>On a Multi-Modal Corridor</th>
<th>Yes</th>
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<td>On/near a De-Emphasized Street(s)</td>
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<tr>
<td>In/Near a Residential Neighborhood</td>
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### OTHER PROJECT CONSIDERATIONS

#### Data Provided and/or Concurred By (Traffic Consultant):

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SECTION 5:

GUIDELINES FOR TRANSPORTATION REVIEW OF PROJECTS
GUIDELINES FOR TRANSPORTATION REVIEW OF PROJECTS
This material may be reprinted or quoted without permission, provided credit is given to the City of Pasadena Department of Transportation. This document can be downloaded at http://www.cityofpasadena.net/Transportation/. For comments or additional questions regarding the City's transportation review process, please contact Transportation Planning & Development Division at (626) 744-7208.
The Pasadena Mobility Element contributes to the City’s vision of **promoting a livable community where people can circulate without cars**. The Element is based on achieving the following three objectives: **Encourage** non-auto travel, **Protect** neighborhoods, and **Manage** multimodal corridors. The Mobility Element reflects extensive public review over a two-year period: Three Council policy workshops, twenty five neighborhood meetings, and five joint discussion meetings of the Planning Commission and the Transportation Advisory Commission were held prior to the document’s final approval.

The implementation programs of the Mobility Element include an increased emphasis on comprehensive review of transportation aspects of development projects in addition to the existing environmental review process. This document outlines major transportation factors that should be taken into account to facilitate project review and to guide development throughout the community.

All of the factors included in this document are drawn from Mobility Element policies, programs, and implementing actions. These considerations are applicable to all development projects subject to transportation project review. They should be applied in the context of City plans and policies.
The type, location, and operating characteristics of a development project should be taken into consideration at the outset of the project review process. Also, details pertinent to transportation issues should be identified at that time. Following are factors that should be addressed:

**PROPOSED PROJECT**
- ✓ New development
- ✓ Expansion and/or reuse of an existing development

**PROJECT LOCATION**
- ✓ Within a Specific Plan area
- ✓ On, or adjacent to, a multimodal corridor
- ✓ Located near other planned projects with opportunities to share mitigations and enhancements
- ✓ On, or adjacent to, a de-emphasized street
- ✓ On an existing or approved transit route
- ✓ Adjacent to a transit stop
- ✓ On a designated bikeway
- ✓ Close to sensitive land uses such as senior center, hospital, recreation center, school, park, etc.
**PROJECT SCOPE & DETAILS**

- ✔ Within a Transit-Oriented District (TOD)
- ✔ Adjacent to a Gold Line Station
- ✔ Adjacent to a busy pedestrian intersection
- ✔ On, or adjacent to, a Suggested Route to School
- ✔ Proximity to approved transportation projects

**LAND USE(S)**

- ✔ Single land use
- ✔ Mixed use
- ✔ Opportunity for shared parking

**PROJECT SCALE AND TRAFFIC IMPACT**

- ✔ Scale of development
- ✔ Number of intersections with significant traffic impact
- ✔ Street capacity consistent with City policy to minimize widening of streets

**OTHER TRANSPORTATION CHARACTERISTICS**

- ✔ Items based on community comments
- ✔ Vehicle fleet to be located on site
- ✔ Private shuttle for the project
PROJECT SCOPE & DETAILS

☑ User groups with special transportation needs such as children, seniors and persons with disabilities
☑ Special transportation considerations such as emergency uses, location adjacent to police or fire station, or public utility
☑ Specified tenant with alternative hours of peak activity
☑ Use includes special events
☑ Freight delivery considerations, both on-street and off-street
☑ Proximity to a bus stop or transit center
☑ Opportunities to provide transit/bicycle/pedestrian amenities and car-sharing
☑ Adequate lighting for transit/pedestrian purposes
☑ Site location and height for accommodating traffic video equipment
☑ Extent of pedestrian activity in project vicinity
☑ Extent of bicycle activity in project vicinity
☑ Sidewalk configuration and opportunity to place bicycle racks
☑ Traffic safety information regarding adjacent intersections
☑ Opportunities for rideshare drop-off
☑ Destination-oriented use of heavy vehicles
Once the scope of the development project has been defined, the project review process should assess the need for enhancements that would facilitate the implementation of the Mobility Element.

To assist review of projects, the following transportation aspects (see pages 7-15) should be addressed during the review process. They are grouped into six general categories: parking, bicycle, pedestrian, neighborhood protection, transit, and multimodal corridors. The need for including transportation measures or enhancements should be assessed if the project is characterized as follows:

- The project has an **impact on parking services** and/or requires a heightened need for parking.
- The project has a high or notable amount of **pedestrian traffic or bike use**.
- The project has a **detrimental traffic impact** on adjacent neighborhoods and/or on de-emphasized streets.
- The project is served by or impacts a **transit corridor**.
- The project is on/near a **multimodal corridor** or will have a notable impact on a multimodal corridor.

Following are transportation policies of the Mobility Element that should be considered during the review of new development projects and factors to be taken into account as part of that review.

**Parking**
Policies regarding the provision of parking are included in the Mobility Element because the presence of on-street and off-street public parking has a direct effect on the use of the street network. The Mobility Element policies discourage the oversupply of auto parking in new development and promote a balanced approach that fosters non-auto travel. The combination of Transit-Oriented District (TOD) policies, parking management policies, and transportation demand measures offers powerful and timely opportunities to achieve a livable community where people can circulate without cars.

An additional challenge in the development of parking solutions is recognition of the unique character of many areas of the city, which means that no one parking solution will fit all situations. The City will continue to engage in collaborative efforts with residents and the business community to define, and in some instances develop, parking programs to meet their particular needs.
PROJECT REVIEW CONSIDERATIONS

IDENTIFY OPPORTUNITIES TO MINIMIZE THE NEED FOR LONG-TERM AND EMPLOYEE PARKING IN COMMERCIAL AREAS THROUGH PROGRAMS DESIGNED TO REDUCE DEPENDENCE ON AUTO COMMUTING AND TO PROMOTE NON-AUTO TRAVEL. THE FOLLOWING ASPECTS SHOULD BE ADDRESSED:

- Apply the Trip Reduction Ordinance (TRO) to reduce dependence on the single-occupant automobile.
- Require developments of a threshold size to provide appropriate transit enhancements, bicycle facilities, and other provisions to encourage rideshare, such as taxi staging areas, and rideshare pick-up areas for carpools and vanpools.
- Develop parking guidelines for Transit-Oriented Districts that discourage an oversupply of long-term parking by placing a cap on the maximum allowable long-term parking for new development.
- Locate building entrances in close proximity to the street to provide for convenient access to transit stops and sidewalks.
- Place parking in the rear or below buildings to avoid creating a barrier to street access.
- Encourage mixed-use development to share parking and common driveways.
- Seek opportunities to enhance pedestrian circulation and safety with special attention given to the needs of seniors, youths, and persons with disabilities.
- Identify the feasibility of direct pedestrian linkages between transit portals/platforms and their adjacent commercial development through project orientation and design.
PROJECT REVIEW CONSIDERATIONS

- Mitigate traffic impacts by coordinating parking management policies, transit enhancement policies, and Transportation Demand Management (TDM) policies such as provision of transit passes in lieu of free parking.
- Provide visitor parking close to destinations.
- Assess short- and long-term bicycle parking options.
- Provide information on transportation benefit programs for employees that encourage non-auto travel and reduce traffic impacts.
- Assess the feasibility of shared parking between new mixed-use developments or with existing developments.
- Where appropriate, include provisions regarding the prohibition of parking of commercial vehicles in residential areas.
- Assess the need for short-term parking depending on proposed land uses.
- Consider availability and need for short- and long-term parking options such as bicycle lockers, bicycle valets, and/or bicycle stations.
- For developments of a threshold size, encourage application of technology to improve the efficiency of parking facilities to minimize their traffic impact on local streets.
- Identify opportunities to provide priority parking for clean-fuel vehicles and car-share vehicles.
BICYCLE

Pasadena has a number of existing and planned bikeways designated as paths, lanes, and routes. Well-placed and adequate bicycle parking supports the use of these bikeways. Mobility Element policies foster the use of bikeways and the provision of supporting bicycle facilities and amenities.

PROJECT REVIEW CONSIDERATIONS

Promote the use of bicycles and identify opportunities for bicycle enhancements. The following aspects should be addressed:

- Review opportunities for the provision of bicycle facilities as part of the trip reduction ordinance.
- Incorporate bike enhancements as part of improvements to the traffic signal system.
- Increase the availability of bicycle parking as part of the project and on the adjacent sidewalk.
**PROJECT REVIEW CONSIDERATIONS**

**PEDESTRIAN**

The City has developed walkway areas in specific locales. The further development of these facilities will improve safety for pedestrians and can also encourage the use of other non-auto modes of transportation. The improvements include appropriately scaled sidewalks and plazas, paths, trails, pedestrian bridges, crosswalks, and pedestrian signals with crosswalks at signalized intersections to accommodate pedestrian circulation.

### PROJECT REVIEW OBJECTIVE

Promote improvements for pedestrians to support vibrant and active streets. The following aspects should be addressed:

- Incorporate pedestrian-friendly features in the design of developments.
- Provide pedestrian linkages in developments adjacent to the Gold Line stations.
- Enhance pedestrian safety and provide pedestrian amenities at major places of activity with particular attention given to the needs of seniors, youths, and persons with disabilities.
- Provide pedestrian enhancements on multi-modal corridors including provisions that protect pedestrians from vehicular traffic.
- Provide pedestrian safety enhancements at busy intersections including traffic signal assists for seniors and persons with disabilities.
CITY OF PASADENA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION REVIEW GUIDELINES

PROJECT REVIEW CONSIDERATIONS

- Refer to the *Old Pasadena Streetscapes and Alley Walkways Refined Concept Plan* for guidelines on affected projects.

NEIGHBORHOOD PROTECTION

The traffic conditions on a street affect not only pedestrians (both adults and children) but also people living within the residential structures along a street. The impacts of traffic include noise, dust, air pollution, vibration, traffic accidents, and decreased pedestrian safety. These impacts affect the quality of life for people who live nearby and may raise safety concerns. The City places an emphasis on the protection of neighborhoods from the impacts of traffic, particularly cut-through traffic, the speed of cars, on-street parking and, in some cases, noise impacts.

<table>
<thead>
<tr>
<th>PROJECT REVIEW OBJECTIVE</th>
</tr>
</thead>
</table>

Recognize the need to incorporate neighborhood protection measures in developments that could have spillover impacts on adjacent neighborhoods or on de-emphasized streets. The following aspects should be addressed:

- Assess whether proposed development adversely impacts adjacent neighborhoods and develop mitigation measures to minimize this impact.
- Identify measures to eliminate or minimize the intrusion of traffic generated by new development into residential neighborhoods and on de-emphasized streets.
- Address the need for mitigation of traffic impacts for projects intended to accommodate special events.
Do not plan or implement traffic capacity enhancement projects on de-emphasized streets.
**PROJECT REVIEW CONSIDERATIONS**

**TRANSIT**

The City benefits from an extensive network of local and regional transit routes that provide good citywide coverage. Initiation of the Gold Line Light Rail service, bus transit restructuring studies being conducted by the San Gabriel Valley Sector, expansion of the ARTS service, definition of Transit-Oriented Districts (TOD), and adoption of a Bicycle Master Plan provide considerable opportunities to promote and encourage non-auto travel. The planning and development of new projects are important to reduce dependence on the automobile and promote expansion and enhancement of the transit program.

**PROJECT REVIEW OBJECTIVE**

Promote the use of transit through improved and expanded services, convenient and comfortable transit centers; clear and easy-to-understand user information; clean, safe, and convenient transit waiting areas; and amenities that promote the use of transit. The following aspects should be addressed:

- Provide convenient transit access between affordable housing, employment, and services.
- Assess the need for additional transit stops, the location of existing stops, and the need for transit amenities at these locations.
- Seek opportunities to strengthen the transit components of the Trip Reduction Ordinance.
- Provide for adequate bicycle facilities linked with transit services.
Encourage provisions for clean, safe, and attractive transit stops as part of new project development.

Assess potential opportunities for non-auto travel demonstration programs such as car-sharing.

Improve public information at transit stops.

Provide well-lighted and clean transit stops.

Locate transit stops adjacent to uses that increase user convenience and safety.

Include the provision of wayfinding signs in the review of projects adjacent to major transit transfer locations.

Consider installation of bus shelters where appropriate.

Consider landscaping and related enhancements at transit stops.

Assess the vertical curb at transit stops for passenger safety in boarding and alighting.

Provide for passenger waiting areas that are set back from the street edge and are protected from vehicular traffic.

Review the transit stop location relative to adjacent intersections.

Insure that provisions are incorporated for seniors and persons with disabilities.

Locate transit stops in convenient user locations.

Incorporate transit priority provisions in traffic signal upgrade improvements required as mitigation measures.
MULTIMODAL CORRIDORS
Multimodal corridors are the City’s major thoroughfares for movement within, to, and from Pasadena and should be readily identifiable to the traveling public. These corridors should create an environment where different modes of travel can coexist. Where appropriate, the roadway should be shared, efficient travel should be facilitated, and convenient connections at key destinations and transfer locations should be encouraged. These streets are the site of many major places for pedestrian activity and destinations. The Mobility Element policies provide for seamless connections and modal transfers. They reinforce programs that contribute to a balanced and efficient transportation system linking existing and planned growth.

PROJECT REVIEW OBJECTIVE
Develop identifiable corridors that move traffic efficiently and keep traffic from intruding into adjacent neighborhoods. The following aspects should be addressed:

- Apply automated traffic signal technology to improve efficiency and environmental performance of major travel corridors.
- Provide streetscape amenities along the entire length of multimodal corridors that will be consistent with guidelines adopted as part of specific plan areas.
- Assess the need for measures to protect pedestrians from vehicular traffic particularly at major areas of pedestrian activity.
PROJECT REVIEW CONSIDERATIONS

- Assess the appropriateness of equipping a signalized intersection with vibrating or audible pedestrian functions for hearing/vision impaired persons.
- Develop engaging and active corridors through improved vehicular signage, pedestrian access, streetscape, and other enhancements.
- Provide for peak-hour parking restrictions where needed.
- Provide for and encourage mid-day delivery services.
- Provide signage to keep traffic on major travel corridors.
- Provide clear signage for transit, parking, and bicycle routes.
- Provide wayfinding signs to support pedestrian activity.
- Incorporate priority treatment for transit in determining bus stop locations, bus stop amenities, transit user signage/information, and traffic signal upgrades.
- Review the need for pedestrian safety considerations and related amenities.
- Include bicycle facilities and related amenities.
- Review truck deliveries to determine whether they can be made in mid-day hours.
- Assess the adequacy of existing on-street provisions for goods delivery.
- Assess whether a site is an appropriate location for a taxi staging area.
- Potential for frequent use of taxi cab service.
- Adequacy of street to accommodate a taxi waiting area.
SUITABLE MULTI-MODAL MEASURES

TRAFFIC MANAGEMENT SYSTEM

- Upgrade Transportation Management Center hardware, software, and monitoring equipment
- Expand Intelligent Transportation System (ITS) components, such as CCTV and Changeable Message Signs (CMS).
- Expand the City’s communication/fiber-optic backbone
- Install additional arterial loop detectors (system loops)
- Deploy traffic monitoring network in residential neighborhoods

ROADWAY SYSTEM

- Upgrade traffic signals to encourage traffic to use major arterials rather than residential streets
- Change roadway striping to enhance safety and reduce congestion
- Install wayfinding signage
- Minimize potential conflicts by encouraging developers to construct fewer driveways

PEDESTRIAN ACTIVITIES

- Equip signalized intersections with vibrating or audible pedestrian functions for hearing/vision impaired persons.
SUITABLE MULTI-MODAL MEASURES

- Provide streetscape amenities along the entire length of multimodal corridors that will be consistent with guidelines adopted as part of specific plan areas

**Public Transit**
- Provide information on transportation benefit programs for employees and multi-family residential development projects that encourage non-auto travel, including rideshare, vanpool, bus/rail route, and dial-a-ride information
- Provide transit stop amenities, including bus shelters, benches, and trash recepticles
- Consider landscaping and related enhancements at transit stops
- Upgrade traffic signal to provide transit priority provisions
- Contribute to capital costs

**Bicycle Facilities**
- Consider video detection for bicyclists at appropriate locations
- Increase the availability of bicycle parking both on-site and on the adjacent sidewalk
- Provide bicycle maps and bicycle safety brochures

**Parking and Loading**
- Apply technology to improve the efficiency of parking facilities to minimize traffic impacts on local streets
SUITABLE MULTI-MODAL MEASURES

- Identify locations for priority parking for clean-fuel and car-share vehicles
- Implement peak-hour parking restrictions
- Prohibit on-street parking at critical locations to improve visibility
- Assess the adequacy of existing on-street provisions for goods delivery
- Provide passenger loading areas at key locations
- Limit truck delivery to non-peak traffic hours
- Implement parking restrictions or prohibitions to protect adjacent residential neighborhoods from on-street parking spillover

NEIGHBORHOOD PROTECTION

- Assess the potential impacts on adjacent residential neighborhoods and install appropriate traffic calming measures, such as speed humps, chokers, partial road closures, etc.
Richmond, CA

MEMORANDUM

Date: June 1, 2012
To: Chris Janson, Opticos Design
From: Brooke DuBose, Tien-Tien Chan, and Carrie Nielson, Fehr & Peers
Subject: Richmond Livable Corridors: Draft TDM Program Memo

This memorandum documents the draft recommended Transportation Demand Management (TDM) programs for the City of Richmond Livable Corridors project, which supplants traditional zoning to provide a Form-Based Code to organize and structure future development. The study area consists of West and East Macdonald Avenue, 23rd Street, and San Pablo Avenue. These TDM strategies are intended to provide study-area-wide strategies to help reduce single occupancy vehicles trips to and increase walking, biking, and transit trips along these major corridors. Encouraging new transit and active mode trips along these corridors will further activate these streets, increase personal safety, and, in turn, promote future investment.

The recently adopted City of Richmond General Plan includes a discussion of developing TDM programs and incentivizing their implementation. Action CR5.A states the need to develop a TDM program in support of transit, bicycling, and walking through transit subsidies, car-share service, and bicycle facility enhancements, among other means. The Action item also includes discussion of an incentive program using strategies such as reduction in transportation impact fees for new development that commits to TDM measures and reducing parking requirements for mixed-use development. The TDM strategies outlined in this memo build on the strategies outlined in the General Plan and prioritize those that are most suited to the Richmond Livable Corridors study areas.

The TDM strategies detailed in this memo focus on five broad strategies to promote walking, bicycling, and transit trips while helping to manage auto demand. Each strategy is presented with additional sub-strategies that begin to create an action plan for TDM implementation through the Richmond Livable Corridors project. Figure 1 provides an illustrative summary of the existing strategies and the recommended Program. Existing programs primarily represent countywide
programs, such as carpool, vanpool, and schoolpool; Guaranteed Ride Home; and bicycle commuter assistance programs. A variety of other educational programs are also in place, including workshops on car-sharing and telecommuting, on-site assessments of commuter alternatives, and presentations to employers on the benefits of TDM programs. New Richmond-specific programs have been implemented through EasyGo, which includes peer-to-peer car-sharing, bike-sharing, and a "kid's cab" shuttle for elementary school-aged children.

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**Figure 1 – Recommended TDM Programs**

Source: WCCTAC Transit Enhancement Strategic Plan; Fehr & Peers, 2012
Figure 1 represents the overall organization of TDM strategies. The following sections detail the five major TDM strategies and corresponding measures. Each measure is categorized based on relevance to small or large businesses or whether or not it is a broader community-wide strategy. The measures are also evaluated based on the following factors:

- Cost of implementation;
- Potential effectiveness in the context of the Richmond Livable Corridors project;
- Length of time needed to implement the strategy (short-term versus long-term); and
- Appropriate corridors for implementation.

1. DEVELOP A SHUTTLE IMPLEMENTATION PLAN TO PROVIDE INCREASED ACCESS TO TRANSIT CENTERS AND AROUND RICHMOND

As sections of West and East Macdonald Avenue, 23rd Street, and San Pablo Avenue densify and draw additional residents, workers and visitors to the area, shuttle service connecting major employers, BART stations, and other transit hubs such the proposed ferry terminal, will be an important strategy for reducing single-occupancy vehicle trips in Richmond. Based on the short-term and long-term development nodes identified in the Form-Based Code, a shuttle implementation plan can further help to prioritize development and can be a benefit to development in terms of increasing property values through additional amenities for new employees and residents. Table 1 presents recommended strategies related to development of a shuttle implementation plan.

The WCCTAC Transit Enhancement Strategic Plan includes next-steps for exploring shuttle service. The City of San Pablo’s San Pablo Avenue Specific Plan also identifies shuttles to connect with El Cerrito Del Norte BART, which may provide an opportunity to coordinate through locations in Richmond.
**TABLE 1: DEVELOPMENT OF SHUTTLE IMPLEMENTATION PLAN STRATEGY SUMMARY**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Sub-Strategy</th>
<th>Category</th>
<th>Cost</th>
<th>Effectiveness</th>
<th>Short- vs Long-term</th>
<th>Location</th>
</tr>
</thead>
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<td>Implement Shuttle Plan</td>
<td>Identify Shuttle Markets</td>
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<td>x</td>
<td>Low</td>
<td>Medium ST / LT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large Employer</td>
<td>x</td>
<td>x</td>
<td>Medium</td>
<td>ST / LT All</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Community</td>
<td>x</td>
<td></td>
<td>ST / LT All</td>
<td>All</td>
</tr>
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<td>Implement Shuttle Plan</td>
<td>Establish Shuttle Advisory Committee</td>
<td>Small Retail</td>
<td>x</td>
<td>x</td>
<td>Low</td>
<td>Medium ST / LT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large Employer</td>
<td>x</td>
<td>x</td>
<td>Medium</td>
<td>ST / LT All</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Community</td>
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<td></td>
<td>ST / LT All</td>
<td>All</td>
</tr>
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<td>Consolidate Shuttles</td>
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<td>x</td>
<td>Net Savings</td>
<td>Medium ST</td>
</tr>
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<td></td>
<td></td>
<td>Large Employer</td>
<td>x</td>
<td>x</td>
<td></td>
<td>Downtown Core</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Community</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide Shuttle Service</td>
<td>Provide Shuttle Service</td>
<td>Small Retail</td>
<td>x</td>
<td>x</td>
<td>High</td>
<td>Medium LT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large Employer</td>
<td>x</td>
<td>x</td>
<td></td>
<td>All</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Community</td>
<td>x</td>
<td></td>
<td></td>
<td>All</td>
</tr>
</tbody>
</table>


1.1 Identify Shuttle Markets

Identify new shuttle markets and key destinations. Consider conducting outreach to identify additional areas of high demand that are currently not being served. The City of San Pablo recently identified markets for new shuttle service from San Pablo into and through Richmond. For additional information consult the City’s 2011 San Pablo Avenue Specific Plan.

1.2 Establish a Shuttle Advisory Committee

Representatives from the City, neighborhood associations, business groups, and shuttle providers can meet regularly to identify implementation steps for shuttle service and continued evaluation of its effectiveness.

1.3 Consolidate Shuttles

Explore opportunities to consolidate existing shuttle services (four private shuttle services connecting BART with Kaiser, California Department of Public Health, Richmond Field Station, and Orton Development Ford Point). This analysis should be conducted in collaboration with the Shuttle Advisory Committee.
1.4 Provide Shuttle Service

Provide shuttle service from the Richmond BART station to key areas in Richmond based on analysis of shuttle markets and Shuttle Advisory Committee developed implementation plan.

2. IMPLEMENT EMPLOYER-BASED COMMUTE INCENTIVES

Employer-based commute incentives consist of subsides provided by employers to encourage use of transit and active modes as means to get to work. Employer-based commute incentives allow employers to provide less parking, which means that companies pay for fewer leased parking spaces or build fewer spaces initially. For the Richmond Form-Based Code, strategies should be tailored towards smaller businesses, which comprise the majority of the commercial activity along the study area corridors under existing and future conditions. As such, recommended TDM measures should focus on transit pass subsidies and group discounts for passes purchased by employers in bulk, which represent realistic TDM measures for small to medium sized businesses. Implementing these strategies will help to increase transit use both by Richmond residents and those who commute to Richmond, incentivizing their commute by bus or BART. Because every transit trip also ends in walking or biking to or from the transit stop, this will also help to make transit-rich streets safer, more active environments. These incentives are presented in Table 2.

Though parking cash-out has been recommended as a key strategy in other Richmond-area documents, including the recently adopted General Plan and the WCCTAC Transit Access Enhancement Strategic Plan, parking cash-out is a very long-term strategy for Richmond-based employers, particularly within the Livable Corridors study area. Parking demand management strategies and on-street pricing strategies must first be in place for this to be an appropriate TDM strategy for Richmond businesses.
### TABLE 2: EMPLOYER-BASED COMMUTE INCENTIVES STRATEGIES SUMMARY

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Sub-Strategy</th>
<th>Category</th>
<th>Cost</th>
<th>Effectiveness</th>
<th>Short- vs Long-term</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement Employer-Based Commute Incentives</td>
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<tr>
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<td>Utilize Group Discounts</td>
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</tr>
<tr>
<td></td>
<td>Provide Parking Cash-Out</td>
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<td>LT</td>
<td>All</td>
</tr>
</tbody>
</table>


#### 2.1 Provide Transit Subsidy

Employers can provide every employee with a monthly transit subsidy. Transit subsidies can be deposited directly in employee's Clipper Cards for ease of use and transferability to multiple transit agencies. Medium sized employers may be able to provide in the range of $100 monthly, which would cover the cost, for example, of a $80 AC Transit monthly pass.

#### 2.2 Utilize Group Discounts

The City can work with transit agencies to secure group discounts on transit fares for employers.

#### 2.3 Provide Parking Cash-Out

As a long-term strategy, employers that offer employees free parking can be required to offer a parking cash-out option. The parking cash-out may be in the form of a transit subsidy. As discussed previously, parking cash-out relies on the implementation of metered parking and parking demand management strategies in Richmond.

### 3. IMPLEMENT EFFICIENT PARKING STRATEGIES

On-street parking is currently free and largely unregulated throughout Richmond. Large employer parking lots are typically single-use and free or low-cost. The large lots typically located on-site discourage employees who work at major employers in Downtown Richmond from taking transit, walking in the neighborhood and spending money at local restaurants and
businesses. Free parking in some sections of the study area allow people to park in prime spaces in front of businesses without having to move their car for long stretches of time, such as in the Downtown area along Macdonald Avenue. Installing metered parking within the study area would help regulate demand and allow for money to go directly back into the corridor through parking management districts and similar funding mechanisms. Those funds could in turn be used to improve streetscapes as identified in the Form-Based Code and help maintain those new facilities. Parking strategies are presented in Table 3.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Sub-Strategy</th>
<th>Category</th>
<th>Cost</th>
<th>Effectiveness</th>
<th>Short-vs Long-term</th>
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<tr>
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<td>Net Savings</td>
<td>Medium</td>
<td>LT All –in Commercial Areas</td>
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<tr>
<td>Implement Parking Management District</td>
<td>Implement Parking Management District</td>
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<td>Low</td>
<td>LT Macdonald Avenue, San Pablo Avenue</td>
</tr>
<tr>
<td>Implement Additional Parking Policies</td>
<td>Implement Additional Parking Policies</td>
<td>x</td>
<td>x</td>
<td>Low</td>
<td>Medium</td>
<td>LT All</td>
</tr>
</tbody>
</table>


### 3.1 Implement Shared Parking

Shared-parking facilities can be implemented at existing and new locations where feasible. Though most lots in the study area are small and may not be able to support large shared parking areas, the Target site and the surrounding area may be an effective location to implement shared parking given the larger parcel size. Additionally, the City can consider identifying opportunities to convert under-utilized parking to open space or other public uses.
3.2 Install Metered Parking

The City can implement on-street and off-street parking meters at key commercial locations. The implementation may include a variable pricing strategy with higher parking fees during peak periods and lower fees during off-peak periods. Residential parking permit programs may also be considered if necessary to reduce the impact of spillover parking.

3.3 Implement Parking Management Districts

As a supplement to metered parking, the City may establish a parking benefits district whether the revenue earned from parking meters are used to fund parking management, traffic calming, or streetscape projects for the district.

3.4 Implement Additional Parking Policies

The City may establish parking maximums where applicable. This strategy may allow for reduced parking minimums or no parking requirements were feasible. Considerations could include on-street parking to count towards parking minimums where it is required, parking in-lieu fees, and waivers of parking based on parking demand analysis.

4. TRANSIT AND BICYCLE STRATEGIES

Recent studies and adopted plans have identified specific improvements at and around the Richmond BART Station. If implemented, these improvements would make regional transit a more attractive option for many choice transit riders and would also improve connections from regional commuter rail to local bus service. Walking and bicycling improvements would increase the multi-modal access to the station. In addition to improving operations, these identified access improvements would improve the perception and experience of this important regional gateway to the City of Richmond, a critical element of the Richmond Livable Communities strategy. Transit and bicycling strategies are shown in Table 4.
TABLE 4: TRANSIT AND BICYCLE STRATEGIES SUMMARY

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Sub-Strategy</th>
<th>Category</th>
<th>Small Retail</th>
<th>Large Employer</th>
<th>Community</th>
<th>Cost</th>
<th>Effectiveness</th>
<th>Short- vs Long-term</th>
<th>Location</th>
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<td>x</td>
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<td>Low</td>
<td>LT</td>
<td>Downtown</td>
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<tr>
<td>Provide Bicycle Strategies</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Low / Medium</td>
<td>Low</td>
<td>LT</td>
<td>All</td>
</tr>
</tbody>
</table>


4.1 Improve Access to and Service at Richmond BART

Access to and service at Richmond BART can be improved through the following strategies:

- Upgrade and expand circulation area for buses
- Improve bus waiting area with upgraded landscaping and improved shelters
- Real-time electronic information signs for buses
- Improve signage within the BART station
- Post general bus service information at bus transit center area
- Improve maintenance/cleanliness
- Upgrade benches for outdoor seating
- Improve street crossings, implement street lighting, and fill sidewalk gaps around the station

4.2 Provide Bicycle Facilities

Expand the citywide bicycle network by implementing proposed on- and off-street bikeways, closing key gaps in the citywide network, install wayfinding signage, and provide bicycle parking at key locations may be an important TDM tool to increase the number of bicycling trips. The City can consider converting select parking spaces into bicycle parking or public sitting areas and requiring bicycle parking for all development projects.
5. OTHER STRATEGIES

TDM strategies and policies such as those discussed in this memo do not have built-in enforcement mechanisms. Without additional strategies to incentivize or require their implementation, many employers and developers may be disinclined to implement these policies. Such a policy is congruent with the Circulation Element of the newly adopted City of Richmond General Plan, which identifies development of TDM program and incentive programs as an action item under the banner of Sustainable and Green Practices; though, such TDM and incentive programs are not currently in place. The summary of a TDM policy for new developments is shown in Table 5.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Sub-Strategy</th>
<th>Category</th>
<th>Cost</th>
<th>Effectiveness</th>
<th>Short-vs Long-term</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Strategies</td>
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<td>Low</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Large Employer</td>
<td>x</td>
<td>Medium</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Community</td>
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</tbody>
</table>


5.1 TDM Policy for New Developments

Citywide TDM policies can be established as conditions of approval for development. Additionally, the City can reduce transportation impact fees for projects that demonstrate commitment to TDM strategies and reduction in parking requirements. The policies should fall in-line with the TDM strategies recommended in this memo and those referenced in the General Plan.
Transportation Demand Management (TDM) Plan
580 N. Mary Avenue
Sunnyvale, California

Prepared for: Hoover Associates
Prepared by: FEHR & PEERS
160 West Santa Clara Street
Suite 675
San José, CA 95113
(408) 278 - 1700

December 2, 2011
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<th>Page</th>
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CHAPTER 1. INTRODUCTION

This report presents the Transportation Demand Management (TDM) plan for the office development located at 580 N. Mary Avenue in Sunnyvale, CA. The proposed building size results in a Floor Area Ratio (FAR) for the site of 55 percent, where 35 percent is allowed. FAR represents the total floor area of the building compared to the size of the site (area). Certain developments in excess of 35 percent FAR require approval of a Use Permit. To achieve City Council approval for the density bonus, this project must demonstrate that it meets 26 review criteria, including providing a TDM plan.

PURPOSE OF THE TDM PLAN

The purpose of this TDM plan is to reduce the number of vehicle trips generated by the site. It contains a number of measures and strategies that encourage the use of alternative modes of travel such as transit, ridesharing (carpooling and vanpooling), bicycling, and walking. It may also contain measures that eliminate trips to the site such as telecommuting. The specific trip reduction goal of the plan is described in a subsequent section.

PROJECT DESCRIPTION

The project site is located at 580 N. Mary Avenue at the corner of W. Maude Avenue and contains 5.18 acres, or 225,640 square feet (sf). A site location map is shown on Figure 1. A US Post Office is currently operating at the project site. A previous study indicated that there would be no change in the number of trips generated during the AM peak hour and approximately half the number of trips generated during the PM peak hour with the proposed land use modifications. Therefore, the project will reduce PM peak hour demand on the surrounding transportation network.

The proposed project will include one building for general office use that will contain 124,000 sf representing a FAR of 55 percent. The site contains 424 parking spaces and 9 handicapped accessible spaces. It also contains 16 bike lockers and bike racks for 6 bicycles providing parking for 22 bicycles. The proposed site plan is shown on Figure 2.

TRIP GENERATION ESTIMATES

The purpose of the vehicular trip generation estimates is to determine the number of vehicle trips entering and exiting the site for a variety of purposes (employee trips, visitor trips, deliveries, etc.) during a selected time period. The amount of traffic was estimated using rates published in Institute of Transportation Engineers' (ITE), Trip Generation, 6th Edition (2008).

Trip estimates were prepared for the proposed building size (124,000 sf with an FAR of 55 percent) and for buildings sizes representing 35 percent FAR (79,000 sf) and 45 percent FAR (101,500 sf). The results are presented in Table 1. The proposed project is estimated to generate approximately 220 AM peak hour trips and 215 PM peak hour trips.

TRIP REDUCTION GOALS

The purpose of this TDM plan is to offer a reduction equivalent to the trip difference between 35 and 55 percent FAR with a minimum reduction goal equivalent to the trip difference between 35 and 45 percent FAR. The reduction goal of the program is a 27 percent reduction based on the average AM and PM peak hour trip estimates. The minimum reduction goal of the program is a 16 percent reduction based on the average for the AM and PM peak hour trip estimates.
<table>
<thead>
<tr>
<th>Land Use</th>
<th>ITE Code</th>
<th>Units¹</th>
<th>Daily</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Rate²</td>
<td>Rate³</td>
<td>Trips</td>
<td>Rate²</td>
</tr>
<tr>
<td>Proposed 55% FAR</td>
<td>710</td>
<td>124 ksf</td>
<td>12.69</td>
<td>1,574</td>
<td>1.8</td>
</tr>
<tr>
<td>2% Major Bus Stop Reduction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Trips (A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,543</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>192</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45% FAR</td>
<td>710</td>
<td>101.5 ksf</td>
<td>13.29</td>
<td>1,349</td>
<td>1.87</td>
</tr>
<tr>
<td>2% Major Bus Stop Reduction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Trips (B)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,322</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>163</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35% FAR</td>
<td>710</td>
<td>79 ksf</td>
<td>14.09</td>
<td>1,113</td>
<td>1.96</td>
</tr>
<tr>
<td>2% Major Bus Stop Reduction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Trips (C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,091</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>133</td>
</tr>
<tr>
<td>35% to 55% FAR Target TDM Reduction Goal (D) where D = A - C</td>
<td>452</td>
<td>59</td>
<td>8</td>
<td>67</td>
<td>9</td>
</tr>
<tr>
<td>35% to 45% FAR Target TDM Reduction Goal (E) where E = B - C</td>
<td>231</td>
<td>30</td>
<td>4</td>
<td>34</td>
<td>5</td>
</tr>
</tbody>
</table>

Notes:
1. ksf = 1,000 square feet
2. Rate per ksf
3. Following ITE trip generation equations used (ITE Code 710 - General Office Building, 6th Edition):
   AM: Ln (T) = 0.80 Ln (X) + 1.55, Enter = 85%, Exit = 12%
   PM: T = 1.12 * (X) + 78.81; Enter = 17%, Exit = 83%
   Where X = 1,000 square feet of floor area, T = number of vehicle trips, Ln = natural log

CHAPTER 2. TRANSPORTATION FACILITIES AND SERVICES

The transportation facilities and services that support the use of modes of transportation other than the single-occupant vehicle (SOV) include commuter rail, light rail transit (LRT), buses and shuttle buses, bicycle facilities, and high-occupancy vehicle (HOV) lanes. Existing and planned support facilities and services near the 580 N. Mary Avenue site are discussed in this chapter. Rail and bus routes near the site are shown on Figure 3. Figure 4 presents the bicycle facilities and HOV facilities are shown on Figure 5.

COMMUTER RAIL – CALTRAIN

Caltrain provides intercity passenger rail service between San Francisco and San Jose, with limited service to Gilroy during commute hours. Both the Sunnyvale and Mountain View Caltrain Stations are accessible to the project site and are described below in further detail. Rail service to these stations are summarized in the schedule tables to the right.

The Sunnyvale Caltrain Station is the closest station to the project site. It is served by Local-Stop, Limited-Stop, and Baby Bullet (express) service. The station is served by three Baby Bullet and six Limited-stop northbound trains in the AM peak period with headways between five and forty-two minutes. In the PM peak period, the station is served by two Baby Bullet, five Limited-stop, and one Local-stop southbound trains with headways between five and thirty-four minutes. The distance between the station and the project site is 1.5 miles, or about a 30 minute walk. This distance is beyond what a typical commuter is willing to walk, generally up to a ½ mile, to reach their final destination. 1.5 miles is a manageable distance for biking, however, as described below, there are limited bike facilities connecting Sunnyvale Station to the project site. The Station has 15 bike racks and 75 bike lockers available for reservation. There are no Caltrain shuttles that connect to the Sunnyvale Station. However, Caltrain riders can connect to the project site via VTA Bus Route 54, which has a transit stop at the intersection of Mathilda Avenue and Maude Avenue, a half mile from the project site.

The Mountain View Station is one stop north on the Caltrain route. Although the station is nearly three miles from the project site, it is made accessible via the Mary Moffett Shuttle connection. The shuttle, which is described in further detail in the Caltrain Shuttle section below, has a stop adjacent to the project site. The Mountain View Station is served by Local-stop, Limited-stop, and Baby Bullet (express) service, with a higher frequency of trains in the AM and PM peak periods compared to the Sunnyvale Station. In the AM peak period, the Station is served by nine Limited-stop and three Baby Bullet northbound trains, and two Local-stop, four Limited-stop, and four Baby Bullet southbound trains. In the PM peak period, the station is

SUNNYVALE STATION SCHEDULE


am - italics | pm - bold
yellow - limited-stop | red - baby bullet

MOUNTAIN VIEW STATION SCHEDULE


am - italics | pm - bold
yellow - limited-stop | red - baby bullet
served by six Limited-stop and five Baby Bullet northbound trains, and one Local-stop, seven Limited-stop, and three Baby Bullet southbound trains.

The Mountain View Station has 25 bike racks and 116 bike lockers available for reservation. The commute between the Station and the Project site is approximately three miles, or a 15-20 minute ride. Caltrain bicycle riders can commute nearly the entire way on bicycle facilities, including Central Expressway and E Evelyn Avenue.

**Caltrain Shuttle**

The *Mary Moffett Shuttle* operates between the Mountain View Caltrain Station and the Mary-Moffett area during commute hours. The shuttle operates four trips in the AM peak period and four in the PM peak period, coordinated with Local, Limited, and Baby Bullet service. The morning and afternoon schedules are included below. Funded by both public and private sources, the shuttle is free for all Caltrain passengers. The Mary Moffett Shuttle route provides direct service to the project site at the corner of Mary & Maude, in addition to two other stops within walking distance. The shuttle operates four AM trips and PM trips with approximately 1-hour headways. The shuttle schedule is summarized in Table 2 & 3.

### Table 2

**MARY MOFFETT SHUTTLE: MORNING SCHEDULE (AM)**

<table>
<thead>
<tr>
<th>Northbound Train #</th>
<th>Mountain View</th>
<th>207</th>
<th>217/221</th>
<th>227/231</th>
<th>135</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6:23</td>
<td>7:23/7:37</td>
<td>8:23/8:37</td>
<td>9:29</td>
<td></td>
</tr>
<tr>
<td>Southbound Train #</td>
<td>Mountain View</td>
<td>104</td>
<td>210/312</td>
<td>220/322</td>
<td>220/322</td>
</tr>
<tr>
<td></td>
<td>5:33</td>
<td>7:38/7:44</td>
<td>8:38/8:44</td>
<td>9:38/9:44</td>
<td></td>
</tr>
<tr>
<td>Mountain View</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caltrain</td>
<td></td>
<td>6:35</td>
<td>7:46</td>
<td>9:45</td>
<td>9:45</td>
</tr>
<tr>
<td>410 Mary</td>
<td></td>
<td>6:43</td>
<td>7:54</td>
<td>8:53</td>
<td>9:53</td>
</tr>
<tr>
<td>Mary &amp; Maude</td>
<td></td>
<td>5:44</td>
<td>7:55</td>
<td>8:54</td>
<td>9:54</td>
</tr>
<tr>
<td>760 Mary</td>
<td></td>
<td>6:45</td>
<td>7:56</td>
<td>8:55</td>
<td>9:55</td>
</tr>
<tr>
<td>Mary &amp; Almanor</td>
<td></td>
<td>6:46</td>
<td>7:57</td>
<td>8:56</td>
<td>9:56</td>
</tr>
<tr>
<td>Almanor &amp; Palomar</td>
<td></td>
<td>6:47</td>
<td>7:58</td>
<td>8:57</td>
<td>9:57</td>
</tr>
<tr>
<td>Almanor &amp; Vaqueros</td>
<td></td>
<td>6:48</td>
<td>7:59</td>
<td>8:58</td>
<td>9:58</td>
</tr>
<tr>
<td>755 Mathilda</td>
<td></td>
<td>6:49</td>
<td>8:00</td>
<td>8:59</td>
<td>9:59</td>
</tr>
</tbody>
</table>

*Note: This table only shows the shuttle stops in the vicinity of the project site. Source: Caltrain (2011)*

### Table 3

**MARY MOFFETT SHUTTLE: AFTERNOON SCHEDULE (PM)**

<table>
<thead>
<tr>
<th></th>
<th>3:29</th>
<th>4:22</th>
<th>5:16</th>
<th>6:16</th>
</tr>
</thead>
<tbody>
<tr>
<td>755 Mathilda</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Almanor &amp; Vaqueros</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE 3
MARY MOFFETT SHUTTLE: AFTERNOON SCHEDULE (PM)

<table>
<thead>
<tr>
<th>Route</th>
<th>3:30</th>
<th>4:23</th>
<th>5:17</th>
<th>6:17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almanor &amp; Palomar</td>
<td>3:30</td>
<td>4:23</td>
<td>5:17</td>
<td>6:17</td>
</tr>
<tr>
<td>Mary &amp; Almanor</td>
<td>3:31</td>
<td>4:24</td>
<td>5:18</td>
<td>6:18</td>
</tr>
<tr>
<td>760 Mary</td>
<td>3:32</td>
<td>4:25</td>
<td>5:19</td>
<td>6:19</td>
</tr>
<tr>
<td>Mary &amp; Maude</td>
<td>3:33</td>
<td>4:26</td>
<td>5:20</td>
<td>6:20</td>
</tr>
<tr>
<td>410 Mary</td>
<td>3:34</td>
<td>4:27</td>
<td>5:21</td>
<td>6:21</td>
</tr>
<tr>
<td>Mountain View</td>
<td>3:42</td>
<td>4:35</td>
<td>5:30</td>
<td>6:30</td>
</tr>
<tr>
<td>Caltrain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northbound Train #</td>
<td>261</td>
<td>365</td>
<td>273/275</td>
<td>383/285</td>
</tr>
<tr>
<td>Mountain View</td>
<td>4:03</td>
<td>4:37</td>
<td>5:37/5:46</td>
<td>6:37/6:46</td>
</tr>
<tr>
<td>Southbound Train #</td>
<td>158</td>
<td>260/362</td>
<td>260</td>
<td>270/280</td>
</tr>
<tr>
<td>Mountain View</td>
<td>4:15</td>
<td>4:37/4:51</td>
<td>5:38</td>
<td>6:36/6:50</td>
</tr>
</tbody>
</table>

Note: This table only shows the shuttle stops in the vicinity of the project site. Source: Caltrain (2011)

LIGHT RAIL TRANSIT

Santa Clara Valley Transportation Authority (VTA) operates light rail transit (LRT) and bus service in Santa Clara County. The VTA Mountain View to Winchester Avenue light rail line (Line 902) runs on tracks west and north of the project site. The line operates between 4:46 AM and 12:39 AM on 15- to 30-minute headways. On weekends, service is provided between 6:04 AM and 12:39 AM with 30-minute headways. The Middlefield Station is one mile west of the project site, though not an ideal walking distance (approximately 20 minutes), it is a manageable 7-minute bike ride.

The Moffett Park Station, also served by the Mountain View to Winchester Avenue light rail (line 902) is located less than a mile north of the project site. Although close to the project site, it is difficult to access; there are no direct pedestrian or bicycle connections across U.S. Route 101 and California State Route 237 to the station. Light Rail riders can take VTA Bus Route 54, which provides service on N. Mathilda Avenue. The travel time between the Moffett Park LRT Station and the Project Site would be approximately 31 minutes by bus.

Operating characteristics of Line 902 are summarized in Table 4.

VTA BUS ROUTES

There are two VTA bus routes that serve the site, Route 54 and Route 32.

Bus Route 54 operates along Mathilda Avenue and provides service between De Anza College and the Lockheed Martin Transit Center. During weekdays, Route 54 serves the stops near the project site between 6:03 AM and 9:29 PM with 30-minute headways. On weekends, Route 54 operates between 7:51 AM and 7:51 PM with 45 to 60-minute headways. Bus stops for Route 54 are provided along Mathilda Avenue near Maude Avenue and Del Ray Avenue.

Bus Route 32 operates on Mathilda Avenue and could be used as a connection to Bus Route 54. Route 32 provides service between the San Antonio and Santa Clara transit centers. Route 32 follows major
arterials and travels through Mountain View, Sunnyvale, and Santa Clara. These routes are summarized in Table 4.

<table>
<thead>
<tr>
<th>Route</th>
<th>From</th>
<th>To</th>
<th>Weekdays</th>
<th>Weekends</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Operating Hours</td>
<td>Peak Headway¹ (minutes)</td>
<td>Operating Hours</td>
</tr>
<tr>
<td>54</td>
<td>De Anza College</td>
<td>Lockheed Martin Transit Center</td>
<td>6:03 a – 9:29 p</td>
<td>30</td>
</tr>
<tr>
<td>32</td>
<td>San Antonio Transit Center</td>
<td>Santa Clara Transit Center</td>
<td>6:00 a – 7:59 p</td>
<td>30</td>
</tr>
</tbody>
</table>

**Light Rail Service (VTA)**

<table>
<thead>
<tr>
<th>Route</th>
<th>From</th>
<th>To</th>
<th>Weekdays</th>
<th>Weekends</th>
</tr>
</thead>
<tbody>
<tr>
<td>902</td>
<td>Downtown Mountain View</td>
<td>Winchester</td>
<td>4:46 a – 12:39 a</td>
<td>15</td>
</tr>
</tbody>
</table>

**Caltrain Service**

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Weekdays</th>
<th>Weekends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunnyvale Station</td>
<td>San Francisco (4th &amp; King)</td>
<td>San Jose Diridon</td>
<td>4:30 a – 1:32 a</td>
</tr>
<tr>
<td>Mountain View Station</td>
<td>San Francisco (4th &amp; King)</td>
<td>San Jose Diridon</td>
<td>4:30 a – 1:32 a</td>
</tr>
<tr>
<td>Mary/Moffett Area Caltrain Shuttle</td>
<td>Mountain View Caltrain Station</td>
<td>Alma Plaza</td>
<td>6:35 a – 10:23 a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:00 p – 6:30 p</td>
<td>4 PM SB Runs</td>
</tr>
</tbody>
</table>

**Notes:**

1. Headways are defined as the time interval between two transit vehicles traveling in the same direction over the same route.

Sources: VTA, Caltrain, November 2011.
HOV LANES

High Occupancy Vehicles (HOV) lanes, also known as diamond or carpool lanes, restrict use to vehicles with two or more persons (carpool, vanpool, and buses) or motorcycles during the morning (5:00 AM to 9:00 AM) and evening (3:00 PM to 7:00 PM) commute periods. US 101 and State Route 237 (SR 237) provide regional access to the Project site. Both of these travel routes include HOV lanes.

US 101 extends north through San Francisco and south through San Jose. Near the project site, US 101 travels in an east-west direction with approximately 140,000 daily vehicles. The freeway has three mixed-flow lanes and one HOV lane in each direction.

SR 237 is an east-west freeway providing access between the Cities of Mountain View and Milpitas. SR 237 has two mixed-flow lanes and one HOV lane in each direction east of the Lawrence Expressway. Near the project site, SR 237 has an average daily traffic (ADT) volume of approximately 90,000 vehicles.

The Santa Clara Valley Transportation Authority (VTA) is implementing the Silicon Valley Express Lanes Program. The Express Lanes will give single-occupancy vehicles (SOV) the option of using an express lane by paying a toll. Tolls will vary throughout the day based on congestion levels to help maintain level of service and free-flow conditions. The current toll price will be displayed on electric signs above the lanes. Tolls and fees will be collected electronically using the FasTrak collection system. Carpools, motorcycles, and transit buses can continue to use the Express Lanes without paying the toll. Similar to HOV lanes, the Express Lanes will be separated from mixed-flow lanes by a painted buffer. The express lanes are expected to increase efficiency of the roadway and create a revenue stream that can be reinvested into facility maintenance and transit enhancement.

The Silicon Valley Express Lanes Program anticipates 34 miles of express lanes on US 101 by 2016, and by 2012, express lanes on the SR 237/I-880 connectors.

BICYCLE FACILITIES

Bicycles are an important component of the City's transportation network. The City of Sunnyvale's bikeways are classified as Class I, Class II, or Class III facilities, as follows and shown to the right:

- **Class I Bikeway** – bike paths within exclusive right-of-way, sometimes shared with pedestrians
- **Class II Bikeway** – bike lanes for bicycle use only that are striped within the paved area of roadways
- **Class III Bikeway** – bike routes are shared with motor vehicles on the street. Class III bikeways may also be defined by a wide curb lane and/or use of a shared use arrow stencil marking on the pavement, known as a “sharrow”

Existing bicycle facilities near the project site are shown on Figure 4. Class II Bike Lanes (in purple) are provided on N. Mary Avenue, W. Maude Avenue, E. Middlefield Road, and the Central Expressway. Class III Bikeways (in orange) are provided on Mary Avenue south of the Caltrain tracks, and a small network of streets east of Fair Oaks Avenue. A Class I Bike Path (in green) runs adjacent to SR 85.

The bicycle network provides a nearly complete route for bicyclists traveling from the Middlefield LRT Station, along Middlefield Road and W. Maude Avenue, and the Mountain View Caltrain Station, along the Central Expressway and N. Mary Avenue. Gaps in the bicycle network, especially on N. Mary Avenue.
Avenue, prevent a complete bicycle route between the Sunnyvale Caltrain Station and the project site. The City of Sunnyvale 2006 Bicycle Plan recommends future bike lanes on N Mathilda Avenue and W Maude Avenue, which will help complete the route. In the meantime, however, although current facilities do not exist on these streets, N. Sunnyvale Avenue and Maude Avenue would serve as the most direct and practical bicycle route between the Sunnyvale Caltrain Station and project site.

PEDESTRIAN FACILITIES

Pedestrian facilities include sidewalks, crosswalks, trails, and pedestrian signals or warning devices. Sidewalks are located on both sides of the streets adjacent to the project site: N. Mary Avenue and W. Maude Avenue. There is a continuous sidewalk from the VTA Bus 54 stop at W. Maude Avenue and N. Mathilda Avenue, which provides a safe walking route for bus commuters to the project site. Sidewalks and crosswalks are also provided on the walking route from the Middlefield LRT Station, a mile west of the project site. The signalized N. Mary Avenue and W. Maude Avenue intersection adjacent to the project site includes both crosswalks and curb ramps. The next intersection north, N. Mary Avenue and Benecia Avenue, neither has crosswalks nor curb ramps. As mentioned earlier, SR 237 and US 101 create a barrier between the Moffett Park LRT Station a mile north of the project site. There is no direct pedestrian under or over crossing.
CHAPTER 3. LIST OF POTENTIAL TDM MEASURES AND STRATEGIES

The City of Sunnyvale has a long list of TDM measures and strategies that are described in Transportation Demand Management (TDM) Tool Kit, prepared by The Hoyt Company in December 1999. Since that time new measures and strategies have been developed primarily based on the prevalence of web-based tools. The list of measures from the toolkit is summarized in Tables 5 and 6. Measures from this list plus more recent measures that are included in the TDM Plan for 580 N. Mary Avenue are described in the next chapter.

The Sunnyvale TDM Tool Kit Measures can be divided into two sets of strategies: Planning and Design, and Programs and Services. The Planning and Design strategies are part of the initial planning of the development to ensure that multiple modes of travels will be supported by a project’s design, including sidewalks, bicycle parking, and urban design features. Further, these provisions help connect the project to its surrounding environment and transportation networks.

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<th>TABLE 5</th>
<th>SUNNYVALE TDM TOOL KIT MEASURES: PLANNING AND DESIGN</th>
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<td>Street design</td>
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<td>Land dedication for transit facilities</td>
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<td></td>
<td>Transit passenger shelter/bus stop</td>
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<td>Bus/rail station subsidy</td>
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<td>Parking Design Measures</td>
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<td></td>
<td>Parking configuration</td>
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<td></td>
<td>Preferential parking</td>
</tr>
</tbody>
</table>
## Table 5
SUNNYVALE TDM TOOL KIT MEASURES: PLANNING AND DESIGN

<table>
<thead>
<tr>
<th>Planning and Design Measures</th>
<th>TDM Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reduced parking</td>
<td>Reducing the number of parking spaces with a strong TDM program to shift people into alternative modes of transportation.</td>
</tr>
<tr>
<td></td>
<td>Reduced parking fees</td>
<td>Free parking or reduced fees for preferential spaces (for sites that have paid parking).</td>
</tr>
<tr>
<td>Pedestrian Design Measures</td>
<td>Minimize walking distances</td>
<td>Design pedestrian access with minimum walking distance and/or the most direct route to transit stops.</td>
</tr>
<tr>
<td></td>
<td>Pedestrian connections</td>
<td>Safe, convenient pedestrian connections between buildings and surrounding streets.</td>
</tr>
<tr>
<td></td>
<td>Internal pedestrian access</td>
<td>Safe, convenient pedestrian connections between buildings on the site.</td>
</tr>
<tr>
<td>Bicycle Design Measures</td>
<td>Showers/clothes lockers</td>
<td>Shower facilities and clothes lockers for those who walk and bike to work.</td>
</tr>
<tr>
<td></td>
<td>Bicycle parking (short + long term)</td>
<td>Secure bicycle parking including racks, lockers, and enclosed locked limited access areas.</td>
</tr>
</tbody>
</table>

### On-Site Amenities

- Cafeteria with hot food service, ATM, exercise facilities, convenience retail, childcare, valet service, post office/stamps, Onsite transit pass sales

On-site amenities provide services that would otherwise require a separate trip before, during, or after work hours.

Source: Transportation Demand Management (TDM) Tool Kit, prepared for the City of Sunnyvale by The Hoyt Company, December 1999.

Fehr & Peers, 2011.

The Program and Service TDM measures are typically employer-implemented strategies that support employee specific commuting options. These programmatic measures are often dependent on the design measures. For example, bicycle parking at the project site will be necessary for an effective employee bicycle program. The program and service measures are listed and described in Table 6.
<table>
<thead>
<tr>
<th>Program and Service Measures</th>
<th>TDM Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Board</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information board</td>
<td>Permanent locations for updated TDM information.</td>
<td></td>
</tr>
<tr>
<td>Transportation Coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation coordinator</td>
<td>Transportation coordinators are responsible for developing, marketing, implementing, and evaluating TDM programs.</td>
<td></td>
</tr>
<tr>
<td>Carpool Programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpool programs</td>
<td>Carpool programs help carpools to form by matching drivers and passengers.</td>
<td></td>
</tr>
<tr>
<td>Vanpool Programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanpool programs</td>
<td>Vanpool programs help vanpools to form by matching drivers and passengers and by providing or subsidizing vans.</td>
<td></td>
</tr>
<tr>
<td>Transit Programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transit subsidies</td>
<td>Employers subsidize transit passes through programs such as Commuter Check or by purchasing passes.</td>
<td></td>
</tr>
<tr>
<td>Onsite pass outlet</td>
<td>Providing transit passes for sale onsite as a convenience for employees.</td>
<td></td>
</tr>
<tr>
<td>Shuttle programs</td>
<td>Operation of a shuttle service to nearby rail and transit stations and possibly to midday destinations.</td>
<td></td>
</tr>
<tr>
<td>Parking Programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferential parking</td>
<td>Designated parking spaces for carpools and vanpools near building entrances.</td>
<td></td>
</tr>
<tr>
<td>Paid parking</td>
<td>Free parking or reduced fees for preferential spaces (for sites that have paid parking).</td>
<td></td>
</tr>
<tr>
<td>Parking cashout</td>
<td>Employees receive the cash equivalent of employer-provided parking if they elect to forgo parking.</td>
<td></td>
</tr>
<tr>
<td>Pedestrian Programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrian programs</td>
<td>Walking programs encourage employees to walk to work and may include mapping walking routes, creating walking groups or buddies, and providing incentives.</td>
<td></td>
</tr>
<tr>
<td>Bicycle Programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle programs</td>
<td>Bicycle programs</td>
<td>Bicycle programs encourage employees to bike to work and may include mapping routes, creating biking groups or buddies, and providing incentives.</td>
</tr>
<tr>
<td>Promotional Programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New employee orientation</td>
<td>Introduces new employees to the TDM program.</td>
<td></td>
</tr>
<tr>
<td>Flyers, posters, emails</td>
<td>Ways to keep the TDM message in front of employees on a regular basis.</td>
<td></td>
</tr>
<tr>
<td>Transportation fairs</td>
<td>Transportation fairs provide alternative mode information in a fun event.</td>
<td></td>
</tr>
<tr>
<td>Newsletter articles</td>
<td>Articles about TDM in company newsletters.</td>
<td></td>
</tr>
<tr>
<td>Program and Service Measures</td>
<td>TDM Measure</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Commuter information center</td>
<td>An on-site, one-stop shop for transit and commute alternatives information to assist building tenants with trip planning.</td>
</tr>
<tr>
<td></td>
<td>Transit field trips</td>
<td>Orient new transit riders by showing them the local routes, fare collection method, transfer points, and other operational features.</td>
</tr>
<tr>
<td></td>
<td>Free trial rides</td>
<td>Free transit tickets for employees interested in using transit.</td>
</tr>
<tr>
<td></td>
<td>Transit riders guide</td>
<td>A guide with transit routes and schedules to the site.</td>
</tr>
<tr>
<td></td>
<td>Bike-to-work day</td>
<td>A regional event to introduce bicycle commuting.</td>
</tr>
<tr>
<td></td>
<td>Bicycle riders guide</td>
<td>A guide with bicycle routes, lanes, and paths to the site and bicycle parking facilities on the site.</td>
</tr>
<tr>
<td></td>
<td>Guaranteed Ride Home Program</td>
<td>Employees who use transit, carpools, or vanpools are guaranteed a ride home in case of emergency or if they need to work late, typically with taxis, rental cars, or company cars.</td>
</tr>
</tbody>
</table>

**Telecommuting**

| Telecommuting                     | Telecommuting allows employees to work from home or from neighborhood telecenters via telecommunicatiions. |

**Alternative work schedule**

| Flextime                          | Employees set or modify their arrival and departure times.                                             |
| Staggered Work Hours              | Work units or groups select or are assigned different starting and ending times for their work day.     |
| Compressed Work Week              | Employees work more hours in a single day, but fewer days of the week.                                 |

CHAPTER 4. SELECTED TDM MEASURES AND STRATEGIES

The TDM measures and strategies for 580 N. Mary Avenue are based on the physical attributes of the site and the proposed building, plus the transportation facilities and services currently near the site. Additional measures would be needed to achieve the trip reduction goals. These measures include programs that would be created by the tenants. Therefore, they would need to be included in lease agreements or some other instrument to ensure their implementation.

SITE AND DESIGN MEASURES

Building-Related Measures

1. Building Entries

The main building entrance is located on W. Maude Avenue, a roadway with pedestrian facilities. Locating the building entrance near pedestrian facilities supports an active pedestrian environment and encourages walking and transit use.

2. Building Setbacks

The building is located close to both N. Mary Avenue and W. Maude Avenue with only a circulation aisle and one or two rows of parking between the building and the street. Locating the building near pedestrian facilities encourages walking and transit use. Alternatively, having seas of parking between the roadway and the building encourages driving.

3. Passenger Loading Zones

The passenger loading zone is near the main entry. It is convenient for carpools and vanpools dropping off passengers. Passenger loading zones are also convenient if the project decides to implement a shuttle program in the future.

4. Building Wiring

The building will be wired with fiber optics to facilitate telecommuting.

Parking Design Measures

5. Parking Configuration

The parking lot layout is conducive for pedestrian access and circulation. The building entrances are a short distance from the street sidewalks with clearly defined pedestrian walkways and crossings.

6. Preferential Parking

There are several areas on the site plan near the building entrances that could be designated as carpool and vanpool spaces. These spaces would be located in premium and convenient locations to incentivize carpooling. If the spaces are underutilized, the carpool spaces may be made available to single occupancy vehicles after peak commute times.
Pedestrian Design Measures

8. Minimize Walking Distances

As described under Building Entries and Building Setbacks, the building design and placement on the site are such that pedestrian walking distances to the sidewalks on the adjacent streets are minimized.

9. Pedestrian Connections

The parking lot layout is conducive for pedestrian access and circulation. The building entrances are a short distance from the street sidewalks with clearly defined pedestrian walkways and crossings.

Bicycle Design Measures

10. Showers and Lockers

The building will have shower facilities and lockers and/or changing facilities to accommodate people bicycling to work. Shower and changing rooms will help promote bicycling as an alternative commute option for interested employees.

11. Bicycle Parking

The site plan depicts 16 bicycle lockers located adjacent to the building on the N. Mary Avenue frontage and bike racks accommodating 6 bicycles on the opposite end of the building. The number and placement of bicycle facilities is adequate according to the City of Sunnyvale municipal code.

PROGRAM AND SERVICE MEASURES

In addition to the Site and Design attributes that contribute to alternative mode use, the tenants of the building will need to provide additional measure to meet the TDM goals. These measures include a Commute Trip Reduction Program and subsidized transit passes.

12. Commute Trip Reduction Program

The Commute Trip Reduction Program includes a variety of measures to encourage ridesharing, bicycle use, and transit use such as:

a) Dissemination of TDM information
b) Carpooling encouragement
c) Ride-matching assistance
d) Preferential carpool parking
e) Flexible work schedules for carpools
f) Part-time transportation coordinator

This program incorporates many of the programs in the toolkit list including carpool, pedestrian, bicycle, and promotional programs. It would be managed by a part-time transportation coordinator who would be responsible for disseminating information, overseeing promotional activities, and conducting the annual monitoring and reporting. Information regarding transit service in the area plus connections to the site, maps of bicycle facilities, etc. and/or website links should be included in employee handbooks and discussed during new employee orientation. Carpooling should be encouraged by either providing a
carpool matching program on-site or via peer-to-peer matching program such as ZimRide. Bicycling should be encouraged by adopting a bicycle program that pairs riding buddies, promotes Bike to Work Day, and provides introductions to the basics of bicycle commuting and safety.

13. Subsidized Transit Passes

All employees who elect to use transit should be provided with subsidized transit passes through the Commuter Check or other similar program.

ADDITIONAL MEASURES

If the TDM monitoring shows that the trip reduction goals are not met, then measures would need to be added to the plan. Examples of measure that could be added are described in the following sections.

14. Guaranteed Ride Home

A common reason that employees do not use alternative modes (i.e., carpool, vanpool, or transit) is the inability to leave work unexpectedly for a family emergency or the fear of being stranded if they need to work late. One TDM element that allays these fears is a Guaranteed Ride Home program. With this program, employees can use a taxi service, rental car, or other means to get home, and the employer pays for the service. The lease agreement will state that the tenants must participate in a Guaranteed Ride Home program, which will be managed by the TDM Coordinator. Employees who wish to use the service would contact the transportation coordinator to make the travel arrangements.

15. Parking Cash-Out

With a parking cash-out program, employees are offered the option of a “free” parking space or a cash equivalent that can be used to offset the cost of commuting by an alternative mode. Employers would be required to offer employees a cash payment equivalent to the cost of the parking space to the employer based on their rent payments.

16. Shuttle Bus Program

The project employer’s would establish a shuttle bus program that transports employees to residential locations, transit centers, or designated pick-up and drop-off stops.

TRIP REDUCTION EVALUATION

The project’s TDM target is a 23 percent reduction in peak hour trips. This target stems from the project’s increased FAR from the designated 35 percent FAR for the site to the project’s planned 55 percent FAR.

Methods documented in *Quantifying Greenhouse Gas Mitigation Measures*¹, a report recently released by the California Air Pollution Control Officers Association (CAPCOA), were used to estimate the trip reduction effects of the proposed TDM strategies. The CAPCOA report provides methods for quantifying vehicle miles traveled (VMT) and vehicle trip (VT) reduction for a list of mitigation measures, primarily focused on project-level mitigation. The CAPCOA measures were screened on the basis of the feasibility of quantifying the reductions, the availability of robust and meaningful data upon which to base the quantification, and whether the measures would result in appreciable reductions. The report represents

the state of practice in quantifying effectiveness of TDM strategies. It has been adopted into CalEEMod, a statewide land use emissions model developed in collaboration with the air districts of California, and is recommended for use in California Environmental Quality Act (CEQA) documentation by the Bay Area Air Quality Management District.

The Site and Design measures and the Program and Service measures are projected to have a combined reduction of 16 percent based on the empirical data in the CAPCOA report. This meets the minimum goal of a 16 percent reduction. Adding the guaranteed ride home, parking cash-out, and shuttle bus program are anticipated to increase the total reduction to 19 percent. The actual reductions and resulting vehicle trip generation will be measured during the annual monitoring and reporting process discussed in the next chapter.
CHAPTER 5. MONITORING, EVALUATION, AND REPORTING

The intent of the TDM plan is to reduce vehicle trips and lessen the impact to traffic congestion anticipated to occur by the proposed development. Therefore, it is important to ensure strategies are implemented to monitor and evaluate how successful the programs are in performing their respective reductions and report the results to the City of Sunnyvale. The monitoring program will evaluate how effective the strategies are in meeting the reduction goals and identify areas the plan may be enhanced to assist the needs of the tenants on site.

The goal of the TDM program is a trip reduction of 27 percent, with a minimum allowable reduction of 16 percent. The program will be assessed annually to assess compliance with the target rate. The City will base TDM program compliance on the percentage of total employees who used transportation alternatives, not the percentage of survey respondents. Survey non-respondents will be assumed to be driving alone and will count against the compliance rate. It is important to conduct as thorough a survey as possible. The following procedures will be used to monitor and evaluate how effective the strategies are in meeting the target rate.

Annual Commute Surveys – Surveys will be provided by the developer or building tenants (employers) to measure the number of employees commuting by alternative modes. The survey results should include mode splits and employee perceptions of the strategies available to them. Results will be used to monitor how effective current strategies are and enhance areas not meeting expectations.

The developer/building tenants (employers) must survey every year to collect data required for the TDM Annual Status report. The new data should be analyzed and compared to the previous survey results to determine progress and potential modifications needed to improve the program.

TDM Status Report to the City – A TDM report presenting a summary of the survey results will be provided to the City for review. It will provide the progress and effectiveness of current strategies and identify areas in need of improvement. For areas identified in need of improvement, the report should present what changes will occur in the TDM plan and how these enhancements are anticipated to meet the target rate.

Modifications to the TDM Program – The Transportation Demand Management (TDM) Tool Kit, CAPCOA report, and other TDM research documents should be consulted to identify modifications to the TDM program that will result in increases in alternative mode use and decreases in vehicle trips.

A successful TDM program will reduce the development’s impact to traffic congestion and improve air quality in the community. When alternative mode commute trips are increased and drive alone commute trips are reduced the program is effective.
CHAPTER 6. SUMMARY AND CONCLUSIONS

This report presents the TDM plan for the office development at 580 N. Mary Avenue. The purpose of this plan is to reduce the number of vehicle trips generated by the site. It contains a number of measures and strategies that encourage the use of alternative modes of travel such as transit, ridesharing (carpooling and vanpooling), bicycling, and walking.

The proposed building size results in a FAR for the site of 55 percent, where 35 percent is allowed. The goal of this TDM plan is to offer a reduction equivalent to the trip difference between 35 and 55 percent FAR, or a 27 percent average AM and PM peak hour reduction. The minimum reduction goal of the TDM plan is to offer a reduction equivalent to the trip difference between 35 percent and 45 percent FAR, or a 16 percent average AM and PM peak hour reduction.

This comprehensive TDM Plan was designed to meet the specific needs for this project. The planning, design, program, and service strategies will reduce project trips by 16 to 19%. In addition to reducing single-occupancy vehicle trips, this TDM Plan will make use of existing regional and local transit systems, and provide flexible commuting solutions for future employees.

The TDM measures and strategies are based on the physical attributes of the site and the proposed building, plus the transportation facilities and services currently near the site. Additional measures would be needed to achieve the trip reduction goal of 27 percent. These measures include limiting parking supplies, implementing a car share program and improving transit system frequency and accessibility.
TRANSPORTATION DEMAND MANAGEMENT (TDM) TOOL KIT

A guidance document to assist developers in the City of Sunnyvale prepare, implement, and monitor the success of TDM Plans and Programs.

Prepared for:
The City of Sunnyvale

Funding for this TDM Tool Kit was provided by Applied Materials, Arques Campus

Prepared by:
The Hoyt Company (916) 448-2440

December, 1999
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WHAT IS TDM?

Transportation Demand Management (TDM) is a combination of services, incentives, facilities and actions that reduce automobile trips to help relieve traffic congestion, parking, and air pollution problems. TDM encourages more efficient use of our transportation system.

WHY IS TDM IMPORTANT TO THE CITY OF SUNNYVALE?

Growth and expansion experienced in the region has contributed to the increased demand on our local transportation systems. This increased demand results in traffic congestion, greater traffic volumes and declining air quality (50% of our air pollution comes from mobile sources). In fact the increased demand impacts a number of factors which are important to the City of Sunnyvale including:

Economic Growth: Efficient transportation access to employment and shopping sites is an important consideration to business and developers when considering expansion opportunities. A good transportation system is an important selling point of communities that desire to attract development. In addition, good transportation is very important to the movement of goods and services and thus has a direct impact on sound economic growth and productivity.

Environmental Quality: Congested road conditions can have a detrimental effect on the environment, in particular air quality. Making improvements to the transportation system or trying to change travel behavior has been an important objective of those wanting to improve environmental quality.

Quality of life: To some people, congested highways and roads are a symptom of deteriorating quality of life in a community. Transportation is an important issue for our residents. Safe and convenient access to jobs is a key quality of life issue for people who live and/or work in Sunnyvale.

The purpose of Transportation Demand Management is to promote more efficient utilization of existing transportation facilities, and to ensure that new developments are designed in ways to maximize the potential for alternative transportation usage.

LAND USE PLANNING AND SITE DESIGN MEASURES

Sometimes called "urban design" or "transit oriented design", these are measures that are incorporated in the planning phase of a development that will ensure that
the development is designed to reduce single occupancy vehicle (SOV) trips, and encourage alternative transportation usage. The strategies associated with this type of urban design can range from provision of sidewalks, to the design orientation of an entire development that is more conducive to pedestrian movement. Design considerations can also provide stronger intermodal connections for the community, providing opportunities for pedestrians and bicyclists to better link with transit and regional pedestrian/bike trail system.

Any new development in the City of Sunnyvale should take into consideration existing and planned transit, bikeway, pedestrian and roadway facilities when designing the project.

Benefits/Costs: The benefits of urban design strategies to enhance mobility are primarily found in the increased use of alternative modes of transportation and the reduction in vehicle miles traveled for these types of communities.\(^1\) They also can benefit the developer by creating a more marketable project.

\(^1\) Institute of Transportation Engineers, A Toolbox for Alleviating Traffic Congestion and Enhancing Mobility, 1997, p. 226.
LIST OF PLANNING/DESIGN MEASURES
I. LIST OF PLANNING/DESIGN MEASURES:

A. BUILDING DESIGN/LAYOUT

1. Building Entries. Building entries should be orientated toward plazas, parks, and pedestrian oriented streets rather than oriented towards parking lots. Entrances should be close to existing or planned transit stops.

2. Building Setbacks. Building setbacks should be reduced and standardized to provide closer access to sidewalks and transit stops.

3. Passenger Loading Zones. Passenger loading zones should be placed in convenient locations near entrances, preferably covered, to provide accessible locations for the drop off and pick up of carpool and vanpool riders and transit/shuttle passengers.

4. Building Wiring. Buildings should be wired with fiber optics to facilitate teleworking.

B. TRANSIT DESIGN ELEMENTS

1. Intersection Geometrics. Street intersections should be designed to accommodate transit vehicles (including internal project circulation roads if bus or shuttle service is anticipated to enter project).

2. Street Designs. Street designs should be structurally capable of supporting the weight of buses (including internal project circulation roads if bus or shuttle service is anticipated to enter project).

3. Land Dedication for Transit Facilities. Land may be dedicated for construction of a rail station/bus stop or other purposes related to transit if a need is determined by the transit district. Evidence of the land dedication is required prior to the issuance of building permit or in conjunction with the final filing of an approved parcel or tentative map. This measure will provide for future transit accessibility and growth.
4. Transit Passenger Shelter/Bus Stop. If the proposed development is located along an existing or designated transit route the applicant may want to include this TDM measure. The applicant must agree to construct or pay for the construction of a shelter or bus stop on or adjacent to the property.

5. Bus/Rail Station Subsidy. When a proposed development is located within 1/4 mile from a bus route or 1/2 mile from a site designated as a future bus transit center/rail station, the applicant may agree to pay all or part of the cost associated with that center. Land, construction and/or maintenance of the center/station are included in these costs. The applicant may agree to cover the expenses of another center/station within the transit system in lieu of constructing a new facility.

C. PARKING DESIGN MEASURES

Perhaps more than any other TDM action (other than congestion pricing), parking management can have a dramatic impact on travel behavior. Two important benefits to developers of reduced parking requirements are the savings in construction costs associated with reduced parking, and the availability to utilize land that otherwise would be used for parking as increased density or project amenities such as landscape or park area. The actual savings in cost will vary from one location and situation to another. A study estimated that the capital cost of parking structures at UCLA was at least $23,600 per parking space added, and the average cost of providing parking was at least $124 per space per month (Shoup 1995).

1. Off Street Parking. Off street parking should be primarily located on the side or in the rear of buildings; not in the front of the building resulting in a sea of parking between any transit service and the building.

2. Parking Configuration. The parking lot layout should not dominate pedestrian oriented streets or interrupt pedestrian routes.

3. Preferential Parking. Designate spaces for "carpool/ vanpool/alternative fuel vehicles only." The spaces must be labeled or marked carpool/vanpool/alternative fuel vehicles
only. A minimum of 10% of all parking places should be permanently reserved. Placement of the spaces must be designated in the construction plans, and approved prior to receiving the building permit. The rules and regulations regarding the usage of the preferential parking and auditing procedures must be defined as part of the Annual TDM Status Report submitted to the City of Sunnyvale.²

4. Reduced Parking. Reducing the number of parking spaces combined with a strong TDM program can help shift people into alternative modes of transportation. This can save developers a tremendous amount of money in real estate and construction costs by not having to build the maximum number of parking spaces allowable. This measure should not be utilized without companion TDM measures (such as subsidized transit passes for employees).

5. Reduced Parking Fees. In the event that a site has paid parking, the preferential parking spaces are provided free (or reduced by at least 50%) to incentivize employees to carpool, vanpool, or purchase clean fuel vehicles. This incentive works in tandem with the High Occupancy Vehicle (HOV) lanes in and around Sunnyvale, allowing carpools and vanpools to commute quickly and cheaply.

D. PEDESTRIAN DESIGN MEASURES

1. Minimize Walking Distances. Designing pedestrian access so that there is the minimum walking distance and/or the most direct route to transit stops will help promote transit usage.

2. Pedestrian Connections. Safe, convenient pedestrian connections should be provided from the project to surrounding external streets. Lighting, landscaping and building orientation should be designed to enhance pedestrian safety.

3. Internal Pedestrian Access. Safe, convenient pedestrian walkways should be incorporated into the project design.

² Refer to City of Sunnyvale zoning code section 19.48.025 Preferential parking for carpool vehicles, and Ord. 2081-83 § 14: Ord. 1967-80 § 15.
E. BICYCLE DESIGN MEASURES

1. Showers and Clothes Lockers. The applicant may provide shower and clothes locker facilities free of charge for the employees of the development to encourage bicycle commuting and walking. Half length lockers are preferable as they allow employees to store professional clothing without it becoming wrinkled. The applicant shall specify the number of and location of such facilities, and if user fees will be imposed. Shower and locker facilities should be conveniently located near the bicycle storage facilities. These must be included in building plans.

2. Bicycle Parking. Secured bicycle parking facilities shall be located in convenient, safe, clean and well lighted areas, near building entrances, out of pedestrian parks, and within view of windows, security offices or high volumes of pedestrian traffic. Secured bicycle parking shall be protected from the weather and have surfaces that are mud, dust and debris free, and not be adjacent to car parking or traffic lanes without adequate protection.

Secured bicycle parking devices shall include the following: lockers; or enclosed, locked limited access areas with rigid metal racks or fixed stationary objects which allow the bicycle frame and both wheels to be locked with a bicycle locking device or the bicyclist supplying only a lock and six foot cable. Secured bicycle parking shall be located in a flat area on the ground level. If located within a building, secured bicycle parking shall be easily accessible on the ground floor or by elevator to other floors. Reasonable and sufficient ingress and egress must be provided so that a bicycle may be easily moved in and out of the locker or locked limited access area.

3. Short-Term Bicycle Parking. Short-term bicycle parking provides shoppers, customers, messengers and other visitors who generally park for two hours or less a convenient and readily accessible place to park bicycles.

a. Short-term bicycle parking shall be located within 50 feet of a main entrance.

b. Distribute short-term parking. Where there is more than one building on a site, or where a building has more than one main entrance, the parking must be distributed to serve all buildings or main entrances.

c. If more than 10 short-term spaces are required at least 50% must be covered.
4. **Long-Term Bicycle Parking.** Long-term bicycle parking provides secure weather protected parking for bicyclists who stay on site for several hours.

   a. **Cover.** At least 50% of long-term spaces must be covered.

   b. **Security.** Security must be achieved in one of the following ways:
      - In a locked controlled access room or area enclosed by a fence with a locked gate.
      - Within view or within 100 feet of an attendant or security guard.
      - In an area that is monitored by a security camera.

F. **ON-SITE AMENITIES**

On-site amenities provide services at the development that otherwise would require a separate trip before, after or during work hours. On-site amenities can include such things as:

1. Cafeteria with hot food service
2. Automatic teller machine
3. Exercise facilities
4. Convenience retail (newspaper, sundries, snacks, nylons, etc.)
5. Childcare
6. Valet services (dry cleaning, auto detailing, bicycle tune-up/repair service, etc.)
7. Post office/stamps
8. On-site transit pass sales

G. **INFORMATION BOARDS**

Information boards and/or kiosks located in the design of the development provide for a permanent location for TDM information. These information boards must be updated regularly to keep the information current and interesting.
LIST OF PROGRAM/
SERVICE MEASURES
II. LIST OF PROGRAM/SERVICE MEASURES

TDM Program/Service measures are programs, incentives and marketing activities that promote alternative mode usage. Some of these strategies, such as a telework program, can only be implemented by the employer. However, there are some things that a developer can do that will assist an employer's ability to implement these measures (i.e. in the case of telework, the developer can install fiber optic wiring). In addition, if the developer is also going to be the occupant (i.e. Applied Materials builds a building to house Applied Materials' employees), then Program/Service measures should be an integral part to a comprehensive TDM program.

The TDM Matrix (see Attachment) identifies which measures can be implemented by developers, and which measures can be implemented by employers.

A. TRANSPORTATION COORDINATOR SERVICES

The Transportation Coordinator is responsible for developing, marketing, implementing and evaluating the TDM programs. The Transportation Coordinator is a designated, on-site staff person (half to full time) with specific TDM responsibilities and authority. The TDM programs and design measures that you implement will not be used unless they are actively promoted. Transportation Coordinator duties at a minimum should include:

1. Distribution of pertinent information to all tenants/employees regarding the facilities, programs and services available at the work site.

2. Contracting and acting as a liaison to all appropriate transit agencies. This includes distribution of appropriate transit information, transit passes, commuter check, and any other duties related to the utilization of transit services.

3. Contacting and acting as a liaison with Rides for Bay Area Commuters, the Bay Area Air Quality Management District, Santa Clara Valley Transit and other transportation agencies.

4. Distribution of carpool/vanpool matching applications to all new tenants upon occupancy and/or new employees upon hire, as well as on an annual basis.

5. Distribution of alternative commute mode information to all new tenants upon occupancy and/or new employees upon hire, as well as on an annual basis. This shall include, but not be...
limited to, transit information, bicycle maps, vanpool information, preferential parking information, guaranteed ride home information, etc.

6. Distribution and placement of fliers on informational boards and kiosks and other appropriate locations. At a minimum this information should be updated quarterly.

7. Development and implementation of promotional programs and/or coordination with regional promotional programs relating to TDM. Regional programs includes such campaigns as California Rideshare Week, Bike to Work Week, Spare the Air Programs, Clean Air Month, and Back to Transit. Information on the regional programs can be found on the RIDES web page (www.rides.org/).

8. Monitoring and evaluation of TDM programs including an annual survey of tenants/employees and development of annual status report which is submitted to the City of Sunnyvale on or before January 1st each year.

B. CARPOOL PROGRAMS

A carpool is two to six people sharing a ride in an automobile. The most common carpool approach is rotating automobile use among carpoolers with no exchange of money. Another method is a carpool group using one car and sharing commute expenses. Either way, the driver of the carpool has the vehicle available for personal or company use during the workday. Carpooling reduces the cost of commuting and provides a stress-free ride to and from work for non-drivers. The City of Sunnyvale is fortunate to have a number of High Occupancy Vehicle (HOV) lanes which provide a tremendous time savings and therefore incentive for carpoolers.

Carpooling is an easy TDM program to implement, simply put it aims to fill an empty seat in a commuting automobile. Carpools can provide door-to-door directness and a convenience level and flexibility that is most like a single occupancy vehicle. A carpool can be as simple as a husband and wife, or neighbors commuting together. The biggest barrier to carpooling is committing to a common work schedule. This can cause difficulties for commuters whose work hours are not consistent from one day to the next. Often these problems can be avoided through schedule planning, part-time carpooling, and the provision of back-up services, such as a guaranteed ride home when unexpected situations arise.
Developers can implement physical improvements that will assist carpool formation. Developers who also occupy the building can implement an employee carpool program.

Program Implementation:

1. Call RIDES for Bay Area Commuters. RIDES can help you with free services to help your company promote commute alternatives including a regional carpool matching database. The RIDES Commute Services Representative for Santa Clara County is Linda Furnas (510) 273-2069.

2. Use your survey results and an annual distribution of carpool matching information to find out how many employees are currently carpooling, and the number of employees that are interested in carpooling.

3. Determine what complementary design measures and programs that you can incorporate into your carpooling program. Do you provide preferential parking? Do you offer a Guaranteed Ride Home Program? If not, can you implement one? Does your budget allow you to offer incentives or prize drawing for carpoolers?

4. Get the word out! Market your carpooling program to your employees. Utilize established company communication mediums (newsletters, employee memos, e-mails, staff meetings) and specialized events and marketing pieces.

5. Periodically touch base with employees who were carpool candidates. See if they indeed switched transportation modes. Ask them what is working, or what programs could help them commit to a carpool option. Do not substitute this informal contact for comprehensive monitoring and evaluation.

6. Monitor and evaluate your program. Include the evaluation results in your annual status report. Utilize your annual survey as a basis for your evaluation. Add qualitative results such as commuter testimonials as well.
C. VANPOOL PROGRAMS

A developer could implement a vanpool program by subsidizing the cost of a vanpool for a set number of years or by providing company sponsored vanpools. Company sponsored vanpools would make most sense when the developer was also the employer (i.e. owner/occupant) of the building.

A comprehensive vanpool program can be an integral part of your TDM program. Vanpool formation and operation can require special assistance. RIDES for Bay Area Commuters has staff who specialize in vanpools. They can help you start and promote a vanpool program at your work site. They provide free presentations and step-by-step assistance to help you or your employees organize vanpools. The City of Sunnyvale is fortunate to have a number of High Occupancy Vehicle (HOV) lanes which provide a tremendous time savings and therefore incentive for vanpoolers.

Vanpools operate like a mini-transit service, with an organized route, schedule and passenger fare charges. Vanpools are comprised of 7 to 15 people. Fares depend on the commute distance, the total number of riders, the type of van, company-provided equipment, and incentives or subsidies. For passengers, vanpools provide a low cost, convenient, stress-free commute. Typically, the vanpool driver rides free of cost in exchange for driving, collecting fares, and managing maintenance for the van. Vanpooling is a great way to utilize the High Occupancy Vehicle Lanes in Santa Clara County and the region.

Site benefits of a vanpool program can include:

- Reduced demand for parking.
- Improved access to employment sites where traffic congestion is a problem.
- Improved community relations as a result of decreased traffic, energy use, and air and noise pollution.
- Better access to an expanded labor pool.

1. Developer/Employer-sponsored: The company owns or leases the van(s) and administers the program. Riders pay a fare that represents their prorated share of operating cost. The driver typically rides for free. A company can choose to subsidize the van in direct or indirect ways. Employer sponsored vans usually carry company employees only and are not available for other riders.
Advantages:

- Possible lower passenger fares.
- Potential for fare collection through payroll deductions.

Other considerations:

- Financial obligation for van(s).
- Insurance and legal liabilities.
- Long-term commitment.
- Personnel and budget allocations required to operate the vanpool program.

2. Subsidized Vanpools: There are two types of vanpool that a developer could subsidize a third party lease arrangement, or an owner/operated vanpool. In either case, the developer could commit to providing a certain amount on a monthly or annual basis to help pay for the cost of vanpooling.

3. Third-party Lease: A group of employees lease a van from an auto dealership, van leasing company, transit agency, or nonprofit organization. Vans are generally leased on a 30-day basis. Van lease rates are based on cost of the vehicle, maintenance, mileage, fuel cost and insurance costs.

Advantages:

- Leasing company assumes legal and financial responsibility for the van(s). Insurance coverage is available through the vendor.
- Leasing company is responsible for van maintenance.
- Immediate program start-up.
- Vendor may help design and maintain the program.

Other considerations:

- Possible higher passenger fares.
- Lack of employer control over vanpool vehicle.

4. Owner-operated: The vehicle and vanpool is the sole responsibility of the employee acting as owner/driver. The owner has complete responsibility for organizing the vanpool, and all financial, maintenance and insurance requirements.
Advantages:

- Employee's vehicle is funded by fares.
- Possible lower passenger fares.
- No company capital investment or administration required.

Other considerations:

- Insurance coverage may be expensive and difficult to obtain.
- Driver/owner administers the program.
- Driver absorbs the cost if the program fails.

Program Implementation:

1. Call RIDES for Bay Area Commuters. RIDES can help you with free services to help your company promote commute alternatives including vanpool formation assistance. The RIDES Commute Services Representative for Santa Clara County is Linda Furnas (510) 273-2069.

2. Identify clusters of potential vanpool riders. You can do this through your Commute Mode Survey, e-mail, posting “vanpool riders wanted” flyers, at a transportation fair, or through newsletters. If possible, tap into human resources departments and identify clusters of employees via home zip code data.

3. Determine design elements and programs that can be incorporated into your vanpool program. Do you have preferential parking? Do you have a Guaranteed Ride Home program?

4. Market your program. Contact the potential riders to determine interest in vanpooling. Determine if there is a concentrated level of interest in vanpooling originating in one area or corridor.

5. If the level of interest is strong, bring the potential riders together to:

- discuss the benefits of vanpooling
• discuss possible route, pick-up points, work schedules
• discuss the fare structure
• determine driver(s)
• discuss any company sponsored benefit (subsidy, free parking, etc.)
• discuss vanpool type (owner-operated, company sponsored or third party lease)

6. Determine type of vanpool; employer sponsored, third party provider or owner operator. Secure vehicle(s).

7. Determine vanpool fares.

8. Complete driver qualifications and medical screening.

9. Arrange for insurance and adequate maintenance.

10. Set the vanpool rules.

• Determine wait time at stops.
• Determine procedure to notify driver of days when you won’t be a rider due to vacation, illness, etc.
• Determine hours of operation, schedule to arrive 5 to 10 minutes early to allow for unforeseen delays.
• Determine policies for the radio, eating on the van, etc.

11. Begin vanpool service.

12. Monitor and evaluate your program. Utilize your annual survey for quantifiable results. Monitoring can include requiring vanpool drivers to provide you with a copy of their monthly log sheets, and/or parking lot counts.
D. TRANSIT PROGRAMS

Public transit provides practical transportation at a low cost. Transit systems in the Sunnyvale area include bus, shuttles, commuter and light rail. Public transit is an essential part of our transportation system. Transit plays a particularly important role in serving peak period travel demands associated with the commute and school trips. Transit also provides basic mobility for people who do not have an alternative. For many commuters, transit is the preferred choice of travel during the peak periods because commutes are more relaxing with someone else driving and faster in HOV or dedicated rail lanes.

Do not rule out transit if the nearest stop is more than 1/4 mile from your work site. Look for opportunities to connect employees to transit via a shuttle program, by advocating for a transit route change to serve your work site, or by encouraging bicycles to be allowed on buses (to travel the remaining distance).

Developers can incorporate site amenities such as transit shelters, transit stops, or space for on-site transit pass sales that will encourage transit as well as provide transit subsidies for tenants.

1. Transit pass subsidy. Developers and/or employers can subsidize transit passes. Providing financial incentives by partially or fully subsidizing transit passes makes this choice more attractive. An employer can provide up to a $65 per month tax-free transit subsidy. The varying bus and train systems in and around Sunnyvale are key to reducing the number of cars on the roads.

   a. Commuter Check - Commuter Checks are vouchers employees or tenants can use to subsidize transit passes or vanpool fares. Commuter Check Services Corporation (CSCS), based in Englewood, NJ, was formed in 1990 to operate transit fare discount programs as a self-supporting service in coordination with local public transit operators, metropolitan planning agencies and State transportation departments. Over 1500 Bay Area employers participate in Commuter Check.
b. Eco Pass - The Eco Pass is provided by Santa Clara VTA. Companies purchase passes annually for employees and receive a tax write off in return. Over 40,000 Silicon Valley workers are part of the Eco Pass program.

2. On-Site Transit Pass Outlet. Contact your local transit agency to see if your work site can be set up as a transit pass outlet. Providing transit passes for sale at the work site offers a convenient way for your employees to purchase transit passes. Use monthly number of passes sold to help you monitor your transit program.

a. Regional Transit Connection (RTC) - The Regional Transit Connection (RTC) is the transit ticket clearinghouse serving Bay Area employers. By delivering transit tickets to your work site, RTC enables you to provide your employees with tickets from eight Bay Area transit systems. You can choose to either sell them to your employees or offer them as part of a transit subsidy benefit. By creating a convenient way for your employees to buy transit tickets, RTC encourages the use of public transit. More transit usage means fewer cars on the road and a better quality of life for everyone in the Bay Area.

b. How does RTC work?

i. RTC will help you design a program that is right for your company. You decide which tickets to offer, how tickets will be sold, whether to subsidize ticket costs and how employees will pay.

ii. Submit a ticket order each month. RTC can assist you in determining what quantities and which tickets and passes best fit your employees' or tenants' transit needs.

iii. Each month, RTC staff will deliver your tickets by mail or in person. Deliveries are scheduled between the 17th and the 25th of every month.

iv. All tickets are held on consignment. Each month you pay RTC only for the tickets you sell.
RTC sells tickets from the following transit agencies:

- AC Transit
- Alameda-Oakland Ferry
- BART
- Caltrain
- County Connection
- Golden Gate Transit
- MUNI
- SamTrans

More than 160 companies in the Bay Area participate in the RTC program. Call MUNI Tickets to Go at (415) 923-6050 to speak with an RTC representative. Once you are signed up, your ticket order will be delivered to you each month.

3. Shuttle Programs. Developers can sponsor shuttle programs to provide convenient connections to transit and rail stops. In addition, shuttle programs which operate during the mid-day can reduce the need for automobile driving for work related travel and lunchtime trips.

4. Monitoring & Evaluation. Developers can monitor and evaluate your transit program in a number of ways. Include quantifiable results (number of transit riders, number of cars removed from work site) as well as qualitative results (i.e. commuter testimonials) whenever possible. Developers can monitor transit ridership by tracking pass sales, and or obtaining ridership counts from your transit agency.

E. PARKING PROGRAMS

1. Preferential Parking. Reserved, preferred parking spaces set aside for carpoolers can be an incentive for employees to join a car and vanpool or drive an alternative fuel vehicles. These spaces are typically the best spaces in the parking lot, close to the building, in the shade or in a covered location. Use your preferential parking program to help monitor car and vanpool participation.
Developers can implement preferential parking or paid parking programs at leased buildings through property management; developer/occupants can implement this program on-site for their employees.

To implement a preferential parking program:

a. Designate premium parking spaces for registered rideshare (carpool/ vanpool/alternative fuel) vehicles only. Stripe the parking spaces and sign them reserved carpool/vanpool.

b. Numbering the spaces helps with monitoring the program. However, some programs will simply set aside a certain number of reserved preferential spaces and not actually assign a specific spot to the participant.

c. Register carpoolers/vanpoolers and alternative fuel vehicles and assign parking spaces. Be sure to obtain the names, telephone numbers/extension of the participating person. Also list make, model and vehicle license plate numbers.

d. Provide each participant a placard to hang from the rear view mirror or place on their dashboard in order to identify the vehicle as a carpool/vanpool or alternative fuel vehicle. If assigned parking spaces are designated, clearly mark the space number of the placard as well.

e. Monitor the preferential parking spaces to ensure that the spaces are used by car and vanpoolers and alternative fuel vehicles.

   i. Ask other employees to report vehicles that are illegally parked in the preferential parking spaces.

   ii. If applicable, have on-site security monitor the preferential parking spaces as part of their daily rounds. Provide the security department with a roster of registered vehicles per space. Have the security guard monitor for proper preferential parking placards.
iii. Spot check the parking lot personally, by conducting random walk through checks.

iv. Periodically update the preferential parking registration forms to ensure that the participants are still active and that current vehicle information is reported.

v. Develop a project-wide parking policy. This policy should outline the rules of the parking lot, describe the preferential parking program, and establish procedures to address parking lot misuse. Many preferential parking programs will ticket and tow (at the employee's expense) violators of the parking policy.

2. Paid Parking. Parking costs can be the most influential factor in encouraging alternative mode use. Reduced cost of parking for carpools and vanpools is an incentive for people to choose these commute modes. Propose that your company implement discounted or free parking for carpools and vanpools. These parking stalls should be located close to lot entrances or elevators and be clearly marked.

3. Parking Cash Out. Federal legislation included in the Transportation Efficiency Act-21 includes a Commuter Choice Benefits package. Part of the Commuter Choice Benfits Package allows for employers to establish a parking cash out program. Parking cash out allows employees to choose to cash out the value of employer-provided parking (up to $175 per month/$2,100 per year) forego parking, and receive the taxable cash value of the parking, or receive a tax-free transit or eligible vanpool benefit up to $65 per month.

Cash out provides an incentive for employees to try other commuting alternatives. The employer transfers its expenditure for the parking space, assuming it is leased, to a direct payment to the employee. If the employee accepts the cash value rather than a tax-free transit or vanpool benefit, then the employee also incurs payroll and income taxes on the amount. The employer only incurs payroll taxes on the cash value provided.
This additional compensation will allow the employee to finance other commuting modes that are not considered qualified transportation fringe benefits, such as walking, bicycling, carpooling, roller blading, or other means of commuting to work. Reducing employee demand for parking can free up parking spaces for customers, permit employers to use the space for other purposes than parking or remove the need to build expensive new parking facilities.

F. PEDESTRIAN PROGRAMS

Walking to work is often overlooked as an alternative mode of transportation. By walking, commuters help reduce traffic congestion and air pollution. Walking is great exercise for a variety of fitness levels and does not require expensive equipment.

Developers can provide physical improvements such as pedestrian pathways around the property to help promote a walking program. Developers who also occupy the project can implement a pedestrian program for their employees.

Program Implementation:

1. Explore the immediate area so that you will be able to assist walkers in plotting their routes. Consider safety and convenience of the commuter including properly lighted sidewalks and paths designed for pedestrian use.

2. Determine interest in a walking program. Analyze your survey data to identify employees who are interested in walking and/or employees who live relatively close to the work site (under 3 miles). Since the average person walks about 3 m.p.h., suggest that commuters allow 20 minutes travel time per mile.

3. Determine what components or strategies you can include in your walking program. Can you provide incentives such as free walking shoes, or prizes. Do you have a Guaranteed Ride Home program, and are walkers eligible.
4. Market your walking program. Consider starting a walking club or help match walkers with fellow walking employees in a buddy system. Utilize your company’s communication mediums to help get the word out.

5. Check in with your walking employees. Are there program elements that could be improved? Are walking paths on-site connected to the sidewalks. Are there suggestions you can pass along to local jurisdictions for improvements to cross walks, sidewalks and other safety considerations in the area surrounding your work site?

6. Monitoring and evaluating your walking program can be done through your annual Commute Mode Survey. You can also observe walkers coming onto the work site. Questions could be added to the baseline survey such as: What would encourage you to walk to work?

G. BICYCLE PROGRAMS

Bicycle commuting can be fun! Bicycle commuting lowers commute costs, is environmentally friendly and can incorporate exercise into your commute. While bicycle commuting typically is targeted at employees living within 0 to 10 miles of the work site, serious bicyclists will commute much farther.

Establishing a bicycle program can demonstrate your company’s interest in your employees’ well-being, reduced traffic congestion and energy consumption, a concern for the environment, and reduced demand for parking space and expense. Ten to 15 bicycles can park in the space of one automobile parking space! Bicycling is a zero emission choice, directly reducing air pollution by eliminating vehicle trips.

Cyclists save money by using less gas, reducing vehicular wear and tear, and eliminating automobile parking costs. Sometimes, automobile insurance costs may be lower due to reduced mileage on their personal vehicle. Bicycle parking is generally free or very inexpensive. Cyclists also benefit from the exercise during their commute. A 180-pound man cycling at 15 m.p.h. burns almost 10 calories per minute.3

Developers can provide the physical amenities such as bike lockers, bike racks, showers and clothing lockers that will help promote bicycle commuting. Developers who are also the tenant of the building can implement bicycle commute programs for their employees.

Program Implementation:

1. Contact the City of Sunnyvale Public Works Department or RIDES for Bay Area Commuters for a bicycle map of the Sunnyvale area.

2. Conduct a site check to identify the availability of bike lanes, bicycle storage including bicycle lockers and racks, showers and lockers at or near your work site. If showers and lockers are not available on site, identify a location where employees can store clothing and personal items.

3. Check with the local transit agencies to determine their bicycle policy. The option of completing a trip using a combination of bicycling and transit allows for more flexibility.

4. Determine the bicycle commuting interest of employees using your Commute Mode Survey.

5. Determine what other programs that you offer that will compliment your bicycle program. Do you have a Guaranteed Ride Home program? Can you provide incentives to bicycle commuters?

6. Tap into experienced bicycle commuters to buddy-up with those who would like to try commuting by bike.

7. Market your bicycle program. Use a variety of methods. Hold a bicycle commuter brown bag. Bring in a local bike shop to talk about bicycle commuting, safety, and maintenance.

8. Help employees plan their commute route using the City of Sunnyvale bicycle map. Suggest that they make a trial run to determine how long it will really take to commute to work.

9. Monitor and evaluate your program. You can monitor and evaluate your bicycle commute program in a number of ways. Utilize your annual commute mode survey to quantify the
number of bicycle commuters. Because bicycling does not produce emissions, it is an excellent mode to highlight the positive impacts to air quality.

H. PROMOTIONAL PROGRAMS

A developer can implement many of these promotional programs through their Transportation Coordinator or property manager. Developers who are also tenants can implement all of the promotional programs.

1. New Employee Orientations. Add a section in your employee handbook or new employee orientation to introduce your company’s TDM Program to new hires. Incorporate TDM benefits and tax incentives into the presentation of your company’s overall benefits. It is also an opportunity to request a carpool and vanpool matchlist, transit information, bicycle commuter map or other TDM information.

2. Flyers, Posters and E-mails. A flyer, poster and/or e-mail campaign is one way to keep the TDM message in front of your employees on a regular basis. Periodically rotate posters and flyers or send new e-mail messages promoting alternative modes of transportation as a better way to commute.

3. Transportation Fairs. A transportation fair can be a fun way to bring variety of alternative mode information to one location. Add some food, music, speakers and/or prizes and now you have an event! A transportation fair allows employees to ask questions and gather information in a non-threatening environment. Transportation fairs are most successful when held in a location with high foot traffic. Cafeterias and break rooms are ideal. Combining a transportation fair with a benefits fair or a health and safety fair has also proven to be successful because of high attendance rates. Having food at the fair will ensure attendance, because everyone likes free food!

4. Newsletter Articles. Incorporate articles about TDM in a company or department newsletter. Utilize this space to advertise for car/vanpool riders wanted along certain commute routes. Incorporate commuter testimonials into your articles to provide real life examples.
5. Commuter Information Center. Create a Commuter Information Center location by developing a bulletin board or designating a central location to contain commuter information (on-site cafeterias are an excellent location for commuter information). Provide transit system maps, schedules, carpool information, advertise available vanpool seats, etc. Also include construction information, summer driving tips, and other helpful information.

6. Transit Field Trip. Help orient new transit riders by taking them on a transit field trip. This activity will help them become familiar with the local route, fare collection method, transfer points and other operational features. This also provides for a non-threatening opportunity for employees, particularly those not familiar with riding the bus, to ask questions.

7. Free Trial Rides. Work with your local transit agency to purchase or obtain trial ride tickets. Provide these to employees who are interested in trying transit. This provides them a free opportunity to try out the system.

8. Transit Riders Guide. Develop a public transit guide for your work site. Include transit routes and schedules that service your work site, and locations to purchase transit passes. Make sure to include any program that your company has that can benefit a transit rider, such as a subsidy program or guaranteed ride home program.

9. Bike to Work Day. This is a fun way to introduce bicycle commuting to your employees. If an area wide event is not already planned, implement your own Bike to Work day for your employment site. Ask experienced employee bicyclist to volunteer to lead “pedal pools” during the commute time. Designate pick up points along designated bicycle routes. Offer participating employees free coffee and muffins in the morning.

10. Bicycle Riders Guide. Develop a bicycle riders guide for your work site. Include local bike routes, bicycle locker and rack locations, and other pertinent information. If your local transit agency has a bicycle policy for taking bikes on buses or trains include this as well. Make sure to include any program that your
company has that can benefit a bicycle commuter, such as a guaranteed ride home program.

11. Guaranteed Ride Home. Many commuters will not rideshare because they have to work unexpected overtime or fear not being able to get home in an emergency. By offering a guaranteed ride home to ridesharing employees, you can eliminate that barrier. Any employer can set up a guaranteed ride home component whether it is a formal program utilizing transportation service providers (taxi or rental car) or and informal policy using company vehicles and/or designated employees provide rides home in emergency situations.

I. TELECOMMUTING

Telecommuting is a way to bring the job to the person rather than the person to the job. This program can eliminate the commute trip entirely if the employee is telecommuting from his/her home. If a neighborhood telecenter is being utilized, this strategy can significantly reduce an employee’s commute time and distance. Telecommuters may switch from solo driving to walking, cycling, or transit to access neighborhood or satellite centers close to home. Or conversely, they could switch from alternative modes to solo driving for the days they do not telecommute, if part-time carpool or vanpool use is not an option. There is an ongoing debate, however, that the public benefit is not so clear as telecommuting is likely to contribute to sprawl.

Telecommuting is not the answer for everyone. Adjustments must be made to create a workable telecommuting environment for both your company and your employees.

The developer of a project can implement site measures, such as installing fiber optic wiring and extra phone lines to make sure the site is prepared for teleworking. If the developer is also the tenant of the project then they can implement an employer-based telework program. In order to utilize telecommuting as a measure in a Transportation Demand Management Plan you must be able to quantify the impact the telecommuting program has on the building size and/or building occupancy and the number of vehicle trips reduced as a result of the telecommute program.
Employer Benefits:

1. Increased Productivity: A productivity increase by as much as 20% was measured by Bellcore for telecommuting employees. Also, telecommuters have the opportunity to work at their own personal “peak” times, rather than standard hours.

2. Decreased Absenteeism: Employees are able to work in spite of minor illness, car trouble, or family/household emergencies.

3. Decreased Turnover: Employees see telecommuting as a job benefit, thus increasing morale and motivation. Turnover, recruitment costs and training expenses can be reduced.

4. Competitive Advantage in Recruitment: A telecommuting program is an innovative addition to an employee benefits package. You can tap into new labor markets (handicapped, elderly, and geographically remote areas) by incorporating telecommuting programs into your company’s structure.

5. Decreased Overhead: Telecommuting can decrease the amount of office space required by employers. To facilitate telecommuting, employers may establish satellite offices in less costly office space in outlying areas. Fewer employee parking spaces are needed at the main office, resulting in significant savings. This can offset potential capital outlay for the purchase of home equipment.

Program Implementation:

1. Determine employees and/or job classifications that would be good candidates for telecommuting. Managers and employees wishing to participate in your telecommute program should consider:
   a. Isolation from co-workers;
   b. Less visibility;

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4 TDM Case Studies and Commuter Testimonials, p. 69.
c. Lack of on-site support services;
d. Loss of living space
e. Increased at-home costs;
f. Distraction in the home environment;
g. Monitoring of actual work hours;
h. Union, regulatory and legal parameters; and
i. Start-up operating costs.

2. Decide whether your Telework program will be home-based or located at a neighborhood site(s).

3. Work with supervisors to develop realistic performance measures. Working cannot be defined as merely “being at work.” Managers must determine the amount of work that can reasonably be accomplished within an 8-hour period and communicate those expectations to the telecommuting employee. Monitoring of telecommuters can be arranged by telephone, fax, and even occasional in-person visits.

4. Determine equipment needs and who will pay for capital costs/monthly expenses.

5. Determine Telework schedule. Will the employee work full time or part time from a remote location or from home?

6. Monitor and evaluate your program. Monitoring and providing the results of this program is especially important because employees are not visible during work hours. Monitoring should be done through managers or supervisors who are familiar with the telecommuters productivity and work habits. In addition to monitoring the impact of telecommuting on productivity, you should quantify the impact of your Telework program as part of your annual Commute Mode Survey. Count trips and/or Vehicle Miles Traveled (VMT) reduced as a result of your Telework program.
J. ALTERNATIVE WORK SCHEDULE

An Alternative Work Schedule program (compressed work week, flextime, staggered hours) can be beneficial in a number of ways. It can provide versatility, enabling employees to more conveniently use rideshare options, and avoid traffic congestion and transit crowding. It can also be an attractive employee recruitment tool that allows employees to work around childcare or school schedules. Employees tend to view Alternative Work Schedule programs as a highly desirable benefit.

From a developer perspective, the following things need to be taken into consideration if the future tenant would like to implement an alternative works schedule:

- Can building heating, cooling, and ventilation systems be adjusted for longer hours?
- Can security hours be adjustment?
- Will parking policies need to be changed to ensure parking for all shifts?
- Is building access flexible?

If the developer is also the project tenant, they may choose to implement an Alternative Work Hour program for their employees. Alternative Work Hour program elements:

- Flextime
- Staggered Work Hours
- Compressed Work Week

It is not necessary to provide all three to employees; you may choose any or all of these to incorporate into your overall Transportation Demand Management (TDM) program.

TIP - To maximize alternative mode use, offer or give preference for alternative work schedules to employees who use or will use an alternative to the Single Occupant Vehicle (SOV). Keep in mind that changing employees’ work schedules has the potential to break up car and vanpools.
1. **Flextime**

A flextime program permits employees to set or modify their arrival and departure times. Flextime policies usually state that the flexibility in scheduling must not conflict with work flow. Most flextime programs establish a core period of time in which all employees must be present. Employees then can adjust their start and end times around this core period. Supervisors usually retain a significant degree of control over the actual scheduling limits. This could mean that some departments in your company may offer the option of flextime, while others do not.

Flextime can positively influence travel behavior by allowing employees to adjust their work schedules to meet their transportation needs (i.e., adjust to match a bus or vanpool schedule).

*TIP - Some research suggests flextime works against co-workers carpooling, but may facilitate forming pools with neighbors, other companies, etc.*

2. **Staggered Work Hours**

Under a staggered work hour program, work units or groups of employees select, or are assigned, different starting and ending times for their work day. These working hours are usually staggered at 15 to 30 minute intervals. A staggered work hour program can focus on the work unit, or can be based on spreading employee arrival and departure times company wide.

If the goal of the program is to relieve localized traffic congestion, a major schedule shift change may be necessary. This can also lessen impacts on the surrounding neighborhood by dispersing traffic over time.

3. **Compressed Work Weeks**

A compressed work week allows employees to work longer hours, but shorter weeks. The shortened work week and shifted hours may help employees avoid rush hour traffic and reduces the number of commute days. Employees also have an
additional day for leisure activities, personal business and family time. Compressed work week systems can include:

a. "4/10" schedule, in which employees work four 10-hour days/ per week. Employees typically are divided into two groups. One group works Monday through Thursday, the other group works Tuesday through Friday.

b. "3/36" schedule, in which employees work three 12-hour days/ per week. This plan allows for days off other than just Monday or Friday. Employees are divided into five groups and each group is assigned different days off.

c. "9/80" schedule, in which employees work eight 9-hour days (72 hours) plus one 8-hour day for a total of 80 hours over two weeks. This program allows employees to have one day off every two weeks.

TIP - Encourage alternative mode use in conjunction with a compressed work week schedule by giving ridesharing employees first choice of days off.

Program Implementation:

- Determine what elements you will incorporate into your Alternative Work Hours program.

- Determine the rules for each element.

5. Flextime:

Core hour approach - For example: employees may choose when they come to work as long as they work 8 hours a day and all employees are working between 10:00 a.m. and 3:00 p.m.

Case by case basis - Employees change their start and end times to fit their alternative mode choices; the new schedule is consistent day to day. For example the old schedule was 7:30 a.m. to 4:30 p.m. and they needed to adjust it to 8:30 a.m. to 5:30 p.m. to carpool.

Employees flex their own hours to meet business and personal needs as long as 40 hours are worked in a 5 day time period.
6. Staggered Hours:

Starting times are staggered in intervals. Example: first start time is 6:00 a.m., with additional start times every 15 minutes.

Work period assignments can be determined by some designated standard, such as by building, floor, or department.

a. Employees can sign up for desired schedule slot.
b. Pre-assign schedules for employees and give out new schedules.

7. Compressed Work Week:

Are you going to implement one or a combination of a 9/80, 4/40 or 3/36 work schedule?

Who gets to participate: Only alternative mode users? Everyone? Determined by lottery?

a. Check logistics:

Check building availability - Does the building(s) access need to be modified? In some cases employees may need special entrance privileges (given keys to front door, electronic cardkey, etc.).

b. Supply employees interested in the program with written guidelines and explain that schedule flexibility is dependent upon satisfactory work coverage and completion.

c. Implement new flexible schedules where appropriate. Document new employee schedules and provide to others if applicable (personnel manager, payroll manager, etc.).
III. IMPLEMENTATION MECHANISMS

Conditions of approval can require a developer of a project to implement a Transportation Demand Management Program. To ensure the success of a Transportation Demand Management (TDM) program it is important that the developer put mechanisms into place to guarantee the perpetuity of the TDM program.

Two examples of mechanisms that can be utilized to guarantee the perpetuity of the TDM Program are covenants, conditions and restrictions and tenant leases.

A. Covenants, Conditions & Restrictions (CC&Rs)

Incorporating TDM program requirements into the CC&Rs of a property ensure that the TDM program runs with the land.

Sample C.C.&R. language:

Transportation Demand Management Program. The Property (and each and every portion thereof) and every Owner and Occupant thereof shall be subject to and shall abide by and satisfy each and all of the provisions and obligations contained in that certain Transportation Demand Management Plan for the (fill in parcel) approved by the City of Sunnyvale (enter date), applicable to the Property and/or each Parcel therein, including any obligations to provide funding and resources to implement the Transportation Demand Management Plan, and compliance with any applicable requirements of any condition of approval enacted by the City of Sunnyvale applicable to the Property or to the City of Sunnyvale generally.

Mutuality, Reciprocity: Runs with Land. All restrictions, conditions and covenants contained herein, by reference or otherwise, are made for the direct mutual and reciprocal benefit of each and every portion of the Property; shall create mutual, equitable servitudes upon each portion of the Property in favor of every other portion; shall create reciprocal rights and obligations between the respective Owners of all portions of or interests in the Property and privity of contract and estate between all grantees of said portions or interests therein and their Successors; and shall, as to each Owner and its Successors, operate as covenants running with the land for the benefit of all other portions of the Property. The Property, and every part thereof or interest therein, shall hereafter be held, transferred, sold, leased conveyed and occupied
subject to the covenants, conditions and restrictions herein set forth, each and all of which is and are for, and shall ensure to the benefit of an shall apply to every Owner and/or Occupant thereof, and their Successors.

B. Lease Requirements

Incorporating TDM program requirements into tenant leases ensures that occupants of buildings with TDM requirements that are part of their conditions of approval coordinate and cooperate with the building owner and/or property manager to implement TDM programs.

Sample lease language:

Traffic. Tenant hereby agrees to designate one of its employees to act as a liaison with Landlord to facilitate and coordinate such programs as may be required by governmental agencies to reduce the traffic generated by (fill in property name) as required by the City of Sunnyvale as part of conditions of approval and to facilitate the use of public transportation.
IV. MONITORING AND EVALUATION

Monitor the program closely for the first several weeks and make any necessary adjustments. A six month trial period should be sufficient to fairly assess the appropriateness of an alternative work schedule program for your company.

Developers will be responsible for an annual status report to the City of Sunnyvale. Monitoring and evaluation of the TDM programs a developer implements will need to be incorporated into this status report. The City will base TDM program compliance on the percentage of total employees who used transportation alternatives, not the percentage of survey respondents. Survey non-respondents will be assumed to be driving alone and will count against the compliance rate. It is important to conduct as thorough of a survey as possible.

Commute Mode Survey. Use your baseline data as a measuring stick. After six months, re-survey your employees to evaluate the impacts on your mode split. Ask additional attitudinal questions specific to alternative work schedules to evaluate how employees feel about the program. For example, ask questions like:

- Did you change your drive alone behavior because of the Alternative Work Hour program?
- Did you know that you could participate in a flextime program if you commute to work using an alternative to the SOV?
  - If no, would you use an alternative transportation mode if you could flex your work schedule?

A. WHY MONITOR AND EVALUATE PROGRAMS?

Developers will be responsible for submitting an Annual Status Report to the City of Sunnyvale. Monitoring and evaluation of the TDM programs that a developer implements will need to be incorporated into this status report.

It is imperative that you monitor and evaluate your program. For developers, monitor and evaluating your TDM program will allow you to present the effectiveness of your program to the City of Sunnyvale and to the Bay Area Air Quality Management District. In addition, it
allows the developer to track programs to see which programs are most effective. By tracking programs, it also provides the developer information to adjust programs in future years to make sure that their investment in TDM is paying off.

Finally, sharing the success of your TDM program with the City of Sunnyvale provides an opportunity to promote your company’s “Good Neighbor” policy. Your successful TDM program will positively impact those who live and work in Sunnyvale by reducing traffic and improving air quality in the community.

When alternative mode commute trips are increased and drive alone commute trips are reduced your program is effective.

1. For the most valid program evaluation, specific baseline data (employee method of commute and attitudes towards using alternatives) should be collected; conduct a baseline survey before you begin your TDM Program (see survey on following page and survey tips sheet on page 37).

2. You must survey every year to collect data required for the Annual Status report. Analyze your new data and compare it to the previous survey results to determine progress and potential modifications needed to improve your program. If you can, ask alternative mode users when they switched to an alternative and from what mode.

3. Add questions to the baseline survey tool regarding specific components of your TDM Program. These answers will help you modify your program to maximize your program success.

4. Air quality benefits and cost effectiveness can also be evaluated. Providing these results can be very useful when trying to obtain or retain funding for your TDM Program. Cost effectiveness is important in determining the overall costs and benefits of the program and to assess the most cost effective strategies. Bottom line numbers can help you evaluate which programs are most valuable to your TDM program. Contact the Bay Area Air Quality Management District for assistance in evaluating air quality benefits.

The following pages provide the tools needed to evaluate a TDM Program:
a. Baseline Survey  
b. Survey Tips Sheet  
c. Sample Cover Letter  
   (accompanies survey)  
d. Cost Effectiveness Information

RIDES for Bay Area Commuters can also help you with your survey. Linda Furnas is the RIDES Commute Services Representative for Santa Clara County. She can be reached at (510) 273-2069.
### BASELINE SURVEY

#### How far from work do you live? (one way mileage)

- 0 - 9 miles
- 10.0 - 14.9 miles
- 15.0 - 19.9 miles
- 20.0 - 21.9 miles
- 25.0 + miles

#### What is your home zip code?

#### Do you work? Full time ( )
Part time ( )
Compressed work week ( )

#### How did you travel to work each day?

<table>
<thead>
<tr>
<th>Commute Mode</th>
<th>Reasons for Not Commuting to worksite</th>
</tr>
</thead>
<tbody>
<tr>
<td>MON</td>
<td>1 Drive alone to worksite</td>
</tr>
<tr>
<td>TUE</td>
<td>2 Motorcycle/moped</td>
</tr>
<tr>
<td>WED</td>
<td>3 Carpool (# in pool)</td>
</tr>
<tr>
<td>THU</td>
<td>4 Vanpool (# in pool)</td>
</tr>
<tr>
<td>FRI</td>
<td>5 Public transit</td>
</tr>
<tr>
<td></td>
<td>6 Walk</td>
</tr>
<tr>
<td></td>
<td>7 Bicycle</td>
</tr>
<tr>
<td></td>
<td>8 Telecommuted</td>
</tr>
<tr>
<td></td>
<td>9 Reported to another worksite</td>
</tr>
<tr>
<td></td>
<td>10 Traveled on business</td>
</tr>
<tr>
<td></td>
<td>11 Regular day off</td>
</tr>
<tr>
<td></td>
<td>12 Compressed work week day off</td>
</tr>
<tr>
<td></td>
<td>13 Other day off (vacation, sick)</td>
</tr>
</tbody>
</table>

#### A. If you normally use an alternative mode, what motivated you? (√ one-three)

- Cost savings
- Stress reduction
- Guaranteed ride home program
- Time savings
- Convenience
- To help improve our air quality
- Save wear & tear on personal vehicle
- Cash incentive program
- Preferential car/vanpool parking space
- Flextime program
- Showers & clothing lockers
- Other ________

#### B. Before you used an alternative mode, how did you get to work? ________

(Pick the number from question 4 that matches your previous commute mode and enter in the space provided.)

#### Please Answer #6, #7 & #8 if you DRIVE ALONE to work:

#### What is your main reason for driving alone to work? (√ one)

- Need my car at work for company business
- Need my car at work for personal business
- Parking is free or inexpensive
- Need to run errands before or after work
- Prefer to drive my own car
- Need to transport children
- No reasonable transit option
- Transit costs too much
- Safety concerns
- Cannot get home in an emergency
- Live close to work
- Don't have anyone to ride with
- Don't like to depend on others
- Irregular work schedule
- Anything else takes too much time
- Poor bicycle and pedestrian access
- Other ________

#### What would encourage you to use an alternative to driving alone?

- Help finding carpool/vanpool match
- Change in work shift/Flexible work schedule
- Monthly cash subsidy for ridesharing
- Guaranteed ride home program
- Secure, convenient bicycle parking
- Prizes, drawings, time off
- Other ________

#### If you normally drive alone, would you consider commuting using an alternative mode on an occasional basis? Yes  No

If yes, what modes?

- Carpool driver
- Carpool rider
- Vanpool drive/ rider
- Walk
- Bicycle
- Other ________
- Public transit
C. SURVEY TIPS

The statistical reliability of a survey depends in part upon the response rate (number of correctly completed surveys compared to number of distributed surveys). Remember survey non-respondents are assumed to be driving alone and will count against the compliance rate. It is imperative to conduct a thorough survey. Your survey will have a higher response rate if you do the following.

1. Copy/print surveys onto colored paper (light yellow or light green works best).

2. Attach a cover memorandum to each survey (or copy to the backside of the survey to consolidate) requesting their cooperation by completely filling out the survey. The cover memorandum should be signed by someone at the senior management level (see sample cover letter page 39).

3. Let employees know that their responses are strictly confidential.

4. Call a meeting during the survey week where employees can fill out the surveys and you can answer any questions they may have. You may also wish to offer refreshments as they are filling out the survey. Ask employees to hand in the survey to you prior to leaving the meeting.

5. One department could challenge another department to see who can obtain the highest response rate.

6. If possible, names of employees who have completed their survey could be placed into a prize drawing. A prize (for example, a lunch for two) could be given to the employee whose name was drawn.

7. Offer one hour of administrative time off for filling out the survey, or some other incentive.

8. Personally collect the surveys if at all possible.

NOTE: Have your survey translated into non-english languages if significant number of employees need it.
D. SAMPLE COVER LETTER
(ON YOUR COMPANY LETTERHEAD)

DATE:

FROM: IDEALLY SOMEONE IN UPPER MANAGEMENT

RE: EMPLOYEE TRANSPORTATION SURVEY

During the week of INSERT DATES, COMPANY NAME will be disseminating Employee Transportation Surveys to assess current commuting patterns of all personnel. Survey results will be used to adjust or to implement employee programs that benefit you the employee, our company and the community; your input is very important. All individual responses will be kept confidential.

Our goal is to achieve a 100% response rate. Optional: If your company is providing a prize or incentive, you will want to acknowledge that here.

Please make every effort to complete this survey and return it to INSERT NAME(S) by INSERT DUE DATE.

Should you have any questions or need assistance, please contact INSERT CONTACT NAME/PHONE/EMAIL.

Thank you for your cooperation.
E. COST/BENEFIT OF YOUR TDM PROGRAM

You will need to keep track of both capital costs and operating costs. Examples of capital costs include computers and electronic equipment. Since electronic equipment typically has a 5-year life, your annual cost for this equipment should be one-fifth of the total cost. Examples of operating costs are salaries for program managers, commute alternative subsidies and incentives, and marketing costs. If the TDM Program manager position is not full-time, staff hours devoted to the TDM Program will need to be tracked. Cost savings for the employer can be subtracted from program costs. Savings may include reduced leased parking costs or the need to construct additional parking as a result of fewer solo drivers and reduced office space costs for an extensive telecommute program.

Perhaps more difficult to track, but never the less important would be reduced tardiness by employees, reduced absenteeism, and reduced employee turnover. All three behaviors have been attributed to successful TDM programs. However, the information is usually anecdotal rather than scientific.

Analyzing Other Benefits

Your company's TDM Program has produced other benefits besides improved air quality. These should not be excluded from an analysis of the program.

1. The program reduced peak-hour vehicle trips, which reduces gasoline consumption and helps reduce congestion in the region.

2. The program also saved alternate mode commuters money -- not driving to work reduces employee parking and vehicle operating costs. (Costs to drive alone = $0.41 per mile - costs include gas, oil, maintenance, tires, insurance, and lease/purchase price)

3. An effective TDM Program is often considered a valued benefit that attracts job candidates and lowers employee attrition. Related questions on an employee survey can often solidify this value of the TDM Program.

4. Include other benefits of the TDM Program specific to your program and your company/work site.

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V. COMMONLY ASKED QUESTIONS AND ANSWERS

A. CARPOOL

Q. Who drives the carpool?
A. Each carpool group decides their own rules. In some carpools, the responsibility of driving is rotated amongst members of the carpool. In other cases, some members of the carpool prefer to ride only.

Q. What if I need my car during the day?
A. Plan ahead and be the driver of the carpool on the days that you need your car. If you need your car frequently, look for a carpool partner that prefers to ride only.

Q. Who pays the cost of the commute?
A. Each carpool group sets their own rules. If you are sharing the responsibility of driving you do not need to split expenses. If one person in the carpool is the designated driver or drives the majority of the time, figure out what an appropriate share of the commute cost is for each person in the carpool.

Q. What if I have a mid-day emergency or need to work unexpected overtime?
A. Be prepared. Have a plan that addresses these situations before you experience one. Many companies offer their employees a Guaranteed Ride Home program that provides them with a ride home in case of an emergency or unexpected overtime. If a Guaranteed Ride Home program is not available, set up a contingency plan with your carpool partner(s) and/or co-workers.

Q. Do I have to carpool everyday?
A. No. A carpool can be as flexible as you want it to be.
Simply set up the rules and coordinate with your carpool members. Carpooling once or twice a week can help reduce traffic congestion and air pollution.

Q. Will my insurance adequately cover my carpool?

A. Check with your insurance company to ensure that you have adequate coverage. Also ask if they offer reduced rates if you are not using your car everyday to commute to work.

B. VANPOOL

Q. How is the vanpool fare determined?

A. The only true way to determine cost is to run the expense numbers based on vanpool type, number of riders and mileage. If it is an employee owned or company sponsored van make sure to include operation and maintenance costs. Third party providers will be able to help you with these numbers. For employee actual cost, factor in any employer sponsored tax-free subsidy for fare or parking.

Q: What kind of commitment do I have to make to vanpool?

A: Typically vanpools operate on a month to month basis, requiring a 30 day notice (minimum) prior to leaving the vanpool.

Q: What happens if the regular driver is not available to drive?

A: Each vanpool needs to have back-up drivers to fill in when the regular driver is not able to drive due to vacations, sick leave or travel/overtime commitments for work. If no driver is available for the van for a particular day, vanpool riders typically coordinate carpools.
Q: Does a vanpool provide door to door service?

A: Each vanpool group sets up its own rules. Some vans will provide door to door service, however most will schedule a set number of pick-up points.

Q: What is the responsibility of the driver?

A: The driver is responsible for operating the vehicle, making the scheduled stops, arranging for the vehicle maintenance, fueling and fare collection. In return, drivers typically ride for free and may also get a set number of miles per month that they can use the vehicle for personal business.

Q: What if I have a mid-day emergency or need to work unexpected overtime?

A: Be prepared. Have a plan that addresses these situations before you experience one. Many companies offer their employees a Guaranteed Ride Home program that provides them with a ride home in case of an emergency or unexpected overtime. If a Guaranteed Ride Home program is not available, set up a contingency plan with your co-workers. Keep a transit schedule on hand to identify if you can take a later bus or train home.

TRANSIT

Q: Do I have to take transit everyday?

A. No. You can be as flexible as you want it to be. Taking transit once or twice a week can help reduce traffic congestion and air pollution.

Q: Should I purchase a monthly pass or pay a daily fare?

A. Typically monthly passes become more economical than daily fares if you take transit at least 18 to 20 days per month.
Q. Can I include transit in my TDM program if the nearest transit stop is more than 1/4 mile from our work site?

A. Absolutely. First, some employees may not mind walking a little further -- a 1/4 of a mile is a rule of thumb measure. Secondly look for opportunities to make transit more convenient. Can you provide an employee shuttle between your work site and the transit stop? Also, talk to the transit provider(s) about the potential to adjust their route(s) to better serve your work site.

Q. What if I am out of shape?

A. Choose an easy pace, and you’ll find cycling no more strenuous than walking. Do a trial ride. Ease your way into better shape and maintain it once you’ve become a regular bicycle commuter.

Q. Won’t it take too long?

A. The average bike commuter travels 10 m.p.h. in traffic. In urban areas cycling generally takes less time than driving for trips of three miles or less, and about the same time for three-to five-mile trips. Or compare it to the time you spend exercising and commuting.

Q. Do you have to live close to work to bike?

A. If you live too far from work for a practical bicycle commute, consider cycling to the bus, transit, or a co-worker’s house and carpool. Or drive part of the way and bike the rest.

Q. Where can I park my bike?

A. With a little research, you can always find a bike parking solution. Some employers will let you bring your bike into the building. Stash your bike at work in a covered, secure place, like a closet or storage room. Existing bike parking may be available in nearby buildings or parking garages. If your employer doesn’t provide parking, make a formal request with other employees. Park outside, but use a good U-lock.
Q. **Do I need a special bike?**

A. If the bike is mechanically sound and fits correctly, you have a commute bike. If you can’t maintain it yourself, take it to a good bike shop. Remember that good maintenance is important when you rely on your bike to get you to work on time.

Q. **What if my work site does not have showers?**

A. Many bike commuters don’t find it necessary to shower at work. Commuting is different than fitness cycling and generally is not a sweaty affair. If you like to ride hard and get a good workout but can’t find a shower where you work, try a nearby health club.

Q. **How can I dress professionally and still ride my bike?**

A. Some bike commuters ride in their business attire, and still look good when they get to work. Most simply ride in causal or cycling clothing and change when they arrive. Some commuters keep several outfits at work, rotating outfits on days they don’t ride, or they take their clothes to a dry cleaner near work.

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D. **ALTERNATIVE WORK HOURS**

Q: **How does flextime impact forming carpools?**

A: Flextime can help facilitate carpool formation by allowing employees to adjust their work schedule to meet their carpool needs. However, if too many different flextime schedules are created, forming carpools within the company may be negatively affected.

Q: **Do staggered work hours and flextime provide air quality benefits?**

A: Not usually, because staggered hours or flextime by themselves do not result in actual trip reduction. In order
to benefit air quality, these programs must be implemented in conjunction with alternative mode use promotion.

Q: I have a very large company, will this program overburden my staff?

A: This program may initially require additional staff time. Once the program is up and running, staff time should not be impacted.

Q: Do staggered work hours and flextime reduce peak hour congestion?

A: Yes. By spreading out the peak period, traffic is dispersed over a longer period of time, thereby reducing congestion.

Q: What if the employee is needed and he/she is not there?

A: Put together a flow chart for all employees with instructions on who to contact if a particular person is out that day. In smaller offices the employee who is out may provide their home number to be contacted if necessary.

Q: How can I make sure productivity is not negatively impacted?

A: Monitor project schedules and deadlines and see if they are being met. Provide the results. In most cases productivity goes up.

E. TELECOMMUTING

Q: How will managers know that the employee is working and not doing other things while at home?

A: The telecommuting employee should have the same deadlines and productivity levels as if he or she were at
work. The answer will be self-evident; if deadlines are being met or not.

Q. How can a manager ensure that an employee who is telecommuting feels included in the team and/or department?

A: Schedule meetings and/or work days for telecommuters at the office. Make sure they are included in the communication loop for internal correspondence and e-mails.
TDM MATRIX
<table>
<thead>
<tr>
<th>Measure/Program</th>
<th>Developer Implemented</th>
<th>Developer as Tenant or Employer Implements</th>
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</tbody>
</table>
Reference/Resource List

The Hoyt Company assisted the City of Sunnyvale in preparing this TDM Tool Kit. They can be contacted at any time to answer questions or to provide creative ideas on TDM programs and services.

The Hoyt Company
801 K Street, 23rd Floor
Sacramento, CA 59814
(916) 448-2440

Contact: Wendy J. Hoyt (whoyt@ns.net)

LOCAL/REGIONAL ORGANIZATIONS

Commute programs can be money savers for both businesses and employees. Businesses may reduce on-site demand for parking and work space. Employees may reduce the monthly cost of their commute by avoiding frequent gas tank refills, and wear and tear on their cars.

Contact the following local agencies to learn more about public transit, carpooling, vanpooling, or bicycling in the Sunnyvale area.

Santa Clara Valley Transportation Authority (VTA)
3331 North First Street
San Jose, CA 95134-1906
Customer Service Phone: (408) 321-2300 or (800) 894-9908
Customer Service Fax: (408) 321-7535
www.vta.org

VTA provides bus service throughout the Sunnyvale, San Jose, Santa Cruz, and Dumbarton areas and light rail train service in the Santa Clara county area. Call the Customer Service Representatives for information about routes, schedules, fares or transfers.

Caltrain
P.O. Box 3006
San Carlos, CA 94070
Customer Service (800) 660-4287 or (650) 508-6200
Caltrain provides rail service throughout the Bay Area, from San Francisco to Gilroy. Call for information about routes, schedules, fares or transfers.
www.caltrain.com/caltrain/index.html
TravInfo
(408) 817-1717
www.travinfo.org
Up-to-date Bay Area travel related information about public transit, current traffic conditions, carpooling or vanpooling, park and ride lots, bicycling, etc.

Rides for Bay Area Commuters
1333 Broadway Suite 601
Oakland, CA 94612
(510) 893-7665 or (800) 755-7665
Find out how to join or start a carpool or vanpool, learn how to use transit, bicycles or your feet to commute to work.
www.rides.org

Association of Bay Area Governments (ABAG)
Mailing Address: P.O. Box 2050
Oakland, CA 94604-2050
(510) 464-7900
Fax: (510) 464-7970
www.abag.gov
This regional organization has information about commute programs.

Santa Clara County Wide Bicycle Advisory Committee
C/O Santa Clara VTA
3331 North First Street, Building B
San Jose, CA 95134
(408) 321-5725
Reviews transportation projects to ensure adequate bicycling facilities are included. Santa Clara County Bicycle Map is accessible via the website.

Silicon Valley Bicycle Coalition
(650) 965-8456
www.svbcbikes.org

Enterprise Vanpool
2950 Merced Suite 200
San Leandro, CA 94577
(510) 877-5451
www.vanpool.com
Leases vehicles for vanpools.
Bay Area Rentals
599 Post Street
San Francisco, CA 94102
(877) 202-8850 (toll free)
www.bayarearental.com/contact.htm
Leases vehicles for vanpools.
San Jose Bicycle Club
225 Pamela Drive, #226
Mountain View, CA 94040
(408) 287-SJBC
www.wenet.net/users/sjbc/
Find out more about bicycling in the San Jose area.

American Lung Association of San Francisco
2171 Junipero Serra Boulevard, Suite 720
Daly City, CA 94014-1980
(650) 994-5864
Fax: (650) 994-4601
www.lungusa.org
Information is available about clean air programs and promotions in Santa Clara County and the Bay Area.

Bay Area Air Quality Management District (BAAQMD)
939 Ellis Street
San Francisco, CA 94109-7714
Public Information and Education Department (415) 749-4900
Public Information and Education Department fax: (415) 749-5101
Websites: www.baaqmd.gov
www.sparetheair.org
Single occupancy vehicles pollute our air. Learn about the connection between automobiles and air pollution and how you can chose a commute to help Spare the Air.

Bay Area Partnership
www.mtc.dst.ca.us/projects/partnership/partner.htm
The Partnership works to improve mobility, air quality, and travel safety in the Bay Area.

Amtrak Capitol Corridor
www.eastbaytrain.org/default.htm
Service from Sacramento to San Jose through the East Bay

The City of Sunnyvale
Bay Area Rapid Transit (BART)
www.bart.com
PO Box 12688
Oakland, CA 94606-2688
(415) 989-2278
Train service though Alameda, Contra Costa, and San Mateo counties.

Public Works, City of Sunnyvale
www.ci.sunnyvale.ca.us/public-works/
Provides engineering, environmental, solid waste, traffic, and tree services to business and residents.

California State Automobile Association (CSAA)
Education and Safety Automobile Association
www.csa.com/about/education
Great links to local websites with transit, vanpooling, bicycling and rideshare information.

Bicycle Advisory Committee, City of Sunnyvale
www.ci.sunnyvale.ca.us/public-works/bac/
The Committee makes recommendations about bicycle and pedestrian projects in Sunnyvale.

Metropolitan Transportation Commission (MTC)
101 Eighth Street
Oakland, CA 94607
(510) 464-7700
Fax: (510) 464-7848
www.mtc.ca.gov/index1.htm
The MTC is the transportation funding and planning organization for the Bay Area.

ACE (Altamont Commuter Express Rail)
(209) 468-3026
Local rail service.

Dumbarton Express (AC Transit)
(510) 891-4882
Local transit.

Samtrans
(650) 508-6243
Local transit service.
VSPI (Van Leasing Organization)
(510) 877-5471
Lease vans for your vanpool.

Electric Automobile Association
(408) 746-5787
Learn more about electric vehicles.

PG&E Clean Air Vehicle
(408) 282-7164
Put a clean air car in your garage.

Clean Air Fuels Corporation
(408) 259-5710
Learn more about clean alternative fuels.

Pacific Bell (telecommuting)
(800) 700-1100
Great resource for telecommuting or teleworking.

New Ways to Work
(415) 995-9860
Find out more about telecommuting.

NATIONAL ORGANIZATIONS

America WALKs
PO Box 29103
Portland, OR 97210
Pedestrian Advocacy Group.
Contact: Ellen Vanderslice, 156 Milk Street, Boston, MA 02109.
Email: americawalks@hevanet.com
www.webwalking.com/amwalks

American Public Transit Association
1201 New York Avenue, N.W. Suite 400
Washington DC 20005
www.apta.com
APTA is a non-profit international association of over 1,100 member organizations
including transit systems; planning, design, construction and finance firms; product
and service providers; academic institutions, and state associations and departments
of transportation.

Association for Commuter Transportation (ACT)
www.vanpoolusa.com
The Association for Commuter Transportation (ACT) supports its members in their efforts to enhance mobility, improve air quality, and conserve energy through Transportation Demand Management (TDM) activities. ACT serves as an information resource, provides advocacy on transportation issues involving commute alternatives, and offers networking and professional development opportunities to its members. ACT is located at 1418 “K” Street, NW, Suite 503, Washington, DC 20005 Phone: (202) 393-3497 Fax: (202) 638-4833

Bicycle Federation of America
www.bikefed.org
A non-profit organization working with people in communities to make America more bicycle friendly and walkable. For more information write to 1506 21st Street, NW, Suite 200, Washington D.C. 20036. E-mail: bikefed@aol.com.

Bicycle Helmet Safety Institute
www.bhsi.org
The helmet advocacy program of the Washington area. A small, active, non-profit consumer-funded program acting as a clearinghouse and a technical resource for bicycle helmet information.

California Alliance for Advanced Transportation Systems
www.caats.org
CAATS is a market-driven public/private partnership to deploy advanced transportation technologies and create jobs in California.

Institute of Transportation Engineers
www.ite.org
The Institute of Transportation Engineers (ITE) is an international, individual member, educational, and scientific association. ITE is one of the largest and fastest-growing multimodal professional transportation organizations in the world. Also prints ITE journal. 525 School Street, SW, Suite 410, Washington, DC 20024. Phone number: (202) 554 - 8050 Fax: (202) 863 - 5486.

International Telework Association
www.telecommute.org
The International Teleworking Association, is a non-profit organization dedicated to promoting the economic, social and environmental benefits of teleworking.

International Bicycle Fund
www.ibike.org/index.htm
IBF is a non-governmental, non-profit organization, promoting sustainable transport and international understanding.

International Federation of Pedestrians
Pedestrian Advocacy Group.
Contact: Ralph B. Hirsch, 3500 Race Street, Philadelphia, PA 19104-4925
Phone number: (215) 386 - 1270. E-Mail: hirsch@igc.org

ITS America
www.itsa.org/home.nsf
The mission of the Intelligent Transportation Society of America (ITS America) is to foster public/private partnerships to increase the safety and efficiency of surface transportation through the application of advanced technologies.

League of American Bicyclists
www.bikeleague.org/home.htm
A non-profit organization with membership of more than 35,000 bicyclists, 450 affiliated recreational clubs and 45 advocacy organizations nationwide. To obtain membership information write to The League of American Bicyclists, 1612 “K” Street, NW, Suite 401, Washington, D.C. 20006.

Telecommute America
www.att.com/ehs
Telecommute America is the first nationwide public awareness, information and education program focusing on the benefits of telecommuting and nontraditional work environments including virtual office, work-at-home, satellite offices, and more!

Telecommuting Safety & Health Benefits Institute (TSHBI)
www.orednet.org/venice/rick/telecommutesafe/
TSHBI advocates telecommuting as a means to save lives, reduce injuries, and improve health, thereby enhancing the quality of life for workers and the general public everywhere.

Woman’s Transportation Seminar
808 17th Street, NW, Suite 200, Washington, D.C. 20006-3953.

California Bicycle Coalition
www.jps.net/cbc

PUBLICATIONS

Association for Commuter Transportation (ACT) TDM Tool Kit
The Tool Kit may be obtained by contacting ACT at 1418 “K” Street, NW, Suite 503, Washington, DC 20005. Telephone: (202) 393-3497. Fax: (202) 638-4833.

Book
A Guidance Manual for Implementing Effective Employer-based Travel Demand Management Programs
Federal Highway Administration Washington D.C., 1994
Comprehensive TDM manual.
# DOT-T-94-05 Available through the Federal Highway Administration 400 Seventh Street, SW, Washington, D.C. 20590. Phone number: (202) 366-0660
Book

A Toolbox for Alleviating Traffic Congestion and Enhancing Mobility
Meyer, Michael D.; Institute of Transportation Engineers, 1997
Available through the Institute of Transportation Engineers, 525 School St., SW, Washington, D.C. 20024. Phone number: (202) 554-8050
Book

Building Livable Communities - A Policymaker's Guide to Transit-Oriented Development
Guidebook, Center for Livable Communities
A follow-up to "Building Livable Communities" guidebook on in-fill development focusing on transit-oriented development. Available through Center for Livable Communities at (800) 290 - 8202.
Book

Commute Alternatives Systems Handbook
The Center for Urban Transportation Research, College of Engineering, University of South Florida, May 1996. Available at (813) 974-2011.
In depth report on alternative usage in transportation through TDMs.
Book

National Bike Month (May) Organizer's Kit
A guide to planning activities promoting biking in the month of May.
Available through The League of American Bicyclists, 1612 "K" Street, NW, Suite 401, Washington, D.C. 20006
Book

TDM Review
A quarterly publication published by Sufka & Associates on behalf of the Association for Commuter Transportation (ACT). It is distributed free to ACT members. TDM Review is an open forum for the free exchange of opinions and information. For more information contact ACT National Headquarters, 1518 "K" Street, NW, Suite 503, Washington, D.C. 20005. Phone number: (202) 393 - 3497
Periodical

United States Department of Transportation's Technology Sharing Program (TSP)
www.fedworld.gov/ntis/ordering.htm
The TSP products consist of reports, manuals, and summary documents.

The City of Sunnyvale
Recent emphasis areas have included commuter issues and travel demand, traffic congestion, land-use development, and risk assessment. If there is a report you would like to order, contact the NTIS Sales Desk, Monday through Friday 8:30 - 5:00 EST at 1-800-553-NTIS (6847) or (703) 605-6000, Fax: (703) 321-8547. Additional NTIS ordering information and a list of products is available at their internet site.

United States Department of Transportation's Report Center
The following are transportation management documents available through the Report Center of the Federal Highway Administration. Additional reports are available and change on a regular basis. For more information or to order call (301) 577-0818.

Air Quality, Selected Facts and Figures
Transportation Alternatives During Highway Reconstructions
Transportation Operations Optimization
Transportation User's Views of Quality
A Guide to Congestion Mitigation and Air Quality Improvement Programs
United States E.P.A. Publications
The following publications are available through U.S. Environmental Protection Agency, NCEPI, P.O. Box 42419, Cincinnati, OH 45242

**Bicycle and Pedestrian Programs**
# EPA420-F-97-032. Pamphlet

**Congestion Mitigation and Air Quality Improvement Program**
# EPA420-F-97-035. Pamphlet

**Congestion Pricing**
# EPA420-F-97-030. Pamphlet  *Driving Alone? An Alternative Might Work Even Better*
Brochure and poster that quotes real people describing why they use alternatives to driving alone. # EPA420-F-97-032. Pamphlet and Poster

**Episodic Emission Control Programs**
# EPA420-F-97-022. Pamphlet

**Intelligent Transportation Systems**
# EPA420-F-97-033. Pamphlet

**Market Incentives Resource Center**
Provides guidance on using the MIRC database.
# EPA420-K-97-001. Pamphlet

**Transportation Control Measure Information Documents**
Information of 16 categories of TCMs.
# EPA420-R-92-006. Pamphlet

**Transportation Control Measures**
# EPA420-F-97-021. Pamphlet

**Voluntary Mobile Source Programs: Crediting Innovation and Experimentation**
Brochure that provides basic information about Voluntary Mobile Source Emission Program policy, and outlines the federal process a state would go through to receive credit for their VMEPs in SIP. # EPA420-K-97-004. Pamphlet

To obtain the following E.P.A. reports call the TRAQ request line, (734) 214-4100.

*Methodologies for Estimating Emission and Travel Activity Effects of TCMs*
Report that gives step-by-step approach for estimation travel and emission changes possible from implementing transportation control measures.

*Quantification Document*
Index that describes studies that quantify emission benefits.

**INTERNET SITES**

Market Incentives Resource Center for Air Quality Programs
www.epa.gov/omswww/traq

The City of Sunnyvale
Market incentive programs in the U.S.

**Transportation Library - United States Department of Transportation Bureau of Transportation Statistics**
www.bts.gov/ntl/index.html#search
A list of internet links and useful information of transportation statistics.

**Transportation Control Measures (TCM) Database**
www.epa.gov/omswww/traq
Searchable directory on TCM programs around the country.

**Transportation for Livable Communities Network (TLCNet)**
www.tlcnetwork.org
TLCNet is a network of interested people that exchange information on making their neighborhoods more child-friendly through traffic calming and promoting public transit, bicycling, and walking. TLCNet is a project of the Conservation Law Foundation, 62 Summer St., Boston, MA 02110.

**TRB Clearinghouse**
www.bts.gov/other/tmip/ch.html
Over fifty full text travel demand forecasting documents and approximately 1,000 abstracts have been collected to date.

**United States Department of Transportation**
www.dot.gov
Site includes links to operating administrations.
United States Department of Transportation is located at 400 Seventh Street, SW, Washington, D.C. 20590

**United States Department of Treasury IRS**
www.irs.ustreas.gov/prod/cover.html
Site contains forms, documents, and information of tax matters from the Internal Revenue Service.

**United States E.P.A. Internet Pages**
The following are html documents the U.S. E.P.A. has posted on their Internet site.
- **Office of Mobile Sources**
  www.epa.gov/oms/omshome.htm
  Information on motor vehicles, fuels, and non-road engines.
- **Smart Travel Resource Center (STRC)**
  www.epa.gov/omswww/traq
  Summaries of public education programs that address transportation and air quality issues.
Survey of Episodic Control Programs
www.epa.gov/omswww/traq
Database on collected data and ECPs not implemented or under development across the country.

Transportation Air Quality (TRAQ) Center
www.epa.gov/omswww/transp.htm
Provides state and local air quality regulators and transportation planners with access to critical information regarding transportation programs and mobile source incentive-based programs, partnership opportunities, grant funding sources, useful contact names, and technical assistance.

United States Pedestrian & Bicycle Research Safety Page
www.tfhrc.gov/safety/pedbike/pedbike.htm
The Pedestrian & Bicycle Research Safety Page provides information on issues and research related to improving pedestrian and bicyclist safety. Tools, information, and contacts to make communities more livable through transportation policy.
Glossary of Terms

ACE - Altamont Commuter Express

ACT - Association for Commuter Transportation
The Association for Commuter Transportation (ACT) supports its members in their efforts to enhance mobility, improve air quality, and conserve energy through Transportation Demand Management (TDM) activities. ACT serves as an information resource, provides advocacy on transportation issues involving commute alternatives, and offers networking and professional development opportunities to its members.

ADA - Americans with Disabilities Act of 1990
Federal Law that requires public facilities, including transportation services, to be fully accessible for persons with disabilities. ADA also requires the provision of complementary or supplemental paratransit services in areas where fixed route transit service is operated. Expands definition of eligibility for accessible services to persons with mental disabilities, temporary disabilities, and the conditions related to substance abuse. The Act is an augmentation to, but does not supersede, Section 504 of the Rehabilitation Act of 1973 which prohibits discrimination on the basis of disability against otherwise qualified individuals in programs receiving federal assistance.

ADT - Average Daily Traffic
The average volume of vehicles passing a fixed point in a 24-hour time frame.

Air Pollution
The undesirable addition to the atmosphere of substances (gases, liquids, and solid particles) that are foreign to the “natural” atmosphere or occur in quantities exceeding their natural concentrations and interfere either with one’s health, safety, or comfort, or with full use and enjoyment of one’s property. Substances or elements often associated with air pollution include Oxides of Nitrogen (NOx), Carbon Monoxide (CO), Carbon Dioxide (CO2), Ground Level Ozone (O3), Volatile Organic Compounds (VOCs), and Particulate Matter (PM).

In the Bay Area automobiles are the single largest source of air pollution. Motor vehicles emit more than 50% of the ground level ozone-forming components and over 70% of the carbon monoxide. There are 20 to 30 days each year when our air pollution levels violate State and Federal Health Standards.¹

¹ Bay Area Air Quality Management District, 1999 Spare the Air brochure.

The City of Sunnyvale

G-1
Alternative Fuels
Any motor fuel other than ordinary gasoline, especially those that result in lower levels of air pollutants (i.e. reformulated gasoline, natural gas and liquid propane).

Alternative Transportation
Modes of transportation other than the single-passenger motor vehicle, including but not limited to carpools, vanpools, buspools, public transit, walking, and bicycling.

AQI - Air Quality Index
A number between 0 and 300 used to indicate the amount of ground level ozone pollution at a given time and location. Stepped air quality categories, from Good to Very Unhealthy, are issued on a daily basis. Categories are issued based on data from monitoring stations around the Bay Area.

BAAQMD - Bay Area Air Quality Management District
The regional air quality enforcement agency for nine counties including Alameda, Contra Costs, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma. The District regulates stationary sources such as manufacturing plants, dry cleaners, gas stations, bakeries, etc. The District also sponsors programs to reduce the number of automobiles and trucks on Bay Area roads and the amount of air pollutants emitted from those vehicles.

Bikeway
A facility designed to accommodate bicycle travel for recreational or commuting purposes. Bikeways are not necessarily separated facilities; they may be designed to operate and be shared with other travel modes.

   Bike lanes are striped along the sides of roadways such as Sunnyvale-Saratoga Road. Bike paths are separated from vehicular traffic such as the off-street trail between Calabazas Creek and Mathilda Avenue.

Bus (Motorbus)
A rubber-tired, self-propelled, manually-steered vehicle with fuel supply carried on board the vehicle.

Bus, Express
A bus that operates a portion of the route without stops or with a limited number of stops.

Bus, Feeder
A bus service that picks up and delivers passengers to a rail transit station (such as ACE or Caltrain) or express bus stop or terminal.
Bus, Subscription
A commuter bus express service operated for a guaranteed number of patrons from a given area on a prepaid, reserved-seat basis.

Bus Shelter
A building or other structure constructed near a bus stop, to provide seating and protection from the weather for the convenience of waiting passengers.

Bus Stop
A place where passengers can board or alight from the bus, usually identified by a sign.

CAA - Clean Air Act, also known as FCAA
Federal legislation that sets national air quality standards; requires each state with areas that have not met federal air quality standards to prepare a State Implementation Plan. The 1990 amendments to the CAA, sometimes referred to as CAAA, established new air quality requirements for the development of metropolitan transportation plans and programs.

CAAA - Clean Air Act Amendments of 1990
The comprehensive federal legislation which establishes criteria for attaining and maintaining the federal standards for allowable concentrations and exposure limits for various air pollutants; the act also provides emission standards for specific vehicles and fuels.

Carbon Dioxide (CO₂)
A colorless gas which enters the atmosphere as the result of combustion process; it is a normal component of ambient air. Increasing amounts of carbon dioxide in the air may be a factor in the rise of the Earth’s surface air temperature.

The burning of one gallon of gasoline produces about 20 pounds of CO₂. A Bay Area resident, driving 10,000 miles per year at 25 miles/gallon will produce about 8,000 pounds of CO₂. By comparison, a human exhales about 1 kilogram per day. (Carbon Dioxide Information Analysis Center)

Carbon Monoxide (CO)
A colorless, odorless, tasteless gas that impedes the oxygenation of the Blood. CO is formed in large part by incomplete combustion of fuel.

In the Bay Area, oxygenated fuel has been sold at gas stations. The oxygenated fuels help reduce the amount of CO emitted by automobiles.
Carpool
An arrangement where two or more adults share the use and cost of privately owned automobiles in traveling to and from pre-arranged destinations together. This can be as simple as two roommates driving to work together.

Clean Fuels
Fuels that, when burned, generate fewer pollutants than gasoline. Compressed natural gas (CNG), methanol, ethanol, and others are considered clean fuels. Also known as, "Alternative Fuels."

CMO - Commute Management Organizations
In some areas Transportation Demand Management programs are carried out by regional entities which perform both the matching function of ridesharing agencies and the management functions of a Transportation Management Association.

In Sunnyvale, Santa Clara VTA, Silicon Valley Manufacturing Group, and RIDES preform the varying tasks of commute management organizations.

CMS - Congestion Management System
One of six management systems that states may develop under Intermodal Surface Transportation Efficiency Act (ISTEA). CMS strategies could include transportation demand management measures, traffic operations improvements, measurements, measures to encourage the use of high-occupancy vehicles, and other actions. In the Bay Area, our CMS is developed in cooperation with the congestion management agency, Santa Clara VTA.

CMAQ - Congestion Mitigation and Air Quality Improvement Program
A categorical funding program created as part of ISTEA. Directs funding to projects that contribute to meeting national air quality standards in non-attainment areas. CMAQ funds generally may not be used for projects that result in the construction of new capacity available to SOVs (single-occupant vehicles).

CNG - Compressed Natural Gas
A clean burning alternative fuel for vehicles.

Commuter
A person who travels regularly between home and work or school.

Commuter Assistance Programs
Services such as ridesharing, transit, and parking policies that help workers commute to work.
Compressed Work Week
A scheduling program which consists of condensing standard working hours into fewer than five days per week or fewer than ten days per two week period.

Conformity
The ongoing process that ensures the planning for highway and transit systems, as a whole and over the long term, are consistent with the state air quality plans for attaining and maintaining health-based air quality standards; conformity is determined by the Metropolitan Transportation Commission (MTC) and the U.S. Department of Transportation (U.S. DOT), and is based on whether transportation plans and programs meet the provisions of a State Implementation Plan. The conformity process is defined by the Clean Air Act.

Congestion Pricing
The imposition of fees, in differential rates varying by time of day and location depending on the level of congestion, on road users in congested areas or traveling on congested roads.

Demand Responsive
Non-fixed-route service utilizing vans or buses with passengers boarding and alighting at pre-arranged times at any location within the system’s service area. Also referred to as “Dial-a-ride”.

Dial-a-Ride
Term for demand-responsive systems usually delivering door-to-door service to clients who make requests by telephone on an as-needed reservation or subscription basis.

Employee Transportation Allowance
A regular periodic payment from employers to employees to defray the cost of travel. Allowances provide positive economic incentive to shift from driving alone to other modes of travel (ie. walking, carpooling, etcetera). Allowances are sometimes implemented in conjunction with a parking charge and are set to be equal to the parking charge. Employees can buy parking or apply the allowance to other travel costs. This is not an eligible tax-free transportation benefit. See Qualified Transportation Benefit for eligible tax-free transportation benefits.

EIR/EIS - Environmental Impact Report/Environmental Impact Statement
An analysis of the environmental impacts of proposed land development and transportation projects; it's an EIR when conducted in response to California Environmental Quality Act, and an EIS when conducted for federally funded or approved projects per National Environmental Protection Act. A draft EIR or draft...
EIS (DEIR or DEIS -- often they are prepared simultaneously) is circulated to the public and agencies with approval authority for comment. A Draft EIR or Draft EIS progresses to a certified Final EIR or Final EIS that contains responses to public comments and ways to mitigate adverse impacts.

EPA - Environmental Protection Agency
The federal source agency of air quality control regulations affecting transportation.

Episodic Program
A trip reduction program that takes place during certain time periods such as during the summer months. A Spare the Air program for Sunnyvale businesses and residents is run by the Bay Area Air Quality Management District. More information about this episodic program is available at http://www.sparetheair.org.

ETC - Employee Transportation Coordinator
Someone designated within a business or organization to assist its workers with forming carpools and vanpools, promoting bicycle commuting, public transit, and other forms of alternative transportation.

FCR - Flexible Congestion Relief
A state-directed funding program made possible by ISTEA that applies state and federal dollars to local and regional transportation projects that cause traffic congestion relief, regardless of mode.

FHWA - Federal Highway Administration
Division of the United States Department of Transportation that oversees highways.

Fixed-Route
Term applied to transit service that is regularly scheduled and operates over a set route. Usually refers to bus service.

Flexible Work Hours (Flextime)
A scheduling policy that gives employees the option of varying their starting and stopping times each work day when all employees are required to be present. The intent is to allow employees greater flexibility to adjust to work hours to individual time schedules and commuting.

FRA - Federal Railroad Administration
Division of the United States Department of Transportation that supervises rail lines.
Freeway
A divided arterial highway designed for the unimpeded flow of large traffic volumes at higher speeds. Access to a freeway is rigorously controlled and intersection grade separations are required.

FTA - Federal Transit Administration
Division of the United States Department of Transportation that funds transit planning and programs.

GRH - Guaranteed Ride Home
Refers to a program that encourages employees to carpool, use transit, bike or walk to work by guaranteeing them a ride home in case they cannot take the same mode home (e.g., if they need to work late or if an emergency occurs).

Highway Trust Fund
The federal trust fund established by the Highway Revenue Act of 1956; this fund has two accounts -- the Highway Account and the Mass Transit Account. Trust fund revenues are derived from federal highway-user taxes and fees such as motor fuel taxes; trust fund uses and expenditures are determined by law.

Home-Based Work Trip
A trip to or from home for the purpose of one's employment.

HOV - High Occupancy Vehicle Lane
The technical term for a carpool lane, commuter lane or diamond lane, which is a lane designated for vehicles carrying two or more (or three or more) people depending on the facility.

HOVs - High Occupancy Vehicles
Generally applied to vehicles carrying two or three or more people. Freeways, expressways and other large volume roads may have lanes designated for HOV use. HOV lanes may be designated for use by carpoolers, vanpools, and buses. The term HOV is also sometimes used to refer to high occupancy vehicle lanes themselves.

Informal Carpool
Form of carpool in which the composition of traveling passengers varies from day to day. There is no formal arrangement for regular riders.

Infrastructure
A term referring to the components of the physical structure, including, but not limited to, roads, bridges, transit, waste system, public housing, sidewalks, utility installations, parks, public buildings, and communications networks.
Intermodal
Those issues or activities which involve, integrate, or affect more than one mode of transportation. Also known as "multimodal".

Inversion
A layer of the atmosphere through which the temperature increases with altitude. An inversion may be found at ground level or aloft.

ISTEA - Intermodal Surface Transportation Efficiency Act
Pronounced "Ice Tea," this landmark $155 billion federal legislation signed into law in December 1991 called for broad changes in the way transportation decisions are made. ISTEA expired in 1998 and has since been replaced by TEA-21. See TEA-21 definition.

ITS - Intelligent Transportation Systems
Use of computer and communications technology to facilitate the flow of information between travelers and system operators. Includes concepts such as "freeway management systems," "automated fare collection," and "transit information kiosks."

Joint Use Development
1.) In transportation, ventures undertaken by the public and private sectors for development of land above, below, or along transportation facilities.
2.) Coordinated development of an area by the public and private sectors.

Kiss and Ride
A place where commuters are driven and dropped off at a station to board a public transportation vehicle.

Land Use
Refers to the manner in which portions of land or the structures on them are used, i.e., commercial, residential, retail, industrial, etc.

Long-Range Transportation Plan
A plan that every state and Metropolitan Planning Organization must develop. The long-range plan for transportation improvements includes a bicycle and pedestrian element in addition to highway, transit, and other elements. The LRP usually looks 20 years ahead and is revised every three to six years.

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2 Florida Department of Transportation, Committee Alternatives Systems Handbook, page 95.
LOS - Level of Service
A system that rates traffic flow from A (excellent) through F (flunks), and compares actual or projected traffic volume with the maximum capacity of the intersection or road in question.

LRT - Light-Rail Transit
Fixed guideway transportation mode that typically operates on city streets or dedicated right of ways and draws its electric power from overhead wires; include streetcars, trolley cars and tramways (i.e. Santa Clara's Valley Transportation Authority light rail line). Differs from heavy rail in that it has lighter passenger capacity per hour and more closely spaced stops.

MPO - Metropolitan Planning Organization
The organizational entity designated by law with lead responsibility for developing transportation plans and programs for urbanized areas of 50,000 or more in population. MPOs are established by agreement of the Governor and units of general purpose local government which together represents 75 percent of the affected population or an urbanized area.

Mixed-Use Development
Defined by the Urban Land Institute as developments with the following criteria: (1) three or more revenue-producing uses that in well-planned projects are mutually supporting, (2) significant physical and functional integration of project components, including uninterrupted pedestrian connections, and (3) development in conformance with a coherent plan.

Mobile Source
A source of pollutants from a self-propelled transportation vehicles, such as motor vehicle, boat, ship, locomotive, aircraft, or off-road motor vehicle.

Mode, Intermodal, Multimodal
Form of transportation, such as automobile, transit, bicycle and walking. Intermodal refers to the connections between modes and multimodal refers to the availability of transportation options within a system or corridor.

Mode Split
An itemization of the types of vehicles or methods used by commuters to travel to work.

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Florida Department of Transportation, Committee Alternatives Systems Handbook, page 96.
NAAQS - National Ambient Air Quality Standards
Federal standards that set allowable concentrations and exposure limits for various pollutants.

NHS - National Highway Systems
A federal transportation program authorized by ISTEA that designates nationally significant Interstate Highways and roads for interstate travel, national defense, intermodal connections, and international commerce. Other eligible activities include bikeways and park-and-ride lots. The NHS is currently being developed as the first component of a larger, intermodal National Transportation System. See "National Transportation System."

Nonattainment Area
Any geographic region of the United States that the U.S. Environmental Protection Agency (EPA) has designated as not attaining the federal air quality standards for one or more air pollutants, such as ozone, carbon monoxide, or particulate matter. Sunnyvale and the surrounding Bay Area are designated as "non-attainment" for ozone.

Off-Peak Period
Non-rush periods of the day when travel activity is generally lower and less transit service is scheduled.

Ozone
Ozone is a colorless gas with a sweet odor. Ozone is not a direct emission from transportation sources. It is a secondary pollutant formed when hydrocarbons (HC) and nitrogen oxides (NOx) combine in the presence of sunlight. The ozone is associated with smog or haze conditions. Although the ozone in the upper atmosphere protects us from harmful ultraviolet rays, ground level ozone produces an unhealthy environment in which to live.

Paratransit
Comparable transportation service required by the Americans with Disabilities Act (ADA) of 1990 for individuals with disabilities who are unable to use fixed-route transportation systems. In Sunnyvale, paratransit service is provided to eligible clients by Outreach.

Park and Ride Lot
Designated parking areas for automobile drivers who then board transit vehicles or meet carpool or vanpool service from these locations.
Parking Cash Out
A strategy that employers can utilize to encourage employees to use alternate modes of commuting by giving up their tax-free parking. Employees can use the taxable cash value to pay for expenses associated with other modes like carpooling or to receive a tax-free subsidy for transit or vanpools.

Parking Management
Measures that encourage alternative mode usage. Measures can include parking charges, preferential parking for car and vanpools, reduced parking cost for car and vanpools, and reduced parking supply.

Parking Pricing
A specific parking management strategy of establishing a pricing mechanism to encourage carpool and vanpool use at a parking facility. This could include charging rates for single occupant vehicles (SOVs), especially during commuter peak hours, and free parking for carpools and vanpools.

Peak Period/Peak Hour
Morning and afternoon time periods when traffic is heaviest (i.e. "rush hour").

Preferential Parking
Designating the most desirable parking spaces, such as those closest to the building entrances, for the exclusive use of carpools and vanpools.

Public Transportation
Transportation by bus, rail, ferry, or other conveyance which provides to the public general or special service on a regular and continuing basis. Also known as "mass transportation", "mass transit", and "transit".

Qualified Transportation Fringe Benefit
This represents a transportation fringe benefit that is tax-free for the employee. This benefit can be in the form of a mass transit subsidy, vanpool subsidy, and employer-provided parking. Carpool subsidy does not qualify. The maximum amount of tax-free benefit is established as $65 per month for transit and vanpool and $175 per month for parking. These benefits can be combined for a total benefit of $240 per month or $2,880 per year.

Rail, Commuter
Railroad local and regional passenger train operations between a central city, its suburbs and/or another central city. It may be either locomotive-hauled or self-propelled, and is characterized by multi-trip tickets, specific station-to-station fares, railroad employment practices and usually only one or two stations in the central business district.
Rail, High Speed
A rail transportation system with exclusive right-of-way which serves densely traveled corridors at speeds of 124 miles per hour (200 km/h) and greater.

Rail, Light
An electric railway with a "light volume" traffic capacity compared to heavy rail. Light rail may use shared or exclusive rights-of-way, high or low platform loading and multi-car trains or single cars. Also known as "LRT", "streetcar," "trolley car" and "tramway".

Real Time Ridesharing
System in which short term (one-trip) carpools are formed to meet current needs of travelers. A person in need of a ride is matched on short notice with one or more drivers headed to that person's destination. This could also be called an informal or instant carpool.

Reverse Commuting
Movement in a direction opposite the main flow of traffic, such as from the central city to a suburb during the morning peak period.

Reversible Lanes
A highway or street lane on which the direction of traffic flow can be changed to use the maximum roadway capacity during peak periods.

Ride Matching
The process of creating carpools and vanpools through finding people whose travel characteristics (origin and destination and time of travel) closely match.

Ridesharing
A form of transportation, other than public transit, in which more than one person shares the use of the vehicle, such as a van or car, to make a trip. Also known as "carpooling" or "vanpooling".

Seasonal Program
A Seasonal Program is a trip reduction program that takes place during certain time periods such as during the summer months.

Shuttle
A public or private vehicle that travels back and forth over a particular route, especially a short route or one that provides connections between transportation systems, employment centers, etc.

The City of Sunnyvale
SIP - State Implementation Plan
Required documents prepared by states and submitted to the Environmental Protection Agency (EPA) for approval. SIPs identify state actions and programs to implement designated responsibilities under the Clean Air Act.

Smog
A general term used to describe the irritating haze produced by photochemical reactions in the atmosphere.

SOV - Single-Occupant Vehicle
A vehicle with one occupant, the driver.

Staggered Work Hours
An alternative work scheduling program in which the times that groups of employees begin and end work are staggered over a range from 15 minutes to two hours, thus reducing commuting peaks. This is one of the programs that is included under alternative work schedules.

TDM - Transportation Demand Management
Low-cost ways to reduce demand by single occupant vehicles on the transportation system, such as programs to promote telecommuting, flextime and ridesharing.

TEA-21
TEA-21 stands for the Transportation Equity Act for the 21st Century, Public Law 105-178. This law reauthorizes ISTEA and provides federal funding and program authorization for all surface transportation, primarily highways and public transit. It also includes in Title IX, Section 910, an amendment to the Internal Revenue Code, Section 132(f), permitting employers to allow their employees to set aside a portion of their gross income up to certain monthly statutory maximums for transit, vanpools, and qualified parking.

Telework (also known as Telecommuting)
The substitution, either partially or completely, of transportation to a conventional office through the use of computer and telecommunications technologies (e.g., telephones, personal computers, modems, facsimile machines, electronic mail). Implies either work at home or at a satellite work center that is closer to an employee's home than the conventional office.

TMA - Transportation Management Association
A voluntary, non-profit association of private employers, developers, property managers and public agencies joined to cooperatively develop transportation-enhancing programs in a given area. Sometimes called Transportation Management Organizations or TMOs.

The City of Sunnyvale
TMP - Transportation Management Plan
A plan required or volunteered as part of a developer's building permit process. A TMP addresses how to minimize the impacts of employee work trips. Sometimes addresses customer and visitor trips as well.

Traffic Mitigation
The use of transportation management techniques to reduce the traffic impact of new development.

Transit
Generally refers to passenger service provided to the general public along established routes with fixed or variable schedules at published fares. Related terms include: public transit, mass transit, public transportation, urban transit and paratransit.

Trip Generation Rates
Average rates of vehicular travel to and from a development, which are usually cited per square foot, per housing unit, or per acre. The rates published by the Institute of Transportation Engineer (ITE) are often used by transportation professionals in setting up ridership standards and establishing TDM goals.

Vanpool
An arrangement in which a group of passengers share the use and cost of a van in traveling together between pre-arranged destinations and work.

Variable Work Hours
A work schedule that permits employees to arrive and depart during times other than the commuter peak traffic hours.

VMT - Vehicle Miles of Travel
A standard area wide measure of travel activity. Most conventional VMT calculation is to multiply average length of trip by the total number of trips.

Vehicle Trip Reduction
Elimination of actual vehicles due to alternative mode use (i.e. one person taking transit to and from work equals two vehicle trips reduced).

Sources:
Association for Commuter Transportation (ACT) TDM ToolKit
American Public Transit Association (APTA)
Bay Area Air Quality Management District (BAAQMD)
Campaign for Reliable Transportation
United States Environmental Protection Agency
Metropolitan Transportation Commission (California Bay Area)
Florida Department of Transportation, Committee Alternatives Systems Handbook
Federal Highway Administration
Institute of Transportation Engineers, Transportation Demand Management (TDM) Glossary
SUBJECT: 2011-7657 – Peery-Arrillaga / A & P Children Invsllc:
Application on a 5.2-acre site located at 580 North Mary Avenue in an M-S Zoning District (APN: 165-41-002) for a Use Permit to allow a new 124,095 square foot, 5-story office building resulting in approximately 55% Floor Area Ratio with a new 1.5-story parking structure.

REPORT IN BRIEF:

Existing Site Conditions

Surrounding Land Uses

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>Industrial, R&amp;D, and office uses</td>
</tr>
<tr>
<td>South</td>
<td>Industrial, R&amp;D, and office uses (across Maude Ave.)</td>
</tr>
<tr>
<td>East</td>
<td>Industrial, R&amp;D, and office uses</td>
</tr>
<tr>
<td>West</td>
<td>Industrial, R&amp;D, and office uses (across N. Mary Ave.)</td>
</tr>
</tbody>
</table>

Issues

Floor Area Ratio

Environmental Status

A Mitigated Negative Declaration has been prepared in compliance with California Environmental Quality Act provisions and City Guidelines.

Staff Recommendation

Approve the Use Permit with conditions
VICINITY MAP
### PROJECT DATA TABLE

<table>
<thead>
<tr>
<th></th>
<th>EXISTING</th>
<th>PROPOSED</th>
<th>REQUIRED/PERMITTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Plan</td>
<td>Industry</td>
<td>Same</td>
<td>Industry</td>
</tr>
<tr>
<td>Zoning District</td>
<td>M-S</td>
<td>Same</td>
<td>M-S</td>
</tr>
<tr>
<td>Lot Size (s.f.)</td>
<td>225,640</td>
<td>Same</td>
<td>22,500 min.</td>
</tr>
<tr>
<td>Gross Floor Area (s.f.)</td>
<td>50,406</td>
<td>124,095 (office) 23,650 (garage)</td>
<td>78,974 max. without CC review</td>
</tr>
<tr>
<td>Lot Coverage (%)</td>
<td>22.3%</td>
<td>24.7%</td>
<td>45% max.</td>
</tr>
<tr>
<td>Floor Area Ratio (FAR)</td>
<td>22.3%</td>
<td>55.0%</td>
<td>35% max. without CC review</td>
</tr>
<tr>
<td>No. of Buildings</td>
<td>1</td>
<td>2 (office building + garage)</td>
<td>N/A</td>
</tr>
<tr>
<td>Distance Between Buildings (ft.)</td>
<td>N/A</td>
<td>97’</td>
<td>5’ min.</td>
</tr>
<tr>
<td>Building Height (ft.)</td>
<td>18’</td>
<td>74’6”</td>
<td>75’ max.</td>
</tr>
<tr>
<td>No. of Stories</td>
<td>1</td>
<td>5 (office building) 1.5 (parking garage)</td>
<td>8 max.</td>
</tr>
<tr>
<td>Setbacks (Facing Property)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front (Mary/Maude)</td>
<td>30’ / 35’</td>
<td>40’ / 109’</td>
<td>35’ min.</td>
</tr>
<tr>
<td>Left Side</td>
<td>128’</td>
<td>5’</td>
<td>No min.</td>
</tr>
<tr>
<td>Right Side</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Rear</td>
<td>317’</td>
<td>144’</td>
<td>No min.</td>
</tr>
<tr>
<td>Landscaping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Landscaping (s.f.)</td>
<td>54,000</td>
<td>54,396</td>
<td>45,128 min.</td>
</tr>
<tr>
<td>% Based on Lot Area</td>
<td>24%</td>
<td>24.1%</td>
<td>20% min.</td>
</tr>
<tr>
<td>% Based on Floor Area</td>
<td>107%</td>
<td>43.8%</td>
<td>10% min.</td>
</tr>
<tr>
<td>% Based on Parking Lot</td>
<td>45%</td>
<td>56.3%</td>
<td>20% min.</td>
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<tr>
<td>Frontage Width</td>
<td>12’ – 20’</td>
<td>20’ – 60’</td>
<td>15’ min.</td>
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<tr>
<td>Parking Lot Area Shading (%)</td>
<td>Unknown</td>
<td>52%</td>
<td>50% min. in 15 years</td>
</tr>
<tr>
<td>Parking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Spaces</td>
<td>310</td>
<td>411</td>
<td>249 min.</td>
</tr>
<tr>
<td>Standard Spaces</td>
<td>310</td>
<td>411</td>
<td>124 min.</td>
</tr>
<tr>
<td>Compact Spaces</td>
<td>0</td>
<td>0</td>
<td>50% max.</td>
</tr>
<tr>
<td>Covered Spaces</td>
<td>0</td>
<td>70</td>
<td>No min.</td>
</tr>
<tr>
<td>Aisle Width (ft.)</td>
<td>Unknown</td>
<td>26’</td>
<td>26 min.</td>
</tr>
<tr>
<td>Bicycle Parking</td>
<td>0</td>
<td>22 (16 Class I, 6 Class II)</td>
<td>21 min. (75% Class I, 25% Class II)</td>
</tr>
</tbody>
</table>
### Stormwater

| Impervious Surface Area (s.f.) | 199,488 | 171,244 | No max. |
| Impervious Surface (%)         | 88.4%   | 75.9%   | No max. |

### BACKGROUND

#### Description of Proposed Project

The proposed project will redevelop the site with a new 124,095 square foot five-story office building and a new 2-level parking structure. The project will result in approximately 55% Floor Area Ratio (FAR) and requires approval of a Use Permit by the City Council due to the requested FAR exceeding 35%.

#### Previous Actions on the Site

Previous planning applications for the site are summarized below:

<table>
<thead>
<tr>
<th>File No.</th>
<th>Brief Description</th>
<th>Hearing/Decision</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996-0535</td>
<td>Miscellaneous Plan Permit to modify parking lot layout</td>
<td>Staff / Approved</td>
<td>11/15/1996</td>
</tr>
<tr>
<td>1975-0052</td>
<td>Use Permit for a Post Office with unenclosed vehicle storage</td>
<td>Planning Commission / Approved</td>
<td>08/11/1975</td>
</tr>
</tbody>
</table>

### EXISTING POLICY

#### General Plan Goals and Policies:

The following are key goals and policies from the Land Use and Transportation Element of the General Plan which pertain to the proposed project:

**Goal LT-6:** Sustain a strong local economy that contributes fiscal support for desired City services and provides a mix of jobs and commercial opportunities.

**Policy LT-6.2:** Balance land use and transportation system carrying capacity necessary to support a vital and robust local economy.

**Policy LT-6.4:** Encourage sustainable industries that emphasize resource efficiency, environmental responsibility, and the prevention of pollution and waste.

**Floor Area Ratio:** The standard Floor Area Ratio (FAR) permitted in the M-S Zoning District is 35%. A 10% FAR bonus (to 45%) is granted for new non-residential construction which achieves LEED certification at a Gold level.
Buildings proposing additional FAR above these standards require review and approval of a Use Permit by the City Council. To assist the decision makers in considering approval of higher FAR developments, *Review Criteria for Projects Greater than 35% FAR* were developed by the City Council in 2000. These criteria are required as part of the findings to approve a Use Permit. A list of the review criteria is provided in Attachment A.

**Policies Related to Peery Park:** The project site is located in the “Peery Park” industrial area, which is characterized by a large number of Class B and C buildings (see Attachment H for a detailed description of office class levels). While the Sunnyvale Municipal Code (SMC) does not require new office buildings to be of a particular class, several past and present City policies encourage renovation and redevelopment in Peery Park.

In 2003, staff developed a five-year *Community Development (CD) Strategy* to apply City resources strategically for community benefit. The goals of the CD Strategy were adopted by City Council and the document was updated in 2005. The CD Strategy identifies Peery Park as one of four industrial zone action areas, and encourages staff to explore incentives for redevelopment of Class C buildings in Peery Park to Class A structures. The CD Strategy notes that attraction of strong growth companies such as bio-technology to the area is an economic development goal.

In 2008, at the sunset of the five-year CD Strategy, the City Council directed staff to study preparation of a Specific Plan for Peery Park to incentivize reinvestment in the area by considering higher FARs, establishing a Development Reserve, and planning for public improvements. This study has been placed on hold due to budget constraints, but its selection by Council provides a further policy context for the project.

**Industrial Design Guidelines:** The City’s Industrial Design Guidelines (1993) provide recommendations for site planning, architecture, and design. These guidelines are referenced in the discussion and analysis below.

**DISCUSSION AND ANALYSIS**

**Present Site Conditions**
The project site is a single 5.2-acre parcel at the northeast corner of North Mary Avenue and Maude Avenue. The site is developed with a single-story concrete tilt-up building and two surface parking lots. The existing building is occupied by the U.S. Postal Service as a Post Office. Existing site access consists of three driveways along Maude Avenue and two driveways along Mary Avenue. Site landscaping includes 56 mature trees in generally good condition.
Project Context: The project site is located in Peery Park near the City's western boundary. The area includes industrial and office projects developed at a variety of FARs in the 1970s and 1980s. Several nearby properties have recently redeveloped with higher FARs. One key example is the HP site (formerly Palm) located at the opposite corner of Mary and Maude. Redeveloped in 1999, the three-building campus has an average FAR of 55% on two lots. Attachment G illustrates current development intensities in the project area.

Use Permit

Use: The proposed project is for a new five-story Class A office building intended for Corporate Office uses. Multiple smaller professional office tenants could also be accommodated within the building; however, the proposed building would not be appropriate for medical office or clinic use based on the parking provided (see Attachment B, Condition of Approval GC-6).

Floor Area Ratio: The Review Criteria for Projects Greater than 35% FAR (or greater than 45% FAR with green building bonus) are located in the Recommended Findings in Attachment A along with staff's discussion of the criteria. The applicant has also provided project justifications and discussion of the evaluation criteria which are included in Attachment E. Key project features meeting these criteria include high-quality architecture and site design, green building certification, and a Transportation Demand Management (TDM) Program to reduce trips generated by the project.

Site Layout: The proposed site plan locates a five-story office building near the center of the parcel. A two-level parking structure is located along the north property line with a half level below grade. Site access will be provided by one driveway along Mary Avenue and two driveways along Maude Avenue. A paved patio feature will be located at the corner of Mary and Maude Avenues and is a possible location for the project’s required artwork. (See Attachment D for site plans.) The following Guidelines were considered in analysis of the site design:

<table>
<thead>
<tr>
<th>Industrial Design Guidelines (Site Design)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1. New development shall enhance the character of its surrounding area through quality architecture, and landscaping and appropriate site arrangement.</td>
<td>The proposed plan enhances the site and surroundings through high-quality architecture and site design, and by retaining mature trees and integrating them into an upgraded landscape. The siting and design of the building will ensure visibility of its features from streets and surrounding properties.</td>
</tr>
</tbody>
</table>
Industrial Design Guidelines
(Site Design) | Comments
--- | ---
A2. New development in an area with an established character shall be compatible with its surrounding development in intensity, design, setback, building form, scale, material, color and landscaping unless there are specific planning goals to change the character of an area. | The proposed project is consistent with the character of other sites in the area which have redeveloped with higher FAR buildings, including the HP/Palm site across Mary and Maude. Redevelopment with Class A buildings in Peery Park is consistent with City policy.

B1. Site components such as structures, parking, driveways, and out-door functions shall be arranged and located to emphasize the aesthetically pleasant components of the site such as existing mature trees and views, or superior architectural features, and disguise its less attractive scenes such as service facilities, outside storage and equipment areas, and trash enclosures through placement and design of structure and landscaping. | The building’s high-quality architecture will be visible from streets and surrounding properties. The low-lying parking structure is located along a side property line and screened by landscaping. The trash enclosure is integrated into the rear of the parking garage to minimize visibility. A patio feature is located at the corner of Mary and Maude. The central project driveway is aligned with the building’s main entry to create a sense of arrival.

Architecture: The existing building on the site is a one-story concrete tilt-up, which is a typical Class C industrial design found in Peery Park. The proposed Class A building uses high-quality architecture constructed of glass and steel. The building form consists of a central elongated oval flanked by curved areas with terraced roof decks on each level. The architecture generally has a strong horizontal orientation through the lines of glass, but the unique building forms are used to add interest. (See Attachment D for architectural plans.) The following Guidelines were considered in the analysis of the project architecture:

Industrial Design Guidelines
(Building Design) | Comments
--- | ---
B1. New buildings shall maintain diversity and individuality in style while improving aesthetic character of their surrounding area | The proposed architectural style is distinctive and of high quality. The design will enhance the aesthetic character of the area which includes several newer Class A buildings. The proposal is consistent with nearby sites while using new forms and colors for variety.

B2. Roof equipment shall be fully screened by parapets, roof screens or equipment wells. | The proposed design includes an integrated roof screen composed of 12-foot tall spandrel glass mimicking a building floor. This element will enhance architectural quality by camouflaging mechanical equipment without use of a separate roof screen.
<table>
<thead>
<tr>
<th><strong>Industrial Design Guidelines</strong> (Building Design)</th>
<th><strong>Comments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B5. Main entrances of the buildings shall be well defined</strong></td>
<td>The building’s architecture does not prominently emphasize entrances; instead, site design and landscaping are used to define entrance areas. The main building entrance along Maude Avenue is defined through alignment with the central entry driveway. All building entrances are defined by decorative paving and landscaping.</td>
</tr>
<tr>
<td><strong>B6. New buildings shall have at least one major focal point and minor focal point. Focal points should be achieved through horizontal and vertical lines, change in material, change in color, changing the form and shape of a portion of the building, etc. Combining the main entrance and the focal points is encouraged.</strong></td>
<td>The building’s unique forms provide several architectural focal points. The pointed ends of the elongated central oval element draw focus on the east and west facades. On the north and south facades, terraced roof decks form focal points. The site design is also developed to create landscaping focal points at the north and south building entrances and at the corner patio feature.</td>
</tr>
<tr>
<td><strong>E1. A comprehensive material and color scheme shall be developed for each site.</strong></td>
<td>The proposed office building will be constructed of glass and steel with aluminum mullions between glass panels. The building exterior will be composed primarily of glass in a green-blue color, with metal support columns at the base. The proposed parking garage will be constructed of precast concrete in an off-white color with metal railings.</td>
</tr>
<tr>
<td><strong>E3. Large expanses of high reflective surface and mirror glass exterior walls shall be avoided to prevent heat and glare impacts on the adjacent public streets and properties.</strong></td>
<td>The proposed office building will utilize clear glass and spandrel glass along exterior facades to minimize reflection on public streets and adjacent properties. Mirror glass is not proposed. The project site is not adjacent to residential uses.</td>
</tr>
</tbody>
</table>

**Landscaping:** The project provides approximately 24% of the lot area as landscaping in compliance with current SMC requirements. Landscaping will be located throughout the site and will include a variety of plant materials. There are 56 existing trees on-site, 43 of which are defined as protected by the SMC based on size. Existing trees are generally in good condition, but other site landscaping is minimal. A total of 23 protected trees will be removed for site plan reconfiguration. A significant number of existing protected trees along the project perimeter will be retained. The applicant is also proposing to plant approximately 130 new trees within a significantly upgraded landscape. Staff recommends Condition of Approval BP-11.g (Attachment B) requiring that any
protected tree removed be replaced by a 36-inch box size tree. The project data provided by the applicant indicates the proposal meets the requirement for trees to provide 50% shading of parking and drive aisles within 15 years of planting; however, the shading data have not been calculated correctly. Staff recommends Conditions of Approval PS-1.c and BP-11.a requiring increased shading which will be verified by staff. The following Guidelines were considered in analysis of the project landscaping:

<table>
<thead>
<tr>
<th>Industrial Design Guidelines (Landscaping)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2. All areas not in use by structures, driveways, and parking spaces shall be properly landscaped.</td>
<td>The project will upgrade the current site landscaping while preserving the majority of the existing mature trees. All areas not utilized by structures, parking, and driveways will be landscaped with live plant materials, walkways, and patios.</td>
</tr>
</tbody>
</table>

**Parking/Circulation:** Industrial and Corporation Office uses require a minimum of one parking space per 500 square feet of floor area and a maximum of one space per 250 square feet. The proposed project is consistent with this standard by providing approximately 1 parking space per 300 square feet of floor area. A total of 267 surface parking spaces are provided in addition to 144 spaces within a two-level parking structure (411 spaces total). All spaces are standard size. Site access will be provided by one driveway along Mary Avenue and two driveways along Maude Avenue. The new driveways will be located similarly to the existing site driveways with some reconfiguration.

A Traffic Impact Analysis (TIA) was not required for this project. The existing Post Office use is a very high generator of vehicle trips. Despite the high FAR of the proposed project, the peak hour vehicle trips expected to be generated by the new development are significantly less than those generated by the existing use. A more detailed discussion of trip generation and traffic analysis is provided in the Initial Study document (Attachment C, page 18). In addition, the applicant is proposing a Transportation Demand Management (TDM) Program to further reduce vehicle trips. There is no anticipated negative traffic impact of the proposed project.

**TDM Program:** The applicant has submitted a draft TDM Program prepared by Fehr and Peers Transportation Consultants (Attachment F). The program proposes to achieve at least 16% reduction in peak hour trips, which is equivalent to the difference in trips between 35% and 45% FAR. The program proposes TDM measures including site design, a carpool/vanpool program, transit subsidies, and telecommuting program, and notes that additional measures such as guaranteed rides home, parking cash-out, and shuttles could be used to further decrease trips. The TDM Program will be managed by
the building tenant(s) who are not known at this time. Based on the reductions required for other higher-intensity projects, staff recommends requiring the TDM Program be revised to achieve a minimum of a 20% reduction in total daily vehicle trips and a 20% reduction in daily peak hour vehicle trips. An annual report to the City would be required to monitor compliance. Staff also recommends a penalty clause for non-compliance be included in the program similar to other approved TDM Programs. Penalties would vary with the level of compliance, and would be calculated based on the estimated cost per employee of implementing a successful TDM Program. Finally, staff recommends the requirement to implement and manage a TDM Program be included in tenants’ lease agreements. A final TDM Program must be submitted for review and approval by staff prior to issuance of building permits. (See Attachment B, Conditions of Approval BP-18 and AT-9).

**Green Building:** The minimum green building standard required by the SMC for new non-residential construction over 5,000 square feet is to design for LEED Silver level. LEED certification is not required provided the design level is verified by a LEED professional. Per SMC 19.39, designing for a LEED Gold level with certification allows a 10% FAR bonus with no City Council approval required (staff would verify LEED compliance, verify the TDM Program meets requirements, and complete a Design Review). Using the green building bonus would result in an FAR of 45% for this site; however, since the proposed project exceeds that FAR, a City Council hearing is required with consideration of the Review Criteria for Projects Greater than 35% FAR regardless of the level of LEED certification achieved.

The existing project design has been verified to meet LEED Silver standards (56 points achieved where 50 is the minimum for Silver). The applicant has indicated an intent to design to LEED Gold level (at least 60 points). The applicant is working with a LEED consultant on modifications to achieve additional points for Gold certification. LEED consultants generally recommend designing for 5 points above the minimum certification standard as it is common for several intended points to be lost in the construction process. With this standard, an additional 9 points would be needed for reasonable assurance of Gold certification.

Exemplary design is one of the review criteria to be considered by the City Council in granting FAR over 35%, and “green” or sustainable features are typically considered as an element of design quality. While the proposed project complies with the minimum Code requirement of LEED Silver design, it does not provide an exemplary level of sustainability. Staff recommends Conditions of Approval PS-1.d, BP-19 and PF-6 (Attachment B) requiring the project to meet a LEED Gold design level and achieve LEED Gold certification. This will ensure the project design is exemplary in terms of sustainability.
**Stormwater Management:** The project will replace greater than 10,000 square feet of impervious surface; therefore, a Stormwater Management Plan (SWMP) is required. The current Municipal Regional Permit for stormwater discharge requires all treatment be achieved through Low Impact Development measures such as infiltration, harvesting/use, and biofiltration and limits the use of mechanical treatment. The applicant has prepared a draft SWMP which uses landscaped “raingardens” to retain and treat the site’s stormwater prior to discharging it to storm drains. Condition of Approval BP-16 requires third-party certification of a final SWMP prior to issuance of building permits.

**Easements/Undergrounding:** All utilities shall be placed underground per Conditions of Approval PS-4 and BP-29.

**Art in Private Development:** Sites over two acres in size are required to provide publicly displayed artwork (SMC 19.52). A separate permit for approval of the specific installation is required and is subject Arts Commission review. A variety of media are permitted, but required artwork must be visible from the street. The applicant has indicated the proposed patio at the corner of Maude Avenue and Mary Avenue is the preferred location for the project’s art installation. Staff has included a condition of approval addressing the placement and integration of the art to ensure the artwork will be designed specifically for this site (Attachment B, Condition of Approval BP-10).

**Compliance with Development Standards**

As conditioned, the proposed development meets SMC standards for the M-S zoning district including setbacks, lot coverage, height, landscaping, parking, and solid waste. Conditions of Approval are recommended to ensure compliance with parking lot shading requirements (Attachment B). The project complies with the Industrial Design Guidelines as discussed above.

**Expected Impact on the Surroundings**

The proposed project will include demolition of an existing one-story industrial building. Short-term construction-related impacts will include increased noise and dust (see construction plan in Attachment C, pages 3-4). These impacts are not expected to be significant as their proposed duration is short and there are no nearby sensitive uses such as residential. Long-term project impacts include increased building mass and height. These impacts are minimized through exceptional architecture and site design. Peak hour traffic is expected to be reduced by the proposed project. The site plan and high-quality building design will enhance the site and streetscape while minimizing negative impacts. The project is expected to improve the character of the surrounding area.
Environmental Review

A Mitigated Negative Declaration has been prepared in compliance with California Environmental Quality Act provisions and City guidelines (see Attachment C). An Initial Study determined that construction of the proposed project has the potential to result in significant effects on biological resources (possible disturbance of nesting birds) and cultural resources (possible discovery during excavation). Implementing mitigation measures during the construction phase will reduce these impacts to a less-than-significant level. The Mitigation Measures have been incorporated as Conditions of Approval (Attachment B).

FISCAL IMPACT

The proposed project is anticipated to have a positive fiscal impact on the City. Redevelopment of the site as proposed will increase the assessed value of the property and is estimated to result in the City receiving an additional $17,565 in property taxes annually (see Attachment A, page 10 for additional information). In addition, the proposed office building is designed to attract high-quality tenants such as corporate headquarters of technology companies. These tenants will have a positive economic impact by providing jobs and enhancing the image of the City.

Transportation Impact Fee: A Transportation Impact Fee is not required for this development, as the expected number of trips does not exceed the number generated by the existing Post Office use.

Housing Mitigation Fee: Higher-intensity industrial projects are required to mitigate the demand for affordable housing created by the development through payment of a Housing Mitigation Fee (SMC 19.22.035). The current Housing Mitigation Fee requirement is $9.08 per square foot of floor area exceeding 35% FAR. The required fee for this development is estimated at $409,698.68 (see Condition of Approval BP-9.a, Attachment B).

PUBLIC CONTACT

Planning Commission Study Session: The Planning Commission held a Study Session on the proposed project on November 28, 2011. Planning Commissioners generally supported the proposed development intensity, as well as the unique architectural design. Several Commissioners commented on the corner patio feature, stating that artwork placed at the corner may not be visible behind existing mature trees and that pedestrian or vehicle access at the corner may be desirable. Visibility of artwork from the street is a Code requirement and will be considered by the Arts Commission in their final decision on the location and type of artwork. A driveway near the corner is not
recommended as it could pose a traffic hazard. Staff and the applicant have explored a corner pedestrian entry; however, tree removals and grading would likely be required to locate a path from the street corner to the patio due to the steep grade, existing tree locations, and ADA accessibility requirements. Staff recommends Condition of Approval PS-1.e requiring pedestrian access from the public sidewalk into the site be provided as close to the corner as feasible, taking into account preservation of existing trees and accessibility requirements (see Attachment B).

Several Commissioners also had comments about the main driveway along Maude Avenue. The proposed driveway is close to the unsignalized intersection at Potrero Avenue (across Maude Avenue), and concerns were expressed about potential traffic conflicts. Staff reviewed the proposed driveway and found that its location is very similar to an existing site driveway. There is no history of vehicle collisions in this location. With the reduced traffic expected from the project, increased collision potential is unlikely. Relocating the driveway further from Potrero Avenue would have a significant impact on the project’s site plan, including eliminating the alignment of the driveway with the building entrance. As a result, staff does not recommend relocating this driveway. Should a safety issue with conflicting left turns arise in the future, the City has the ability to restrict eastbound left turns into the proposed site using signage or a median.

<table>
<thead>
<tr>
<th>Notice of Mitigated Negative Declaration and Public Hearing</th>
<th>Staff Report</th>
<th>Agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Published in the <em>Sun</em> newspaper</td>
<td>• Posted on the City of Sunnyvale’s Web site</td>
<td>• Posted on the City's official notice bulletin board</td>
</tr>
<tr>
<td>• Posted on the site</td>
<td>• Provided at the Reference Section of the City of Sunnyvale’s Public Library</td>
<td>• City of Sunnyvale’s Web site</td>
</tr>
<tr>
<td>• 36 notices mailed to the property owners and tenants within 300 ft. of the project site</td>
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</table>

**CONCLUSION**

**Findings and General Plan Goals:** Staff was able to make the required Findings for the Use Permit with the recommended conditions. Recommended Findings and General Plan Goals are located in Attachment A.

**Conditions of Approval:** Recommended Conditions of Approval are located in Attachment B.
**ALTERNATIVES**

1. Recommend the City Council adopt the Mitigated Negative Declaration and approve the Use Permit with the attached conditions.

2. Recommend the City Council adopt the Mitigated Negative Declaration and approve the Use Permit with modified conditions.

3. Recommend the City Council adopt the Mitigated Negative Declaration and deny the Use Permit.

4. Recommend the City Council not adopt the Mitigated Negative Declaration and direct staff as to where additional environmental analysis is required.

**RECOMMENDATION**

Alternative 1: Recommend the City Council adopt the Mitigated Negative Declaration and approve the Use Permit with the attached conditions.

Reviewed by:

Hanson Hom, Director, Community Development Department  
Reviewed by: Trudi Ryan, Planning Officer  
Prepared by: Mariya Hodge, Associate Planner

Approved by:

Gary M. Luebbers  
City Manager

**Attachments:**

A. Recommended Findings  
B. Recommended Conditions of Approval  
C. Mitigated Negative Declaration  
D. Site and Architectural Plans  
E. Project Justifications and Letters from the Applicant  
F. Draft Transportation Demand Management Program  
G. Map of Surrounding Floor Area Ratios  
H. Description of Office Class Levels
RECOMMENDED FINDINGS

Recommended Findings - Use Permit

In order to approve the Use Permit, the City Council must make one of the following two findings:

1. The proposed use attains the objectives and purposes of the General Plan of the City of Sunnyvale.

   This finding can be made for the project as conditioned. The project will enhance the character of the site, surrounding neighborhood, and community through redevelopment of a Class C industrial building with a high-quality Class A building. Compliance with adopted General Plan goals and policies is discussed below.

   **Land Use and Transportation Element**

   **Goal LT-6:** Sustain a strong local economy that contributes fiscal support for desired City services and provides a mix of jobs and commercial opportunities.

   **Policy LT-6.2:** Balance land use and transportation system carrying capacity necessary to support a vital and robust local economy.

   The proposed project allows for industrial redevelopment and economic growth which can be accommodated without significant impacts on the existing infrastructure and roadway systems.

   **Policy LT-6.4:** Encourage sustainable industries that emphasize resource efficiency, environmental responsibility, and the prevention of pollution and waste.

   The proposed project will redevelop an older industrial site with a new Class A facility intended for use by technology companies which are more likely to be engaged in sustainable industry. The project as conditioned will have a highly sustainable design achieving LEED Gold certification. The project as conditioned meets the General Plan policy for environmentally responsible developments.

   **Community Design Sub-Element**

   **Policy CC-3.1:** Place a priority on quality architecture and site design which will enhance the image of Sunnyvale and create a vital and attractive environment for businesses, residents and visitors, and be reasonably
balanced with the need for economic development to assure Sunnyvale’s economic prosperity.

The proposed project design uses exceptionally high-quality architecture that enhances the streetscape and the neighborhood, as well as a high-quality site design. The project will also provide additional jobs, enhancing both the image of Sunnyvale and the City’s economic prosperity.

2. **The proposed use is desirable, and will not be materially detrimental to the public welfare or injurious to the property, improvements or uses within the immediate vicinity and within the Zoning District.**

The above finding can be made for the project as proposed. The project will enhance the character of the site, surrounding neighborhood, and community by redeveloping a Class C industrial building with a new Class A structure. The proposed project uses exceptional architecture and high-quality site design as well as adequate setbacks and parking. The proposed project is expected to reduce peak hour vehicle trips and is not anticipated to have a negative traffic or circulation impact in the project area. Potential impacts on biological and cultural resources on the site will be mitigated as noted in the Mitigated Negative Declaration and Conditions of Approval. No other negative environmental impacts are anticipated. The project does not have a potential for detrimental impacts on surrounding properties or uses.

In addition to the two findings above, the City Council policy is to consider the following Review Criteria for Projects Greater Than 35% FAR:

3. **Certain development in excess 35% floor area ratio (FAR) in Industrial Zoning Districts (M-3 or M-S) requires approval of a Use Permit. To assist the decision makers in considering higher FAR developments, the following review criteria will be used:**

<table>
<thead>
<tr>
<th>Review Criteria</th>
<th>Discussion/Explanation</th>
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<tbody>
<tr>
<td><strong>CATEGORY I: COMMUNITY CHARACTER</strong> addresses the issues of land use and transportation capacity and neighborhood compatibility within the context of an overall City image.</td>
<td></td>
</tr>
<tr>
<td><strong>A.</strong> Is there sufficient current and future land use and transportation capacity to incorporate this project?</td>
<td>There is approximately 2.6 million square feet remaining in the City-wide development pool; this project would utilize 45,121 square feet. The project is expected to decrease peak hour vehicle trips compared to the existing use. In addition, the project will implement a TDM Program to further reduce vehicle trips.</td>
</tr>
<tr>
<td>Review Criteria</td>
<td>Discussion/Explanation</td>
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<td>---------------------------------------------------------------------------------</td>
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<tr>
<td><strong>B.</strong> Does project use and design contribute positively to a City image and community character that reflects current and future “high-tech” Silicon Valley?</td>
<td>The proposal will upgrade the site from an existing Class C tilt-up building to a new Class A building ideal for use by technology companies. The unique and high-quality architecture will contribute positively to community character. As conditioned, the building will be required to achieve LEED Gold certification. The contemporary architecture and sustainable features enhance the City’s high-tech image.</td>
</tr>
<tr>
<td><strong>C.</strong> Does the project include minor upgrading of the building for safety or special function purposes?</td>
<td>The proposed project includes redevelopment of the entire site and does not include minor upgrading of the building for safety or specific function purposes.</td>
</tr>
<tr>
<td><strong>D.</strong> Have potential adverse impacts on nearby land uses been avoided, minimized or mitigated?</td>
<td>The project site is surrounded by other industrial and office uses in the Industrial and Service zoning district. There are no anticipated negative impacts on surrounding sites. An initial study identified several potential impacts on biological and cultural resources on the subject site. Mitigation measures have been identified to reduce these impacts to a less-than-significant level.</td>
</tr>
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</table>

**CATEGORY II: ENVIRONMENTAL: TRAFFIC AND AIR QUALITY** focuses on the ability of a proposed project to avoid, minimize or mitigate City-wide and local traffic and air quality impacts.
<table>
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<tr>
<th>Review Criteria</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>E.</strong> Does the project avoid or mitigate significant effects on the regional or City-wide roadway system? Is the project sited to avoid impacts on constrained intersections or roadway segments?</td>
<td>The proposed project is estimated to result in a reduction in vehicle trips due to the high trip generation rates of the existing use. As a result, no Traffic Impact Analysis or Transportation Impact Fee is required. Significant effects on regional and City roadways are not anticipated. The applicant has submitted a TDM Program to further reduce vehicle trips to and from the site.</td>
</tr>
<tr>
<td></td>
<td>The adjacent roadways (Mary and Maude Avenues) are sufficiently wide in the vicinity of the project to provide adequate traffic flow. The intersection of Mary and Maude Avenues is not listed in the City’s Deficiency Plan.</td>
</tr>
<tr>
<td><strong>F.</strong> Are potential air quality impacts mitigated?</td>
<td>A project analysis prepared by ENVIRON has demonstrated the project is not expected to result in significant air quality or greenhouse gas impacts.</td>
</tr>
<tr>
<td><strong>G.</strong> Does the project provide opportunities for appropriate on-site retail/support services and amenities to minimize mid-day vehicle trips?</td>
<td>An existing neighborhood shopping center is located on Mary Avenue approximately ¼ mile from the project site. This center provides support services including restaurants and a shipping/postal center within a convenient walking distance. The proposed office building is speculative at this time and therefore has not developed detailed plans for on-site services. Future tenants may choose to provide on-site services such as employee laundry pick-up and delivery, shipping/postal services, and cafeteria or restaurant.</td>
</tr>
<tr>
<td><strong>H.</strong> Does the project provide mixed uses on the site to complement the primary use and adjacent land uses?</td>
<td>The proposed project is not a mixed-use project.</td>
</tr>
<tr>
<td>Review Criteria</td>
<td>Discussion/Explanation</td>
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<tr>
<td><strong>I.</strong> Is the project located in close proximity to a light rail or Cal-Train station, and/or other convenient transit stops?</td>
<td>The site is located 1.5 miles from the Sunnyvale Caltrain station. The Mountain View Caltrain station is 3 miles away from the project site but offers convenient shuttle service via the Mary Moffett Shuttle which stops adjacent to the project site. The site is located one mile from the Middlefield Light Rail Station in Mountain View. A bus stop is located across the street from the project site (on Maude just south of the intersection with Mary Avenue) which provides transportation to and from Caltrain and Light Rail. While transit ridership may be low compared to vehicle travel, there are sufficient nearby transit options to facilitate a reduction in single-occupant vehicle trips.</td>
</tr>
<tr>
<td><strong>J.</strong> Can identifiable and measurable negative impacts on City infrastructure and services be mitigated?</td>
<td>The proposed project is expected to reduce vehicle trips due to the high trip generation rates of the existing use on the site. While the proposed project requests higher FAR, a development pool is included in the General Plan land use scenario to allow intensification of individual sites above 35% FAR. The proposed project will draw from the development pool for its additional area. The project will pay Housing Mitigation Fees to offset housing demand inducing impacts, and will be required to pay connection and impact fees to offset any impacts on sewer capacity and other public utilities.</td>
</tr>
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</table>
### Review Criteria Discussion/Explanation

<table>
<thead>
<tr>
<th><strong>K.</strong></th>
<th>Is a Transportation Demand Management program planned for the site? Does it reduce traffic in general and promote transit use?</th>
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<tr>
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<td>The applicant has submitted a draft TDM Program prepared by Fehr and Peers Transportation Consultants (Attachment F). The draft program is intended to achieve a minimum of 16% peak hour trip reduction using measures including site design, a carpool/vanpool program, transit subsidies, and telecommuting programs. Staff recommends conditions of approval to modify the program goals to achieve at least 20% reduction in both total daily trips and peak hour trips. Staff also recommends conditions to ensure the program is implemented effectively by future tenants (Attachment B).</td>
</tr>
</tbody>
</table>

**CATEGORY III: SITE DESIGN AND ARCHITECTURE** addresses several components of site design and architecture; focusing on the visual features and aesthetics, techniques to reduce the bulk and mass of the buildings, ways to reduce the amount of surface parking on the site.

<table>
<thead>
<tr>
<th><strong>L.</strong></th>
<th>Does the project demonstrate exemplary architecture and design through:</th>
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<tr>
<td></td>
<td>The proposed project architecture demonstrates excellent design through the following elements:</td>
</tr>
<tr>
<td></td>
<td>• Unique building forms creating an state-of-the-art architectural design on a key corner site</td>
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<td></td>
<td>• High-quality materials including glass and steel for exterior facades</td>
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<td>• Green building design at a LEED Gold level (as conditioned)</td>
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<td>• High-quality site design including decorative paving, patio feature, and upgraded landscaping</td>
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• use of unique and/or high quality building materials, singly and in combination
• state of the art design and materials
• introduction of significant, innovative, and noteworthy architectural forms and elements
• special or unique features of the site plan design and implementation
<table>
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<tr>
<th>Review Criteria</th>
<th>Discussion/Explanation</th>
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<tr>
<td><strong>M.</strong> Does the project complement the City image and community character currently primarily low profile with a less intensive development density?</td>
<td>The proposed five-story Class A office building and site design meet SMC requirements and comply with the Industrial Design Guidelines. Although much of the surrounding community has a lower-profile character, the subject site is located on a corner site along a busy corridor near several other sites which have been redeveloped with higher-FAR Class A buildings. The proposed project complements the character of the surrounding area.</td>
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<td><strong>N.</strong> Does the site plan reduce the bulk and mass of the buildings on the site? Are the following techniques and others used in a creative and resourceful way?</td>
<td>The proposed architecture reduces the effect of mass and bulk through the following:</td>
</tr>
<tr>
<td>• Façade and roofline variations</td>
<td>• The high-quality glass exterior materials create a sense of lightness and translucency that reduces the apparent mass and bulk of the structure</td>
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<td>• Reduction in the building footprint and significant increase of landscaping required by Zoning Code</td>
<td>• Unique building forms including diagonal elements at the east and west sides and terraced roof decks on each building level at the north and south sides create significant façade interest which reduces the bulk and mass of the building</td>
</tr>
<tr>
<td>• Substantially greater setbacks than required by the Zoning Code</td>
<td>• The building footprint is minimized (24% lot coverage where 45% is the maximum) while significant trees and landscaping are used to soften the building’s appearance</td>
</tr>
<tr>
<td><strong>O.</strong> Does the site plan include techniques to reduce non-point source pollution?</td>
<td>The project has prepared a draft Stormwater Management Plan incorporating Best Management Practices to reduce storm water runoff on the site. In compliance with the current Municipal Regional Permit, landscaped raingardens will be used to treat stormwater runoff through biofiltration.</td>
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<tr>
<td>Review Criteria</td>
<td>Discussion/Explanation</td>
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<tr>
<td><strong>P.</strong> Is a reduction in the amount of surface parking achieved?</td>
<td>The proposed project reduces parking supply by providing 86 fewer parking spaces than the maximum permitted. This reduces the amount of impervious surface by approximately 14,000 square feet. A two-level parking structure is also provided to accommodate a portion of the site’s parking, which further reduces impervious surface.</td>
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<tr>
<td>• Significant reduction in the number of surface parking spaces</td>
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<tr>
<td>• Provision of structured parking and/or underground parking</td>
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<tr>
<td>• Introduction of a landscape reserve that can be converted to parking on an as-needed basis, or as a permanent park.</td>
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<tr>
<td><strong>Q.</strong> Is the site comprehensively planned through the creation of a Master Plan or Site Specific Plan? Has a long-term development plan been prepared that allows phasing of the project based on implementation of improvements and mitigations?</td>
<td>The proposal does not include a Master Plan or a Site Specific Plan and does not have a long-term development plan. The project is a single office building located on a single parcel.</td>
</tr>
<tr>
<td><strong>R.</strong> How is the calculation of the “effective” FAR being conducted? Does the size of the project warrant a different method of calculating the FAR?</td>
<td>The FAR has been determined based on SMC standards for FAR; which includes all square footage within the exterior walls of the buildings. No street dedication is required, so gross FAR is not a factor in this project. There is currently no tenant identified for the building. Therefore, no amenities are planned at this time such as cafeterias, large meeting venues, non-employment areas or other services that may reduce effective FAR.</td>
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</table>
**Review Criteria** | **Discussion/Explanation**
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**CATEGORY IV: ECONOMIC, FISCAL AND COMMUNITY BENEFIT** identifies the need to relate the project to the economic prosperity program of the City, potential impact on the City, the relationship to the local economy and employment in terms of the types and numbers of jobs likely to be generated by the project and other features of the development that will result in an overall positive community benefit. The following questions provide examples of how benefit can be described. Please respond to as many as apply.

1. **Does the project implement the goals of the Economic Prosperity Program?**

   The proposed project will assist in achieving the goals of the Economic Prosperity Program which includes business retention, expansion, and economic vitality in a significant industry sector.

   *Goal - Retention of Jobs: Actively promote the City to companies that will create jobs for Sunnyvale residents.*

   *Goal - Local Service Businesses: To preserve opportunity for profitable operation of those small local businesses which provide critical support services to other business and to residents.*

   A new Class A facility will attract companies that will create jobs for Sunnyvale residents. While a Class A building is unlikely to be occupied by small local businesses, site employees are likely to patronize small businesses such as those located at the nearby commercial center on Mary Avenue.
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| 2. Does this project have a significant net positive fiscal impact over the next 5-20 years? | Finance staff has calculated the potential fiscal impact to the City, including potential net revenue generation, property tax and Building Permit fees. The project does not include a “point of sale” use since the building is speculative; therefore no sales tax revenues are anticipated at this time.  
  - The City share of the property tax increase after redevelopment (based on valuation) has been estimated to be $17,565 annually. (Note: future assessed value was not available at the time of this estimate, therefore the construction value of the project was used in-lieu of assessed value.) |
| 3. Does the project include the provision of on-site corporate headquarters and/or a “point of sale” office? | The proposed building is speculative at this time. The site and building design is appropriate for use by corporate headquarters or major divisions of a large company.                                                                                                                                                                                  |
| 4. To what extent does this project provide resident and/or youth employment opportunities both now and in the future? | The proposed building is speculative and the future tenants of the building are not known at this time. A high-quality Class A building is expected to provide additional employment opportunities in the City.                                                                                                                   |
| 5. Do the anticipated types and numbers of jobs complement the current and desired future job profile in Sunnyvale? | The proposed building is speculative and the future tenants of the building are not known at this time. However, the project is designed to accommodate corporate headquarters such as technology companies. These types of jobs are consistent with the City’s economical development goals and are critical to job expansion. |
| 6. To what degree do the proposed jobs generate related jobs and services in Sunnyvale? | The proposed jobs are expected to generate minor additional demand for related services. Using the industry multiplier forecast, for every one job created in this industry segment, three additional jobs are created in the community as support services. |
### Review Criteria

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<td>7.</td>
<td>The project is intended primarily for a single user or has common/shared management (Action Statement C4.2.2.)</td>
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<td>8.</td>
<td>Can the applicant identify other community benefits that could be attributed to the proposed project?</td>
</tr>
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ATTACHMENT B

RECOMMENDED CONDITIONS OF APPROVAL AND STANDARD DEVELOPMENT REQUIREMENTS FEBRUARY 7, 2012

Planning Application 2011-7657
580 North Mary Avenue

Use Permit for a new 124,095 square foot, 5-story office building resulting in approximately 55% Floor Area Ratio with a new 1.5-story parking structure.

The following Conditions of Approval [COA] and Standard Development Requirements [SDR] apply to the project referenced above. The COAs are specific conditions applicable to the proposed project. The SDRs are items which are codified or adopted by resolution and have been included for ease of reference, they may not be appealed or changed. The COAs and SDRs are grouped under specific headings that relate to the timing of required compliance. Additional language within a condition may further define the timing of required compliance. Applicable mitigation measures are noted with “Mitigation Measure” and placed in the applicable phase of the project.

In addition to complying with all applicable City, County, State and Federal Statutes, Codes, Ordinances, Resolutions and Regulations, Permittee expressly accepts and agrees to comply with the following Conditions of Approval and Standard Development Requirements of this Permit:

GC: THE FOLLOWING GENERAL CONDITIONS AND STANDARD DEVELOPMENT REQUIREMENTS SHALL APPLY TO THE APPROVED PROJECT.

GC-1. CONFORMANCE TO APPROVED PLANNING APPLICATION:
All building permit drawings and subsequent construction and operation shall substantially conform to the approved planning application, including: drawings/plans, materials samples, building colors, and other items submitted as part of the approved application. Any proposed amendments to the approved plans or Conditions of Approval are subject to review and approval by the City. The Director of Community Development shall determine whether revisions are considered major or minor. Minor changes are subject to review and approval by the Director of Community Development. Major changes are subject to review at a public hearing. [COA] [PLANNING]

GC-2. PERMIT EXPIRATION:
The permit shall be null and void two years from the date of approval by the final review authority at a public hearing if the approval is not exercised, unless a written request for an extension is received prior to expiration date and is approved by the Director of Community Development. [SDR] [PLANNING]
GC-3. TITLE 25:
Provisions of Title 25 of the California Administrative Code shall be satisfied with dependence on mechanical ventilation. [SDR] [BUILDING]

GC-4. STORMWATER MANAGEMENT PLAN:
The project is subject to Provision C.3 of the Municipal Regional Stormwater Permit Order No. R2-2009-0074, as determined by a completed “Stormwater Management Plan Data Form”, and therefore must submit a Stormwater Management Plan as per SMC 12.60.140 prior to issuance of the building permit. [SDR] [PLANNING]

GC-5. ENCROACHMENT PERMIT:
Prior to any work in the public right-of-way, obtain an encroachment permit with insurance requirements for all public improvements including a traffic control plan per the latest CA MUTCD standards to be reviewed by the City's Transportation and Traffic Division [SDR] [PUBLIC WORKS].

GC-6. USES:
The building is approved for use by industrial, corporate office, and research and development office uses. Medical offices and medical clinics are not permitted by this Use Permit due to insufficient parking. Medical office and clinic uses require separate review and approval by the Director of Community Development. [COA] [PLANNING]

PS: THE FOLLOWING CONDITIONS SHALL BE MET PRIOR TO SUBMITTAL OF BUILDING PERMIT, AND/OR GRADING PERMIT.

PS-1. REQUIRED REVISIONS TO PROJECT PLANS:
The plans shall be revised to address comments from staff, the Planning Commission, and/or the City Council including the following:

a) The parking lot design shall be modified to remove the parking space located closest to the eastern Maude Avenue driveway and replace it with landscaping area. This will extend the driveway throat and reduce potential vehicle conflicts.

b) The parking lot design shall be modified to use standard curbs instead of rolled curbs, unless otherwise approved by the Director of Community Development upon a finding that the proposed rolled curbs provide an effective backstop without the use of separate wheel stop bars.
c) Parking lot shading data shall be corrected to count only the portion of a tree’s canopy which casts shade over an adjacent paved area, not the full size of the canopy. Parking lot landscaping shall comply with the requirement for 50% shading of parking areas and drive aisles within 15 years of planting.

d) Demonstrate the project is designed to meet the standards for LEED Gold certification. A LEED checklist shall be submitted including verification by a qualified LEED professional.

e) Revise site access to locate a pedestrian path from the public sidewalk into the site as close to the corner of Mary Avenue and Maude Avenue as possible, taking into account tree preservation goals and ADA accessibility requirements. [COA] [PLANNING]

PS-2. EXTERIOR MATERIALS REVIEW:
Final exterior building materials and color scheme are subject to review and approval by the Director of Community Development prior to submittal of a building permit. [COA] [PLANNING]

PS-3. PARKING AND CIRCULATION PLAN:
Submit a revised parking and circulation plan subject to review and approval by the Director of Community Development prior to submittal of a building permit. The parking and circulation plan shall include all striping and signage required to direct on-site vehicles. [COA] [PLANNING]

PS-4. UNDERGROUND UTILITIES:
The applicant shall demonstrate that all project utilities including transformers can be placed underground in compliance with SMC requirements. Any modifications shall be submitted to the Director of Community Development for review prior to submittal of building permit plans. [COA] [PLANNING]

BP: THE FOLLOWING CONDITIONS SHALL BE ADDRESSED ON THE CONSTRUCTION PLANS SUBMITTED FOR ANY DEMOLITION PERMIT, BUILDING PERMIT, GRADING PERMIT, AND/OR ENCROACHMENT PERMIT AND SHALL BE MET PRIOR TO THE ISSUANCE OF SAID PERMIT(S).

BP-1. CONDITIONS OF APPROVAL:
Final plans shall include all Conditions of Approval included as part of the approved application starting on sheet 2 of the plans. [COA] [PLANNING]
BP-2. RESPONSE TO CONDITIONS OF APPROVAL:
A written response indicating how each condition has or will be addressed shall accompany the building permit set of plans. [COA] [PLANNING]

BP-3. NOTICE OF CONDITIONS OF APPROVAL:
A Notice of Conditions of Approval shall be filed in the official records of the County of Santa Clara and provide proof of such recordation to the City prior to issuance of any City permit, allowed use of the property, or Final Map, as applicable. The Notice of Conditions of Approval shall be prepared by the Planning Division and shall include a description of the subject property, the Planning Application number, attached conditions of approval and any accompanying subdivision or parcel map, including book and page and recorded document number, if any, and be signed and notarized by each property owner of record.

For purposes of determining the record owner of the property, the applicant shall provide the City with evidence in the form of a report from a title insurance company indicating that the record owner(s) are the person(s) who have signed the Notice of Conditions of Approval. [COA] [PLANNING]

BP-4. BLUEPRINT FOR A CLEAN BAY:
The building permit plans shall include a “Blueprint for a Clean Bay” on one full sized sheet of the plans. [SDR] [PLANNING]

BP-5. RECYCLING AND SOLID WASTE ENCLOSURE:
The building permit plans shall include details for the installation of a recycling and solid waste enclosure. The required solid waste and recycling enclosure shall:

a) Match the design, materials and color of the parking garage building into which the enclosure will be integrated.

b) Be of masonry construction.

c) Provide screening of the enclosure interior through solid/opaque enclosure doors. [COA] [PLANNING]

BP-6. RECYCLING AND SOLID WASTE CONTAINER:
All recycling and solid waste containers shall be metal or State Fire Marshall listed non-metallic. The building permit plans shall provide details illustrating compliance with this condition. [COA] [PLANNING]
BP-7. **SOLID WASTE DISPOSAL PLAN:**
A detailed recycling and solid waste disposal plan shall be submitted for review and approval by the Director of Community Development prior to issuance of building permit. [COA] [PLANNING]

BP-8. **ROOF EQUIPMENT:**
Roof vents, pipes, flues, and equipment shall be combined and/or collected together behind parapets out of public view as per Title 19 of the Sunnyvale Municipal Code and shall be painted to match the roof. [COA] [PLANNING]

BP-9. **FEES AND BONDS:**
The following fees and bonds shall be paid in full prior to issuance of building permit:

a) **HOUSING MITIGATION FEE** - Pay Housing Mitigation fee estimated at $409,698.68, prior to issuance of a building Permit. (SMC 19.22). [SDR] [PLANNING]

b) **ART IN PRIVATE DEVELOPMENT BOND** – A bond, letter of credit, cash deposit or other similar security instrument for 1% of the construction valuation of the entire development project will be required prior to issuance of a building permit. The bond will not be released until completion and installation of the artwork requirement including related landscaping, lighting, base work and commemorative plaque. [SDR] [PLANNING]

BP-10. **ART IN PRIVATE DEVELOPMENT:**
a) Publicly visible artworks shall be provided along Mary Avenue and/or Maude Avenue. The artwork shall be integrated into the building architecture or landscape and be designed specifically for this site to ensure a strong association with the site and context.

b) An Art in Private Development application shall be submitted to the Director of Community Development, subject to review and approval by the Arts Commission, prior to issuance of a building permit. [COA] [PLANNING]

BP-11. **LANDSCAPE PLAN:**
Landscape and irrigation plans shall be prepared by a certified professional, and shall comply with Sunnyvale Municipal Code Chapter 19.37 requirements. Landscape and irrigation plans are subject to review and approval by the Director of Community Development through the submittal of a Miscellaneous Plan Permit (MPP). The landscape plan shall include the following elements:

a) Parking lot shading data shall be included in the landscaping plans and shall be corrected to count only the portion of a tree’s canopy which casts shade over an adjacent paved area, not the full
size of the canopy. Parking lot landscaping shall comply with the requirement for 50% shading of parking areas and drive aisles within 15 years of planting.

b) Landscaping plans shall include locations and details of equipment such as backflow prevention devices. Any such equipment shall be appropriately screened with screening details provided on plans.

c) All areas not required for parking, driveways or structures shall be landscaped.

d) Provide trees at minimum 30-foot intervals along the side and rear property lines, except where mature trees are located immediately adjoining on neighboring properties.

e) Deciduous trees shall be provided along southern and western exposures where possible for passive solar heating and cooling purposes.

f) At least ten percent (10%) of trees planted shall be 24-inch box size or larger and no tree shall be less than 15-gallon size.

g) Any “protected trees” (as defined in SMC 19.94) approved for removal shall be replaced with a specimen tree of at least 36-inch box size.

h) Provide a minimum ten-foot wide landscape buffer along the Mary Avenue and Maude Avenue frontages.

i) Ground covers shall be planted so as to ensure full coverage eighteen months after installation.

j) Landscaping plans shall demonstrate compliance with the water efficient landscaping requirements in SMC 19.37.

k) Landscaping plans and stormwater management plans shall be developed in conjunction to prevent conflicts.

l) Decorative paving as shown on the approved site plans shall be retained as an integral landscaping feature of the final building permit plans.

m) Backflow devices and other appurtenances shall include screening and covers as approved by the Director of Community Development. This includes all devices (irrigation, DCDA, etc.) located above ground. Screening shall consist of black metal mesh with rounded top covers (e.g. – “mailbox style”) and may also incorporate landscaping as additional screening. [COA] [PLANNING]

BP-12. LANDSCAPE MAINTENANCE PLAN:
Prepare a landscape maintenance plan subject to review and approval by the Director of Community Development prior to issuance of building permit. [COA] [PLANNING]
BP-13. TREE PROTECTION PLAN:
Prior to issuance of a demolition permit, a grading permit or a building permit, whichever occurs first, obtain approval of a Tree Protection Plan from the Director of Community Development. The Tree Protection Plan shall include measures noted in Title 19 of the Sunnyvale Municipal Code and at a minimum:

a) An inventory shall be taken of all existing trees on the plan including the valuation of all ‘protected trees’ by a certified arborist, using the latest version of the “Guide for Plant Appraisal” published by the International Society of Arboriculture (ISA).

b) All existing (non-orchard) trees on the plans, showing size and varieties, and clearly specify which are to be retained.

c) Provide fencing around the drip line of the trees that are to be saved and ensure that no construction debris or equipment is stored within the fenced area during the course of demolition and construction.

d) Overlay civil plans including utility lines to ensure existing tree root systems are not damaged during utility work.

e) The tree protection plan shall be installed prior to issuance of any building, grading, or demolition permits, subject to on-site inspection and approval by the City Arborist and shall be maintained in place during the duration of construction and shall be added to any subsequent building permit plans. [COA] [PLANNING/CITY ARBORIST]

BP-14. FENCES AND WALLS:
Design, height, and location of any proposed fencing or walls shall be subject to review and approval by the Director of Community Development. [COA] [PLANNING]

BP-15. STORMWATER MANAGEMENT PLAN:
Submit two copies of a Stormwater Management Plan subject to review and approval by Director of Community Development and third party certification, pursuant to SMC 12.60, prior to issuance of building permit. [COA] [PLANNING/PUBLIC WORKS]

BP-16. STORM WATER MANAGEMENT PLAN THIRD PARTY CERTIFICATION:
Third party certification of the Storm Water Management Plan is required per the following guidance: City of Sunnyvale – Storm Water Quality BMP Applicant Guidance Manual for New and Redevelopment Projects - Addendum: Section 3.1.2 Certification of Design Criteria Third-Party Certification of Storm Water Management Plan Requirements. The third party certification shall be provided prior to building permit issuance. [SDR] [PLANNING/PUBLIC WORKS]
BP-17. BEST MANAGEMENT PRACTICES - STORMWATER:
The project shall comply with the following source control measures as outlined in the BMP Guidance Manual and SMC 12.60.220. Best management practices shall be identified on the building permit set of plans and shall be subject to review and approval by the Director of Public Works:

a) Storm drain stenciling. The stencil is available from the City's Environmental Division Public Outreach Program, which may be reached by calling (408) 730-7738.

b) Landscaping that minimizes irrigation and runoff, promotes surface infiltration where possible, minimizes the use of pesticides and fertilizers, and incorporates appropriate sustainable landscaping practices and programs such as Bay-Friendly Landscaping.

c) Appropriate covers, drains, and storage precautions for outdoor material storage areas, loading docks, repair/maintenance bays, and fueling areas.

d) Covered trash, food waste, and compactor enclosures.

e) Plumbing of the following discharges to the sanitary sewer, subject to the local sanitary sewer agency’s authority and standards:
   i) Discharges from indoor floor mat/equipment/hood filter wash racks or covered outdoor wash racks for restaurants.
   ii) Dumpster drips from covered trash and food compactor enclosures.
   iii) Discharges from outdoor covered wash areas for vehicles, equipment, and accessories.
   iv) Water feature and fountain discharges, if discharge to onsite vegetated areas is not a feasible option.
   v) Fire sprinkler test water, if discharge to onsite vegetated areas is not a feasible option. [SDR] [PLANNING]

BP-18. TRANSPORTATION DEMAND MANAGEMENT:
A final Transportation Demand Management (TDM) Program shall be submitted for review and approval by the Director of Community Development Prior to issuance of a building permit. The final TDM program shall incorporate the following:

a) The program goals shall be revised to require a minimum of a 20% reduction in total daily vehicle trips and a minimum of a 20% reduction in daily peak hour vehicle trips.

b) A penalty clause shall be included for non-compliance with the TDM measures. Penalties shall vary with the level of compliance
and shall be calculated based on the estimated cost per employee of implementing a successful TDM Program.

c) All lease agreements with future tenants of the site shall note that the tenant is responsible for the tenant to implement and manage the TDM Program. [COA] [PLANNING]

BP-19. GREEN BUILDING:
Final plans shall incorporate a completed LEED green building checklist demonstrating the project design achieves a LEED Gold level as verified by a qualified LEED consultant. [COA] [PLANNING]

BP-20. CITY STREET TREES:
The landscape plan shall including existing and proposed City street trees and shall be submitted for review and approval by the City Arborist prior to issuance of building permit. [COA] [ENGINEERING/CITY ARBORIST]

BP-21. PHOTOMETRIC PLAN:
Prior to issuance of a building permit submit a contour photometric plan for review and approval by the Director of Community Development. The plan shall meet the specifications noted in the Standard Development Requirements. [COA] [PLANNING]

BP-22. LIGHTING PLAN:
Prior to issuance of a building permit submit a detailed lighting plan for review and approval by the Director of Community Development. The plan shall include light fixture design, materials, and colors as well as information on photocell control, shielding, vandal-resistant covers, lighting type, and energy efficiency. [COA] [PLANNING]

BP-23. COMPACT SPACES:
Specify compact parking spaces on the building permit plans. All such areas shall be clearly marked prior to occupancy, in accordance with Title 19 of the Sunnyvale Municipal Code. [SDR] [PLANNING]

BP-24. BICYCLE SPACES:
Provide a minimum of 16 Class I bicycle parking spaces and a minimum of 5 Class II bicycle parking spaces (per VTA Bicycle Technical Guidelines) or as approved by the Director of Community Development. [COA] [PLANNING]

BP-25. BICYCLE SUPPORT FACILITIES:
Indoor shower and locker facilities shall be provided for men and women at the ratio of one shower for every 30 employees and
individual lockers and shall be subject to review and approval by the Director of Community Development prior to issuance of a building permit. [COA] [PLANNING]

BP-26. CARPOOL PARKING:
The plans submitted for building permits shall incorporate preferential parking spaces reserved and so marked in the closest possible rows adjoining the building (allowing for visitor, disabled and pool van parking) for exclusive use by carpool vehicles carrying at least two employees per vehicle. [COA] [PLANNING]

BP-27. MITIGATION MEASURE – BIOLOGICAL RESOURCES:
Final construction drawings shall incorporate all mitigation measures related to biological resources as set forth under “Mitigation Measures” in the approved environmental document and as noted below. Mitigation Measure

WHAT:
In conformance with Federal and State regulations regarding protection of raptors, the following CDFG protocols shall be completed prior to any development on the site to ensure that development does not disturb nesting raptors:

1. Avoidance. Construction activities should be scheduled to avoid the nesting season to the extent feasible. The nesting season for most birds in Santa Clara County extends from April 1st through August 31st.

2. Preconstruction/Pre-disturbance Surveys. If demolition and/or construction are to occur between April and August, then preconstruction surveys for nesting birds shall be conducted by a qualified ornithologist to ensure that no nests will be disturbed during project implementation. This survey shall be conducted no more than seven days prior to the initiation of demolition/construction activities. During this survey, the ornithologist shall inspect all trees and other potential habitats (e.g., shrubs, ruderal grasslands, buildings) within and immediately adjacent to the impact areas for nests. If an active nest is found sufficiently close to work areas to be disturbed by these activities, the ornithologist, in consultation with CDFG, shall determine the extent of a construction-free buffer zone to be established around the nest (typically 250 feet for raptors and 50-100 feet for other species) to ensure that no nests of species protected by the MBTA or California Fish and Game Code will be disturbed during project implementation.
3. *Inhibit Nesting.* If vegetation is to be removed by the project and all necessary approvals have been obtained, potential nesting substrate (e.g., bushes, trees, grass, burrows) that are scheduled to be removed by the project shall be removed before the start of the nesting season (prior to April 1st), if feasible, to help preclude nesting. This will preclude the initiation of nests in this vegetation and prevent the potential delay of the project due to the presence of active nests in these substrates. A final report of nesting birds, including any protection measures, shall be submitted to the Director of Community Development prior to the start of grading.

**WHEN:**
These mitigation measures shall be converted into conditions of approval for the Use Permit prior to its final approval. The conditions will become valid when the Use Permit is approved. Conditions will be applicable during the construction of the project.

**WHO:**
The property owner will be solely responsible for implementation and maintenance of these mitigation measures.

**HOW:**
The conditions of approval will require these mitigation measures to be incorporated into the project construction plans.

[COA]  [PLANNING]

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BP-28. **MITIGATION MEASURE – CULTURAL RESOURCES:**
Final construction drawings shall incorporate all mitigation measures related to cultural resources as set forth under “Mitigation Measures” in the approved environmental document and as noted below.

**Mitigation Measure**

**WHAT:**
1) For projects involving substantial ground disturbance, the individual project sponsor shall be required to contact the California Historical Resources Information System (CHRIS) to determine whether the particular project is located in a sensitive area. Future development projects that the CHRIS determines may be located in a sensitive area, on or adjoining an identified archaeological site, shall proceed only after the project sponsor contracts with a qualified archaeologist to provide a determination in regard to cultural values remaining on the site and warranted mitigation measures.

2) In the event that subsurface cultural resources are encountered during approved ground-disturbing activities for a project area construction activity, work in the immediate vicinity shall be stopped
and a qualified archaeologist retained to evaluate the finds following the procedures described below. If human remains are found, special rules set forth in State Health and Safety Code section 7050.5 and CEQA Guidelines section 15126.4(b) shall apply. Preservation in place to maintain the relationship between the artifact(s) and the archaeological context is the preferred manner of mitigating impacts to an archaeological site. Preservation may be accomplished by:

- Planning construction to avoid the archaeological site;
- Incorporating the site within a park, green space, or other open space element;
- Covering the site with a layer of chemically stable soil; or
- Deeding the site into a permanent conservation easement.

3) When in-place mitigation is determined by the City to be infeasible, a data recovery plan, which makes provisions for adequate recovery of the scientifically consequential information about the site, shall be prepared and adopted prior to any additional excavation being undertaken. Such studies must be submitted to the California Historical Resources Regional Information Center. If Native American artifacts are indicated, the studies must also be submitted to the Native American Heritage Commission. Identified cultural resources shall be recorded on form DPR 422 (archaeological sites). Mitigation measures recommended by these two groups and required by the City shall be undertaken, if necessary, prior to resumption of construction activities. A data recovery plan and data recovery shall not be required if the City determines that testing or studies already completed have adequately recovered the necessary data, provided that the data have already been documented in another EIR or are available for review at the California Historical Resource Regional Information Center [CEQA Guidelines section 15126.4(b)].

**WHEN:**
These mitigation measures shall be converted into conditions of approval for the Use Permit prior to its final approval. The conditions will become valid when the Use Permit is approved. Conditions will be applicable during the construction of the project.

**WHO:**
The property owner will be solely responsible for implementation and maintenance of these mitigation measures.

**HOW:**
The conditions of approval will require these mitigation measures to be incorporated into the project construction plans.

[COA] [PLANNING]
BP-29. **UNDERGROUND UTILITIES:**
All utilities shall be placed underground, including boundary lines and transformers, in compliance with SMC requirements. The applicant shall provide a copy of an agreement with affected utility companies for undergrounding of any existing overhead utilities which are on-site or within adjoining rights-of-way prior to issuance of a building permit. [SDR] [PLANNING]

BP-30. **UTILITY CONDUITS:**
Install conduits along the project frontage for cable television, electrical and telephone lines in accordance with standards required by utility companies. Submit a conduit plan prior to issuance of a building permit. [COA] [PLANNING]

BP-31. **FIRE PROTECTION WATER SUPPLY:**
The water supply for fire protection and fire fighting shall be approved by the Department of Public Safety prior to issuance of building permits. A fire hydrant will be required within 50 feet of the FDC on the same side of the street. [SDR] [DPS/FIRE PREVENTION]

BP-32. **FIRE SPRINKLERS:**
A fully automatic fire sprinkler system, fire alarm system, standpipes, and smoke control system are required. Trash enclosures located within 5 feet of building exterior walls or overhangs require fire sprinkler protection. [SDR] [DPS/FIRE PREVENTION]

BP-33. **FIRE EXTINGUISHERS:**
Provide the required number of approved fire extinguishers. [SDR] [DPS/FIRE PREVENTION]

BP-34. **FIRE HYDRANTS:**
Replace all fire hydrants on the project site and along the project frontages which are 30 years or older. [COA] [DPS/FIRE PREVENTION/PUBLIC WORKS ENGINEERING]

BP-35. **FIRE ACCESS ROADS:**
Provide fire access roads as required by Fire Prevention Services. On-site fire hydrants may be required along fire access roads and/or in parking lots. [SDR] [DPS/FIRE PREVENTION]
BP-36. KNOX BOX:  
A Knox (key) box will be required for site and building access in accordance with Fire Prevention guidelines. [COA] [DPS/FIRE PREVENTION]

BP-37. RADIO RETRANSMISSION:  
Radio retransmission equipment may be required for emergency responder radio coverage. [COA] [DPS/FIRE PREVENTION]

BP-38. CONSTRUCTION FIRE ACCESS:  
Prior to any combustible materials on-site, provide fire access drives and operational on-site fire protection systems. [SDR] [DPS/FIRE PREVENTION]

BP-39. FIRE PROTECTION PLAN:  
Provide a written Fire Protection Construction Plan for review and approval by Fire Prevention Services prior to issuance of building permits. [SDR] [DPS/FIRE PREVENTION]

BP-40. ELECTRONIC PLANS:  
Provide an electronic version of building permit plans to Fire Protection Services to assist with Fire Department “Pre-Fire Survey” maps. [SDR] [DPS/FIRE PREVENTION]

BP-41. CONNECTION FEES:  
The developer shall pay all applicable Public Works fees including utility frontage fees, connection fees, and off-site improvement plan and inspection fees prior to issuance of any building permit or encroachment permit. This includes an incremental sewer connection fee estimated at $75,215.15 and an incremental water connection fee estimated at $14,869.98 prior to issuance of a building permit or encroachment permit, whichever occurs first. [COA] [PUBLIC WORKS ENGINEERING]

BP-42. SIDEWALKS:  
Replace all uplifted sidewalk along the project’s Mary Avenue frontage and install root barriers according to the latest City standards. [COA] [PUBLIC WORKS ENGINEERING]

BP-43. DRIVEWAYS AND RAMPS:  
All driveways and access ramps shall be ADA compliant and meet current City standards. Curb-return style driveways are not permitted. [COA] [PUBLIC WORKS ENGINEERING]
BP-44. Curb Striping:
Restrripe the existing red curb along the entire project frontage and maintain as new facilities warrant. [COA] [Public Works Engineering]

BP-45. Double Check Detector Assembly:
Replace the double check detector assembly (DCDA) to current City standards. [COA] [Public Works Engineering]

BP-46. Sewer Cleanout:
Install sanitary sewer cleanouts at the property lines. [COA] [Public Works Engineering]

BP-47. Water Meters:
Upgrade all water meters to radio-read disk-type. [COA] [Public Works Engineering]

BP-48. Signal Equipment:
Due to the potential increase in pedestrian traffic, upgrade pedestrian signal equipment. Proposed upgrades shall be reviewed and approved by the City’s Transportation and Traffic Division. [COA] [Public Works Engineering]

BP-49. Abandoned Driveway Approaches:
All unused driveway approaches shall be replaced with curbs, gutters, and sidewalks meeting current City standards. [SDR] [Public Works Engineering]

BP-50. Equipment at Driveway Approach:
No meters or vaults shall be located within the driveway approach areas. [COA] [Public Works Engineering]

EP: The following conditions shall be addressed as part of an Encroachment Permit Application.

EP-1. Connection Fees:
The developer shall pay all applicable Public Works fees including utility frontage fees, connection fees, and off-site improvement plan and inspection fees prior to issuance of any building permit or encroachment permit. This includes an incremental sewer connection fee estimated at $75,215.15 and an incremental water connection fee
estimated at $14,869.98 prior to issuance of a building permit or encroachment permit, whichever occurs first. [COA] [PUBLIC WORKS ENGINEERING]

**PF: THE FOLLOWING CONDITIONS SHALL BE ADDRESSED ON THE CONSTRUCTION PLANS AND/OR SHALL BE MET PRIOR TO RELEASE OF UTILITIES OR ISSUANCE OF A CERTIFICATE OF OCCUPANCY.**

**PF-1. LANDSCAPING AND IRRIGATION:**
All landscaping and irrigation as contained in the approved building permit plan shall be installed prior to occupancy. [COA] [PLANNING]

**PF-2. COMPACT SPACES:**
All such areas shall be clearly marked prior to occupancy, as indicated on the approved building permit plans. [COA] [PLANNING]

**PF-3. PARKING LOT STRIPING:**
All parking lot striping, carpool and compact spaces shall be striped as per the approved plans and Public Works standards. [COA] (PLANNING/ENGINEERING)

**PF-4. IRRIGATION METERS:**
For commercial and industrial projects, to ensure appropriate sewer billing (water used for irrigation may not be billed for sewer), the developer may provide separate (irrigation and other) intake meters. Such meters may be installed prior to occupancy of the building. [COA] [PLANNING]

**PF-5. MITIGATION MEASURES:**
Documentation indicating that all environmental mitigation measures have been satisfied shall be provided to the Director of Community Development prior to release of occupancy or utilities. Refer to the Mitigated Negative Declaration and Conditions of Approval BP-24 and BP-25 for detailed measures. [COA] [PLANNING] Mitigation Measure

**PF-6. GREEN BUILDING:**
As soon as possible after construction of the project, the developer shall submit the project for LEED certification at a Gold level. The City shall be provided with documentation of the submittal and the final determination on certification. [COA] [PLANNING]
DC: THE FOLLOWING CONDITIONS SHALL BE COMPLIED WITH AT ALL TIMES DURING THE CONSTRUCTION PHASE OF THE PROJECT.

DC-1. BLUEPRINT FOR A CLEAN BAY:
The project shall be in compliance with stormwater best management practices for general construction activity until the project is completed and either final occupancy has been granted. [SDR] [PLANNING]

DC-2. TREE PROTECTION:
All tree protection shall be maintained, as indicated in the tree protection plan, until construction has been completed and the installation of landscaping has begun. [COA] [PLANNING]

DC-3. TRAFFIC SIGNAL CABINET:
The applicant is advised that the northeast intersection houses the main traffic signal cabinet and electrical service point for the entire traffic signal system. The applicant shall exercise extreme caution when working around these facilities to avoid damage. If project construction affects the existing equipment, the applicant shall be responsible for immediate repair and/or replacement of the equipment to restore the traffic signal system at their own cost. [COA] [PUBLIC WORKS ENGINEERING]

AT: THE FOLLOWING CONDITIONS SHALL BE COMPLIED WITH AT ALL TIMES THAT THE USE PERMITTED BY THIS PLANNING APPLICATION OCCUPIES THE PREMISES.

AT-1. RECYCLING AND SOLID WASTE:
All exterior recycling and solid waste shall be confined to approved receptacles and enclosures. [COA] [PLANNING]

AT-2. LOUDSPEAKERS PROHIBITED:
Out-of-door loudspeakers shall be prohibited at all times. [COA] [PLANNING]

AT-3. EXTERIOR EQUIPMENT:
All exterior materials, equipment and/or supplies of any kind shall be maintained within an approved enclosure area. Any stacked or stored items shall not exceed the height of the enclosure. [COA] [PLANNING]
AT-4. UNENCLOSED STORAGE (PROHIBITED):
Unenclosed storage of any kind shall be prohibited on the premises. [COA] [PLANNING]

AT-5. LANDSCAPE MAINTENANCE:
All landscaping shall be installed in accordance with the approved landscape plan and shall thereafter be maintained in a neat, clean, and healthful condition. Trees shall be allowed to grow to the full genetic height and habit (trees shall not be topped). Trees shall be maintained using standard arboriculture practices. [COA] [PLANNING]

AT-6. PARKING LOT MAINTENANCE:
The parking lot shall be maintained in accordance with the approved plans and as follows:
a) Clearly mark all employee, compact, carpool, and other designated spaces. This shall be specified on the building permit plans and completed prior to occupancy.
b) Maintain all parking lot striping and marking in good condition.
c) Assure that adequate lighting is available in parking lots to keep them safe and desirable for the use.
d) Require signs to direct vehicles to additional parking spaces on-site, as needed. [COA] [PLANNING]

AT-7. BMP MAINTENANCE:
The project applicant, owner, landlord, or HOA must properly maintain any structural or treatment control best management practices to be implemented in the project, as described in the approved Stormwater Management Plan and indicated on the approved building permit plans. [SDR] [PLANNING]

AT-8. BMP RIGHT OF ENTRY:
The project applicant, owner, landlord, or HOA, shall provide access to the extent allowable by law for representatives of city, the local vector control district, and the Regional Water Quality Control Board, strictly for the purposes of verification of proper operation and maintenance for the storm water treatment best management practices contained in the approved Storm Water Management Plan. [SDR] [PLANNING]

AT-9. TRANSPORTATION DEMAND MANAGEMENT:
An annual monitoring report shall be submitted to the Director of Community Development in January of each year. The report shall demonstrate compliance with the approved TDM Program including measures implemented and data on trip reductions achieved. If the
TDM goals are not met in a given year, the property owners and/or tenant shall submit to the Director of Community Development proposed program modifications intended to achieve the required goals in future years. [COA] [PLANNING]
**CEQA DOCUMENT DECLARATION**

**ENVIRONMENTAL FILING FEE RECEIPT**

**PLEASE COMPLETE THE FOLLOWING:**

**1.** LEAD AGENCY: City of Sunnyvale

**2.** PROJECT TITLE: Application for a Use Permit

**3.** APPLICANT NAME: Peery-Arrillaga

**4.** APPLICANT ADDRESS: 580 N. Mary Avenue, CA 94086

**5.** PROJECT APPLICANT IS: ☐ Local Public Agency ☐ School District ☐ Other Special District ☐ State Agency ☑ Private Entity

**6.** NOTICE TO BE POSTED FOR 21 DAYS.

**7.** CLASSIFICATION OF ENVIRONMENTAL DOCUMENT

<table>
<thead>
<tr>
<th>a. PROJECTS THAT ARE SUBJECT TO DFG FEES</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ 1. ENVIRONMENTAL IMPACT REPORT (PUBLIC RESOURCES CODE §21152) $2,839.25 $0.00</td>
</tr>
<tr>
<td>☐ 2. NEGATIVE DECLARATION, (PUBLIC RESOURCES CODE §21080(C) $2,044.00 $0.00</td>
</tr>
<tr>
<td>☐ 3. APPLICATION FEE WATER DIVERSION (STATE WATER RESOURCES CONTROL BOARD ONLY) $965.50 $0.00</td>
</tr>
<tr>
<td>☐ 4. PROJECTS SUBJECT TO CERTIFIED REGULATORY PROGRAMS $949.50 $0.00</td>
</tr>
<tr>
<td>☐ 5. COUNTY ADMINISTRATIVE FEE (REQUIRED FOR A-1 THROUGH A-4 ABOVE) $50.00 $0.00</td>
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<tr>
<th>b. PROJECTS THAT ARE EXEMPT FROM DFG FEES</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ 1. NOTICE OF EXEMPTION ($50.00 COUNTY ADMINISTRATIVE FEE REQUIRED) $50.00 $0.00</td>
</tr>
</tbody>
</table>

| ☐ 2. A COMPLETED "CEQA FILING FEE NO EFFECT DETERMINATION FORM" FROM THE DEPARTMENT OF FISH & GAME, DOCUMENTING THE DFG'S DETERMINATION THAT THE PROJECT WILL HAVE NO EFFECT ON FISH, WILDLIFE AND HABITAT, OR AN OFFICIAL, DATED RECEIPT / PROOF OF PAYMENT SHOWING PREVIOUS PAYMENT OF THE DFG FILING FEE FOR THE SAME PROJECT IS ATTACHED ($50.00 COUNTY ADMINISTRATIVE FEE REQUIRED) |

| DOCUMENT TYPE: ☐ ENVIRONMENTAL IMPACT REPORT ☐ NEGATIVE DECLARATION $50.00 $0.00 |

<table>
<thead>
<tr>
<th>c. NOTICES THAT ARE NOT SUBJECT TO DFG FEES OR COUNTY ADMINISTRATIVE FEES</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ NOTICE OF PREPARATION ☐ NOTICE OF INTENT NO FEE $0.00</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>8. OTHER:</th>
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<tr>
<td>☐ NOTICE OF INTENT FEE (IF APPLICABLE): $0.00</td>
</tr>
</tbody>
</table>

9. TOTAL RECEIVED: $0.00

**NOTE:** "SAME PROJECT" MEANS NO CHANGES. IF THE DOCUMENT SUBMITTED IS NOT THE SAME (OTHER THAN DATES), A "NO EFFECT DETERMINATION" LETTER FROM THE DEPARTMENT OF FISH AND GAME FOR THE SUBSEQUENT FILING OR THE APPROPRIATE FEES ARE REQUIRED.

*THIS FORM MUST BE COMPLETED AND ATTACHED TO THE FRONT OF ALL CEQA DOCUMENTS LISTED ABOVE (INCLUDING COPIES) SUBMITTED FOR FILING. WE WILL NEED AN ORIGINAL (WET SIGNATURE) AND THREE COPIES. (YOUR ORIGINAL WILL BE RETURNED TO YOU AT THE TIME OF FILING.)*

**CHECKS FOR ALL FEES SHOULD BE MADE PAYABLE TO: SANTA CLARA COUNTY CLERK-RECORDER**

**PLEASE NOTE:** FEES ARE ANNUALLY ADJUSTED (Fish & Game Code §711.4(b)); PLEASE CHECK WITH THIS OFFICE AND THE DEPARTMENT OF FISH AND GAME FOR THE LATEST FEE INFORMATION.

*... NO PROJECT SHALL BE OPERATIVE, VESTED, OR FINAL, NOR SHALL LOCAL GOVERNMENT PERMITS FOR THE PROJECT BE VALID, UNTIL THE FILING FEES REQUIRED PURSUANT TO THIS SECTION ARE PAID.* Fish & Game Code §711.4(c)(3)

12-02-2009 (FEES EFFECTIVE 01-01-2011)
NOTICE OF INTENT TO ADOPT A
MITIGATED NEGATIVE DECLARATION

This form is provided as a notification of an intent to adopt a Mitigated Negative Declaration which has been prepared in compliance with the provisions of the California Environmental Quality Act of 1970, as amended, and Resolution #118-04.

PROJECT TITLE:
Application for a Use Permit filed by Peery-Arrillaga.

PROJECT DESCRIPTION AND LOCATION (APN):
2011-7657: Peery-Arrillaga [Applicant] A&P Children Invsllc [Owner] Use Permit for a new 124,095 square foot, five-story office building resulting in approximately 55% Floor Area Ratio with a new 1.5-story parking structure located at 580 N. Mary Avenue. (APN: 165-41-002)

WHERE TO VIEW THIS DOCUMENT:
The Mitigated Negative Declaration, its supporting documentation and details relating to the project are on file and available for review and comment in the Office of the Secretary of the Planning Commission, City Hall, 456 West Olive Avenue, Sunnyvale.

This Mitigated Negative Declaration may be protested in writing by any person prior to 5:00 p.m. on Tuesday, February 7, 2011. Protest shall be filed in the Department of Community Development, 456 W. Olive Avenue, Sunnyvale and shall include a written statement specifying anticipated environmental effects which may be significant. A protest of a Mitigated Negative Declaration will be considered by the adopting authority, whose action on the protest may be appealed.

HEARING INFORMATION:
A public hearing on the project is scheduled for:
Monday, January 9, 2011 at 8:00 p.m. and Tuesday, February 7, 2011 at 7:00 p.m. in the Council Chambers, City Hall, 456 West Olive Avenue, Sunnyvale.

TOXIC SITE INFORMATION:
(No) listed toxic sites are present at the project location.

Circulated On December 19, 2011

Signed: [Signature]
Geni Caruso, Principal Planner
<table>
<thead>
<tr>
<th>Project Title</th>
<th>Use Permit #2011-7657</th>
</tr>
</thead>
</table>
| Lead Agency Name and Address | City of Sunnyvale  
P.O. Box 3707, Sunnyvale, CA 94088-3707 |
| Contact Person | Mariya Hodge, Associate Planner |
| Phone Number | 408-730-7659 |
| Project Location | 580 North Mary Avenue  
Sunnyvale, CA 94085  
(APN: 155-41-002) |
| Applicant's Name | Peery-Arrillaga / A&P Children Invislic |
| Project Address | 580 North Mary Avenue  
Sunnyvale, CA 94085 |
| Zoning | M-S (Industrial and Service) |
| General Plan | Industry |
| Other Public Agencies whose approval is required | None |

**Brief description of the Project:** The proposed project includes demolition of an existing 50,406 square foot single-story industrial building and construction of a new 124,095 square foot five-story office building with a new two-level parking structure. The project will result in approximately 55% Floor Area Ratio (FAR) and requires approval of a Use Permit due to a requested FAR exceeding 35%.

**DETAILED PROJECT DESCRIPTION:**

**On-site Development:** The proposed project involves demolition of an existing single-story concrete tilt-up building, grading and site preparation, and construction of a new five-story steel framed office building. A new two-level parking structure will be located partially below grade resulting in 1.5 stories visible above grade. Existing mature trees located on the interior of the site will be removed during demolition. Mature perimeter trees will be retained and protected during construction to the extent feasible.

**Off-site Improvements:** An existing driveway and curb cut along Mary Avenue will be removed, and existing curb, gutter, and sidewalk will be repaired or replaced as needed along Mary Avenue. An existing driveway along Maude Avenue will be widened. No other off-site improvements are proposed.

**Construction Activities and Schedule:** The existing use is expected to vacate the site in May of 2012. Demolition is proposed to begin as soon as possible after vacancy. The proposed construction schedule spans a total of 16 months for demolition, site preparation, and construction. Time estimates for specific construction phases are as follows:
Demolition – 1 week
Site Preparation – 3 weeks (includes staking, grading, and layout for foundation)
Foundation/Reinforcing Steel – 1 month
Structural Steel/Metal Decking – 2 months
Underground Utilities – 1 month
Roof and Decks Construction – 1 month
Exterior Skin and Mechanical – 4 months
Interior Construction including Electrical and Plumbing – 4 months
Fine Grading and Landscaping – 2 months

Construction of the project will not involve pile driving or other extremely high noise-generating activities, with the exception of jack hammering which will occur only during the demolition phase.

Surrounding Uses and Setting: The project site is located on the corner of Mary Avenue and Maude Avenue within an existing industrial area. It is currently occupied by the U.S. Postal Service and used as a Post Office. Surrounding sites are developed primarily with single-story industrial buildings similar to the existing building on the subject site. There are several sites in the immediate vicinity which have been redeveloped with multi-story office campuses with Floor Area Ratios (FARs) similar to the FAR requested on the subject site. Surrounding uses are industrial, R&D, and offices. There is an existing commercial shopping center located on Mary Avenue approximately 1/4 mile from the subject site which is occupied by restaurants and other supportive commercial uses. There are no surrounding residential uses within 1/3 mile of the project site.
EVALUATION OF ENVIRONMENTAL IMPACTS:

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4. "Negative Declaration: Potentially Significant Unless Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section 17, "Earlier Analysis," may be cross-referenced).

5. Earlier analysis may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c) (3) (d). In this case, a brief discussion should identify the following:

6. Earlier Analysis Used. Identify and state where they are available for review.

7. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

8. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

9. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g. general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
ENVIROMENTAL FACTORS POTENTIALLY AFFECTED:
The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics  ☐ Hazards & Hazardous Materials  ☐ Public Services
☐ Agricultural Resources  ☐ Hydrology/Water Quality  ☐ Recreation
☐ Air Quality  ☐ Land Use/Planning  ☐ Transportation/Traffic
☐ Biological Resources  ☐ Mineral Resources  ☐ Utilities/Service Systems
☐ Cultural Resources  ☐ Noise  ☐ Mandatory Findings of Significance
☐ Geology/Soils  ☐ Population/Housing

MANDATORY FINDINGS OF SIGNIFICANCE (see checklist for further information):

Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

☐ Yes  ☑ No

Mandatory Findings of Significance? Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects)?

☐ Yes  ☑ No

Mandatory Findings of Significance? Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

☐ Yes  ☑ No
DETERMINATION:
On the basis of this initial evaluation:

- I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared. □
- I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared. □
- I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. □
- I find that the proposed project MAY have a "potential significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed. □
- I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required. □

Checklist preparer: Mariya Hodge

Title: Associate Planner
City of Sunnyvale

Signature: [Signature]

Date: 12/19/2011
<table>
<thead>
<tr>
<th>Planning</th>
<th>Potentially Significant Impact</th>
<th>Less than Significant with Mitigation</th>
<th>Less Than Significant</th>
<th>No Impact</th>
<th>Source Other Than Project Description and Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aesthetics - Substantially damage scenic resources, including, but not limited to trees, historic buildings?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>Sunnyvale General Plan Map, Open Space Sub-element <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>2. Aesthetics - Substantially degrade the existing visual character or quality of the site and its surroundings including significant adverse visual changes to neighborhood character?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>Sunnyvale General Plan Map, Open Space Sub-element <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>3. Aesthetics - Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>Sunnyvale General Plan Map, Open Space Sub-element <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>4. Population and Housing - Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure), in a way that is inconsistent with the Sunnyvale General Plan?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Sunnyvale Land Use and Transportation Element of the General Plan, General Plan Map <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>5. Population and Housing - Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>Housing Sub-Element, Land Use and Transportation Element and General Plan Map <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>6. Population and Housing - Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>Housing Sub-Element <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>7. Land Use Planning - Physically divide an established community?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>Sunnyvale General Plan Map <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>Planning</td>
<td>Potentially Significant Impact</td>
<td>Less than Significant Impact</td>
<td>Less Than Significant Mitigation</td>
<td>No Impact</td>
<td>Source Other Than Project Description and Plans</td>
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<tr>
<td>10. For a project located the Moffett Field AICUZ or an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Moffett Field Air Installations Compatible Use Zones (AICUZ) Study Map, Sunnyvale Zoning Map, Sunnyvale General Plan Map <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>11. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>There are no private airstrips in or in the vicinity of Sunnyvale</td>
</tr>
<tr>
<td>12. For a project within the vicinity of Moffett Federal Airfield, would the project result in a safety hazard for people residing or working in the project area?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Air Installations Compatible Use Zones (AICUZ) Study Map</td>
</tr>
<tr>
<td>13. Agricultural Resources - Conflict with existing zoning for agricultural use, or a Williamson Act contract?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>Sunnyvale Zoning Map <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>Planning</td>
<td>Potentially Significant Impact</td>
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</tr>
<tr>
<td>15. Noise - Exposure of persons to or generation of excessive groundborne vibration?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sunnyvale Noise Sub-element <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>16. Noise - A substantial permanent or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sunnyvale Noise Sub-element <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>17. Biological Resources - Have a substantially adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S Wildlife Service?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Santa Clara Valley Habitat Conservation Plan (under development, expected adoption date mid-2012), <a href="http://www.scv-habitatplan.org">www.scv-habitatplan.org</a></td>
</tr>
<tr>
<td>18. Biological Resources - Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Santa Clara Valley Habitat Conservation Plan (under development, expected adoption date mid-2012), <a href="http://www.scv-habitatplan.org">www.scv-habitatplan.org</a></td>
</tr>
<tr>
<td>19. Biological Resources - Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Santa Clara Valley Habitat Conservation Plan (under development, expected adoption date mid-2012), <a href="http://www.scv-habitatplan.org">www.scv-habitatplan.org</a></td>
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<tr>
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<tr>
<td>20. Biological Resources - Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>SMC 19.90 Tree Preservation Ordinance, Sunnyvale Inventory of Heritage Trees, Arborist's Report and Tree Survey (Barrie D. Coate and Associates, Oct. 2011)</td>
</tr>
<tr>
<td>21. Biological Resources - Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, other approved local, regional, or state habitat conservation plan?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Santa Clara Valley Habitat Conservation Plan (under development, expected adoption date mid-2012), <a href="http://www.scv-habitatplan.org">www.scv-habitatplan.org</a></td>
</tr>
<tr>
<td>22. Historic and Cultural Resources - Cause a substantial adverse change in the significance of a historical resource or a substantial adverse change in an archeological resource?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>Sunnyvale Heritage Preservation Sub-Element, Sunnyvale Inventory or Heritage Resources, The United States Secretary of the Interior's &quot;Guidelines for Rehabilitation&quot;, Criteria of the National Register of Historic Places</td>
</tr>
<tr>
<td>23. Historic and Cultural Resources - Disturb any human remains, including those interred outside of formal cemeteries?</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>Project description. Project grading and excavation will disturb the site and have the potential to affect subsurface resources if they exist.</td>
</tr>
<tr>
<td>24. Public Services - Would the project result in substantial adverse physical impacts associated with the provision of new or expanded public schools, the construction of which could cause significant environmental impacts, in order to maintain acceptable performance objectives?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>The following public school districts are located in the City of Sunnyvale: Fremont Union High School District, Sunnyvale Elementary School District, Cupertino Union School District and Santa Clara Unified School District. See discussion for information about school impacts.</td>
</tr>
<tr>
<td>25. Air Quality - Conflict with or obstruct implementation of the BAAQMD air quality plan? How close is the use to a major road, hwy. or freeway?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>BAAQMD CEQA Guidelines, Sunnyvale General Plan Map, Sunnyvale Air Quality Sub-Element <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a>, Project Air Quality and Greenhouse Gas Technical Report (ENVIRON, Nov. 2011)</td>
</tr>
<tr>
<td>Planning</td>
<td>Potentially Significant Impact</td>
<td>Less than Sig. With Mitigation</td>
<td>Less Than Significant</td>
<td>No Impact</td>
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</tr>
<tr>
<td>26. Air Quality - Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>BAAQMD CEQA Guidelines, AB 32, Project Air Quality and Greenhouse Gas Technical Report (ENVIRON, Nov. 2011)</td>
</tr>
<tr>
<td>28. Air Quality - Violate any air quality standard or contribute substantially to an existing or projected air quality violation.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>BAAQMD CEQA Guidelines, Sunnyvale Air Quality Sub-Element, Project Air Quality and Greenhouse Gas Technical Report (ENVIRON, Nov. 2011)</td>
</tr>
<tr>
<td>29. Air Quality - Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>BAAQMD CEQA Guidelines, Sunnyvale Air Quality Sub-Element, <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a>, Project Air Quality and Greenhouse Gas Technical Report (ENVIRON, Nov. 2011)</td>
</tr>
<tr>
<td>31. Seismic Safety - Rupture of a known earthquake fault, as delineated on the most recent Aquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>Seismic Safety and Safety Sub-Element of the Sunnyvale General Plan <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a>, Santa Clara County Office of Planning Geologic Hazard Zones Maps</td>
</tr>
<tr>
<td>Planning</td>
<td>Potentially Significant Impact</td>
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</tr>
<tr>
<td>32. Seismic Safety - Inundation by seiche, tsunami, or mudflow?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>Seismic Safety and Safety Sub-Element of the Sunnyvale General Plan&lt;br&gt;www.sunnyvaleplanning.com, Santa Clara County Office of Planning Geologic Hazard Zones Maps</td>
</tr>
<tr>
<td>34. Seismic Safety - Seismic-related ground failure, including liquefaction?</td>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>☐</td>
<td>Seismic Safety and Safety Sub-Element of the Sunnyvale General Plan&lt;br&gt;www.sunnyvaleplanning.com, Santa Clara County Office of Planning Geologic Hazard Zones Maps</td>
</tr>
</tbody>
</table>

Further Discussion if "Less Than Significant" with or without mitigation:

**#4. Population and Housing (Less than Significant):** The proposed project at 124,095 square feet represents approximately 55% Floor Area Ratio (FAR) where 35% FAR is permitted by right. Additional FAR over 35% requires approval of a Use Permit by the City Council. The proposed development intensity is consistent with the existing zoning (Industrial and Service – M-S) and General Plan designation (Industry) of the site as the proposed development intensity may be permitted by Use Permit. The new office square footage would create opportunities for new jobs and could cause a small increase in the City’s jobs/housing balance. Sunnyvale Municipal Code section 19.22.035 requires payment of a Housing Mitigation Fee for any new floor area exceeding 35% FAR in industrial zoning districts. Housing Mitigation Fees are paid at building permit issuance and may be subject to change annually based on the adopted fee schedule. Housing Mitigation Fees are intended to mitigate the potential housing impacts of new jobs by providing funds for the creation of new housing units. This is a standard Code requirement for all projects exceeding 35% FAR in industrial zoning districts and is therefore not a project-specific mitigation. With payment of the required Housing Mitigation Fee, the project will mitigate any potential population growth and job growth impacts. As a result, the project will not be inconsistent the Sunnyvale General Plan.

**#10 and #12. Moffett Federal Airfield AICUZ (Less than Significant):** The project site is located in the vicinity of the Moffett Federal Airfield. According to the Air Installation Compatible Use Zones (AICUZ) Map, the project site is located in a "C3" zone with respect to accident potential. This zone is identified as having minimal accident potential. The zone is identified as being unacceptable for residential uses but normally acceptable for office buildings. While some accident potential exists associated with the airfield, it is minimal. The impact is determined to be less than significant and requires no mitigation.
#17. Biological Resources (Less than Significant with Mitigation): The proposed project includes the removal of several large trees and site grading. The site is currently developed and in active use, therefore the site is unlikely to have been occupied by burrowing owls (Athene cunicularia) which are present in some areas of Sunnyvale. Nesting raptors have not been specifically observed on the site, but there is a potential for raptors to establish nests in tall mature trees such as those on the project site. Although the discovery of nesting raptors on the site is not anticipated, the following mitigation measure has been included in the project to reduce the potential impact to a less than significant level.

WHAT:
In conformance with Federal and State regulations regarding protection of raptors, the following CDFG protocols shall be completed prior to any development on the site to ensure that development does not disturb nesting raptors:

1. Avoidance. Construction activities should be scheduled to avoid the nesting season to the extent feasible. The nesting season for most birds in Santa Clara County extends from April 1st through August 31st.

2. Preconstruction/Pre-disturbance Surveys. If demolition and/or construction are to occur between April and August, then preconstruction surveys for nesting birds shall be conducted by a qualified ornithologist to ensure that no nests will be disturbed during project implementation. This survey shall be conducted no more than seven days prior to the initiation of demolition/construction activities. During this survey, the ornithologist shall inspect all trees and other potential habitats (e.g., shrubs, ruderal grasslands, buildings) within and immediately adjacent to the impact areas for nests. If an active nest is found sufficiently close to work areas to be disturbed by these activities, the ornithologist, in consultation with CDFG, shall determine the extent of a construction-free buffer zone to be established around the nest (typically 250 feet for raptors and 50-100 feet for other species) to ensure that no nests of species protected by the MBTA or California Fish and Game Code will be disturbed during project implementation.

3. Inhibit Nesting. If vegetation is to be removed by the project and all necessary approvals have been obtained, potential nesting substrate (e.g., bushes, trees, grass, burrows) that are scheduled to be removed by the project shall be removed before the start of the nesting season (prior to April 1st), if feasible, to help preclude nesting. This will preclude the initiation of nests in this vegetation and prevent the potential delay of the project due to the presence of active nests in these substrates. A final report of nesting birds, including any protection measures, shall be submitted to the Director of Community Development prior to the start of grading.

WHEN:
These mitigation measures shall be converted into conditions of approval for the Use Permit prior to its final approval. The conditions will become valid when the Use Permit is approved. Conditions will be applicable during the construction of the project.

WHO:
The property owner will be solely responsible for implementation and maintenance of these mitigation measures.

HOW:
The conditions of approval will require these mitigation measures to be incorporated into the project construction plans.

20. Biological Resources (Less than Significant): An Arborist's Report and Tree Survey was completed by Barrie D. Coate and Associates, dated October 7, 2011. The report reviewed the existing trees on-site and concluded that as part of the project, a number of trees will need to be removed to allow the reconfiguration of parking and circulation areas and the construction of the new buildings. Protected trees are defined by the Sunnyvale Municipal Code as any tree greater than 38" in circumference measured at 4.5' from the adjacent grade. The survey evaluated 56 trees and shrubs existing on the site and identified 43 as protected trees. The project site plan and landscaping plans have been developed to
<table>
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<tr>
<th>Planning</th>
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</table>

retain the existing mature protected trees to the greatest extent feasible. A total of 23 protected trees are proposed for removal. These trees will be replaced as required by the Sunnyvale Municipal Code and as per the final landscape plan.

**#23. Historic and Cultural Remains (Less than Significant with Mitigation):** The proposed project includes grading, land disturbance, and excavation for the new building and parking structure. Although there are no recorded archeological sites in the immediate area of the proposed building locations, there still remains the possibility of discovery of Native American remains during grading since there are archeological sites in the greater vicinity. In the event of a discovery, project grading could result in potential disturbance of subsurface cultural resources which would result in a significant impact unless mitigated. There are no surface historic resources currently known to be on the project sites. Although the discovery of cultural resources on these sites is not anticipated, the following mitigation measure has been included in the project to reduce the potential impact to a less than significant level:

**WHAT:**

1) For projects involving substantial ground disturbance, the individual project sponsor shall be required to contact the California Historical Resources Information System (CHRISS) to determine whether the particular project is located in a sensitive area. Future development projects that the CHRISS determines may be located in a sensitive area, or on or adjoining an identified archaeological site, shall proceed only after the project sponsor contracts with a qualified archeologist to provide a determination in regard to cultural values remaining on the site and warranted mitigation measures.

2) In the event that subsurface cultural resources are encountered during approved ground-disturbing activities for a project area construction activity, work in the immediate vicinity shall be stopped and a qualified archaeologist retained to evaluate the finds following the procedures described below. If human remains are found, special rules set forth in State Health and Safety Code section 7050.5 and CEQA Guidelines section 15126.4(b) shall apply. Preservation in place to maintain the relationship between the artifact(s) and the archaeological context is the preferred manner of mitigating impacts to an archaeological site. Preservation may be accomplished by:

- Planning construction to avoid the archaeological site;
- Incorporating the site within a park, green space, or other open space element;
- Covering the site with a layer of chemically stable soil; or
- Deeding the site into a permanent conservation easement.

3) When in-place mitigation is determined by the City to be infeasible, a data recovery plan, which makes provisions for adequate recovery of the scientifically consequential information about the site, shall be prepared and adopted prior to any additional excavation being undertaken. Such studies must be submitted to the California Historical Resources Regional Information Center. If Native American artifacts are indicated, the studies must also be submitted to the Native American Heritage Commission. Identified cultural resources shall be recorded on form DPR 422 (archaeological sites). Mitigation measures recommended by these two groups and required by the City shall be undertaken, if necessary, prior to resumption of construction activities. A data recovery plan and data recovery shall not be required if the City determines that testing or studies already completed have adequately recovered the necessary data, provided that the data have already been documented in another EIR or are available for review at the California Historical Resource Regional Information Center [CEQA Guidelines section 15126.4(b)].

**WHEN:**

These mitigation measures shall be converted into conditions of approval for the Use Permit prior to its final approval. The conditions will become valid when the Use Permit is approved. Conditions will be applicable during the construction of the project.

**WHO:**
The property owner will be solely responsible for implementation and maintenance of these mitigation measures. The conditions of approval will require these mitigation measures to be incorporated into the project construction plans.

**#34. Seismic Safety (Less than Significant):** Per the Santa Clara County Geologic Hazard Zones maps, the project site is located in a liquefaction hazard zone. The Uniform Building Code contains a series of requirements to address safety issues regarding soil types. These standards must be met for a building permit to be issued. Through the City's implementation of the Uniform Building Code requirements for areas with potential for seismic activity, potential impacts related to liquefaction hazards will be less than significant and require no additional mitigation.

**Responsible Division:** Planning Division
**Completed by:** Marlya Hodge, Associate Planner
<table>
<thead>
<tr>
<th>Transportation</th>
<th>Potentially Significant Impact</th>
<th>Less than Significant With Mitigation</th>
<th>Less Than Significant</th>
<th>No Impact</th>
<th>Source Other Than Project Description and Plans</th>
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<tr>
<td>35. Exceeds the capacity of the existing circulation system, based on an applicable measure of effectiveness (as designated in a general plan policy, ordinance, etc.), taking into account all modes of transportation including nonmotorized travel and all relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian walkways, bicycle paths, and mass transit?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>City's Land Use and Transportation Element, Santa Clara County Transportation Plan Congestion Management Program, Institute of Transportation Engineers (ITE) Trip Generation Manual 8th Edition, Memorandum by Fehr &amp; Peers on Project Trip Generation Estimates (Oct. 2011)</td>
</tr>
<tr>
<td>36. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measurements, or other standards established by the county congestion management agency for designated roads or highways?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>Santa Clara County Congestion Management Program and Technical Guidelines (for conducting TIA and LOS thresholds), Institute of Transportation Engineers (ITE) Trip Generation Manual 8th Edition, Memorandum by Fehr &amp; Peers on Project Trip Generation Estimates (Oct. 2011)</td>
</tr>
<tr>
<td>37. Results in a change in air traffic patterns, including either an increase in air traffic levels or a change in flight patterns or location that results in substantial safety risks to vehicles, bicycles, or pedestrians?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>Sunnyvale General Plan including the Land Use and Transportation Element, Sunnyvale Zoning Map</td>
</tr>
<tr>
<td>38. Substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>City and CA Standard Plans &amp; Standard Specifications</td>
</tr>
<tr>
<td>39. Conflict with adopted policies, plans, or programs regarding public transit or nonmotorized transportation?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>Sunnyvale Bicycle Plan, VTA Bicycle Technical Guidelines, VTA Short Range Transit Plan</td>
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### Transportation

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<th>Source Other Than Project Description and Plans</th>
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<tr>
<td>Potentially Significant</td>
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</table>

#### Further Discussion:

**#35 and #36. Capacity and Congestion Management (No Impact):** Although the proposed project would increase floor area ratio on the site from approximately 22.3% FAR to approximately 55% FAR, the project is anticipated to result in a reduction in vehicle trips. The existing Post Office use is a very high generator of vehicle trips. According to the ITE Trip Generation Manual 8th edition, a 50,406 square foot Post Office is expected to generate approximately 560 PM peak hour trips. A 124,000 square foot office building is expected to generate only 218 PM peak hour trips, which represents less than 40% of the estimated existing peak hour trips. Due to potential variations in activity among Post Office locations, the applicant commissioned a trip generation survey to count actual trips generated by the existing Post Office use on this site. According to the Memorandum on Project Trip Generation Estimates (Fehr & Peers, October 14, 2011), 401 PM peak hour trips were generated by the existing site during the survey period. While these trips are fewer than the 560 estimated by ITE, they still represent nearly twice the peak hour trips expected to be generated by the proposed 55% FAR office development. As a result, the project is expected to result in a decrease in vehicle trips and roadway congestion. There is no anticipated negative transportation impact.

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Responsible Division: Transportation and Traffic Division  
Completed by: Mariya Hodge, Associate Planner
<table>
<thead>
<tr>
<th>Building</th>
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<th>Less than Significant Without Mitigation</th>
<th>Less than Significant</th>
<th>No Impact</th>
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</tr>
</thead>
<tbody>
<tr>
<td>43. Hydrology and Water Quality - Place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?</td>
<td>❌</td>
<td></td>
<td>❌</td>
<td>❌</td>
<td>FEMA Flood Insurance Rate Map Effective 5/13/09, <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a>, California Building Code, Title 16 (Building) of the Sunnyvale Municipal Code</td>
</tr>
<tr>
<td>44. Hydrology and Water Quality - Place within a 100-year flood hazard area structures which would impede or redirect flood flows?</td>
<td>❌</td>
<td></td>
<td>❌</td>
<td>❌</td>
<td>FEMA Flood Insurance Rate Map Effective 5/13/09, <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a>, California Building Code, Title 16 (Building) of the Sunnyvale Municipal Code</td>
</tr>
<tr>
<td>45. Hydrology and Water Quality - Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?</td>
<td>❌</td>
<td></td>
<td>❌</td>
<td>❌</td>
<td>1995 ABAG Dam Inundation Map <a href="http://www.abag.ca.gov">www.abag.ca.gov</a>, California Building Code, Title 16 (Building) of the Sunnyvale Municipal Code</td>
</tr>
<tr>
<td>47. Geology and Soils - Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?</td>
<td>❌</td>
<td></td>
<td>❌</td>
<td>❌</td>
<td>Safety and Seismic Safety Sub-Element, <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a>, California Plumbing, Mechanical, and Electrical Codes and Title 16 (Building) of the Sunnyvale Municipal Code</td>
</tr>
</tbody>
</table>
48. Geology and Soils - Be located on expansive soil, as defined by the current building code, creating substantial risks to life or property? □ □ □ □ California Plumbing, Mechanical, and Electrical Codes and Title 16 (Building) of the Sunnyvale Municipal Code

Further Discussion if “Less Than Significant” with or without mitigation:

#47. Geology and Soils (Less than Significant): Per the Santa Clara County Geologic Hazard Zones maps, the project site is located in a liquefaction hazard zone. The Uniform Building Code contains a series of requirements to address safety issues regarding soil types. These standards must be met for a building permit to be issued. Through the City’s implementation of the Uniform Building Code requirements for areas with potential for seismic activity, potential impacts related to liquefaction hazards will be less than significant and require no additional mitigation.

General Discussion: The California Building Code contains a series of building code requirements to address safety issues regarding seismic shaking, flooding, and soil types. In addition, Title 16.62 of the Sunnyvale Municipal Code requires a series of measures for provisions to reduce flood-related hazards to buildings. These standards are suggested by the Federal Emergency Management Agency and required by code by the City of Sunnyvale. These standards must be met for a building permit to be issued.

Responsible Division: Building Division
Completed by: Mariya Hodge, Associate Planner
<table>
<thead>
<tr>
<th>Engineering</th>
<th>Potentially Significant Impact</th>
<th>Less than Significant With Mitigation</th>
<th>Less Than Significant</th>
<th>No Impact</th>
<th>Source Other Than Project Description and Plans</th>
</tr>
</thead>
</table>

| 49. Utilities and Service Systems: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? |   |   |   |   | Project Description Sunnyvale Wastewater Management Sub-Element www.sunnyvaleplanning.com |

| 50. Utilities and Service Systems: Require or result in construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? |   |   |   |   | Project Description Sunnyvale Waste Water Management Sub-Element Water Resources Sub-Element www.sunnyvaleplanning.com |

| 51. Utilities and Service Systems: Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? |   |   |   |   | Project Description Sunnyvale Waste Water Management Sub-Element Water Resources Sub-Element www.sunnyvaleplanning.com |

| 52. Utilities and Service Systems: Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? |   |   |   |   | Project Description Water Resources Sub-Element www.sunnyvaleplanning.com |

| 53. Utilities and Service Systems: Result in a determination by the wastewater treatment provider which services or may serve the project determined that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? |   |   |   |   | Project Description Sunnyvale Wastewater Management Sub-Element www.sunnyvaleplanning.com |

<p>| 54. Utilities and Service Systems: Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? |   |   |   |   | Sunnyvale Solid Waste Management Sub-Element <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a> |</p>
<table>
<thead>
<tr>
<th>Engineering</th>
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<th>Less than Significant</th>
<th>No Impact</th>
<th>Source Other Than Project Description and Plans</th>
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</thead>
<tbody>
<tr>
<td>55. Hydrology and Water Quality - Violate any water quality standards or waste discharge requirements?</td>
<td></td>
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<td></td>
<td>Regional Water Quality Control Board (RWQCB) Region 2 Municipal Regional Permit</td>
</tr>
<tr>
<td>56. Hydrology and Water Quality - Substantially degrade groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Santa Clara Valley Water District Groundwater Protection Ordinance <a href="http://www.valleywater.org">www.valleywater.org</a></td>
</tr>
<tr>
<td>58. Hydrology and Water Quality - Create or contribute runoff which would exceed the capacity of existing or planned storm water drainage systems in a manner which could create flooding or provide substantial additional sources of polluted runoff?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RWQCB, Region 2 Municipal Regional Permit, Stormwater Quality BMP Guidance Manual for New and Redevelopment Projects <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>59. Hydrology and Water Quality - Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Santa Clara Valley Water District (SCVWD) Guidelines and Standards for Land Use Near Streams <a href="http://www.valleywater.org">www.valleywater.org</a> City of Sunnyvale Stormwater Quality Best Management Practices (BMP) Guidance Manual for New and Redevelopment Projects <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>Engineering</td>
<td>Potentially Significant Impact</td>
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|             |                               |                                       |                       |           | Solid Waste Management Sub-Element of the Sunnyvale General Plan  
| 60. Utilities and Service Systems: Comply with federal, state, and local statues and regulations related to solid waste? | [ ] | [ ] | [ ] | [ ] | [ ] | www.sunnyvaleplanning.com |
| 61. Public Services Infrastructure? Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services? | [ ] | [ ] | [ ] | [ ] | [ ] |

Further Discussion if "Less Than Significant" with or without mitigation: None required.
<table>
<thead>
<tr>
<th>Public Safety - Hazardous Materials</th>
<th>Potentially Significant Impact</th>
<th>Less than Significant with Mitigation</th>
<th>Less Than Significant</th>
<th>No Impact</th>
<th>Source Other Than Project Description and Plans</th>
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<tbody>
<tr>
<td><strong>Public Safety</strong></td>
<td></td>
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</tr>
</tbody>
</table>
| 62. Public Services Police and Fire protection - Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services? | ☐ | ☐ | ☐ | ☑ | Sunnyvale Law Enforcement Sub-Element  
Sunnyvale Fire Services Sub-Element  
Safety and Seismic Safety Sub-Element  
www.sunnyvaleplanning.com |
| 63. Public Services Police and Fire protection - Would the project result in inadequate emergency access? | ☐ | ☐ | ☐ | ☑ | California Building Code  
SMC Section 16.52 Fire Code |

Further Discussion if "Less Than Significant" with or without mitigation: None required.

Responsible Division: Department of Public Safety  
Completed by: Mariya Hodge, Associate Planner
## Public Safety – Hazardous Materials

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<tbody>
<tr>
<td>64. Hazards and Hazardous Materials - Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?</td>
<td>☐</td>
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<td>☐</td>
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<td>Project description</td>
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<tr>
<td>65. Hazards and Hazardous Materials - Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?</td>
<td>☐</td>
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<td>☐</td>
<td>☑</td>
<td>Project description</td>
<td></td>
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</tr>
<tr>
<td>66. Hazards and Hazardous Materials - Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☑</td>
<td>Sunnyvale Zoning Map, Project description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>67. Hazards and Hazardous Materials - Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65952.5 and, as a result would it create a significant hazard to the public or the environment?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
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</tbody>
</table>
| 68. Hazards and Hazardous Materials - Impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan? | [ ] | [ ] | [ ] | [✗] | Seismic Safety and Safety Sub-Element of the Sunnyvale General Plan  
www.sunnyvaleplanning.com |

Further Discussion if "Less Than Significant" with or without mitigation: None required.

Responsible Division: Department of Community Services  
Completed by: Mariya Hodge, Associate Planner
<table>
<thead>
<tr>
<th>Community Services</th>
<th>Potentially Significant Impact</th>
<th>Less Than Significant With Mitigation</th>
<th>Less Than Significant</th>
<th>No Impact</th>
<th>Source Other Than Project Description and Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>69. Public Services Parks - Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>Open Space &amp; Recreation Sub-Element <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>70. Recreation - Would the project increase the use of existing neighborhood or regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>Open Space &amp; Recreation Sub-Element <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
<tr>
<td>71. Recreation - Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>Open Space &amp; Recreation Sub-Element <a href="http://www.sunnyvaleplanning.com">www.sunnyvaleplanning.com</a></td>
</tr>
</tbody>
</table>

Further Discussion if "Less Than Significant" with or without mitigation: None required.
ENVIRONMENTAL CHECKLIST REFERENCE LIST

Note: All references are the most recent version as of the date the Initial Study was prepared:

City of Sunnyvale General Plan:
A. General Plan Map
B. Air Quality Sub-Element (1993)
C. Arts Sub-Element (1995)
D. Community Design Sub-Element (1990)
E. Community Engagement Sub-Element (2007)
F. Fire Services Sub-Element (1995)
H. Fiscal Sub-Element (2006)
J. Housing & Community Revitalization Sub-Element (2009)
K. Land Use & Transportation Sub-Element (1997) Revised 4/28/09 with Allocation of Street Space Policies
L. Law Enforcement Sub-Element (1995)
M. Legislative Management Sub-Element (1999)
N. Library Sub-Element (2003)
O. Noise Sub-Element (1997)
Q. Safety & Seismic Safety Sub-Element (2008)
R. Socio-Economic Sub-Element (1989)
S. Solid Waste Management Sub-Element (1996)
T. Support Services Sub-Element (1988)
U. Surface Run-off Sub-Element (1993)
V. Wastewater Management Sub-Element (1996)

City of Sunnyvale Municipal Code:
A. Title 8 Health and Sanitation
B. Title 9 Public Peace, Safety or Welfare
C. Title 10 Vehicles and Traffic
D. Title 12 Water and Sewers
E. Chapter 12.60 Storm Water Management
F. Title 13 Streets and Sidewalks
G. Title 16 Buildings and Construction
H. Chapter 16.52 Fire Code
I. Chapter 16.54 Building Standards for Buildings Exceeding Seventy-Five Feet in Height
J. Title 18 Subdivisions
K. Title 19 Zoning
L. Chapter 19.28 Downtown Specific Plan District
M. Chapter 19.29 Moffett Park Specific Plan District
N. Chapter 19.39 Green Building Regulations
O. Chapter 19.42 Operating Standards
P. Chapter 19.54 Wireless Telecommunication Facilities
Q. Chapter 19.81 Streamside Development Review
R. Chapter 19.96 Heritage Preservation
S. Title 20 Hazardous Materials

Specific Plans:
A. Downtown Specific Plan
B. El Camino Real Precise Plan
C. Lockheed Site Master Use Permit
D. Moffett Field Specific Plan
E. 101 & Lawrence Site Specific Plan
F. Southern Pacific Corridor Plan
G. Lakeside Specific Plan
H. Arques Campus Specific Plan

Environmental Impact Reports:
A. Future Study Environmental Impact Report
B. Lockheed Site Master Use Permit Environmental Impact Report
C. Tasman Corridor LRT Environmental Impact Study (supplemental)
D. Kaiser Permanente Medical Center Replacement Center Environmental Impact Report (City of Santa Clara)
E. Downtown Development Program Environmental Impact Report
F. Caribbean-Moffett Park Environmental Impact Report
G. Southern Pacific Corridor Plan Environmental Impact Report
H. East Sunnyvale ITR General Plan Amendment EIR
I. Palo Alto Medical Foundation Medical Clinic Project EIR
J. Luminare (Lawrence Station Road/Hwy 237 residential) EIR
K. NASA Ames Development Plan Programmatic EIS
L. Mary Avenue Overpass EIR
M. Mathilda Avenue Bridge EIR

Maps:
A. General Plan Map
B. Zoning Map
C. City of Sunnyvale Aerial Maps
D. Flood Insurance Rate Maps (FEMA)
E. Santa Clara County Assessors Parcel
F. Utility Maps
ENVIRONMENTAL CHECKLIST REFERENCE LIST

Note: All references are the most recent version as of the date the Initial Study was prepared:

G. Air Installations Compatible Use Zones (AICUZ) Study Map
H. Noise Sub-Element Appendix A 2010 Noise Conditions Map
I. Santa Clara County Office of Planning Geologic Hazard Zones Maps

Lists / Inventories:
A. Sunnyvale Cultural Resources Inventory List
B. Heritage Landmark Designation List
C. Santa Clara County Heritage Resource Inventory
D. Hazardous Waste & Substances Sites List (State of California)
E. List of Known Contaminants in Sunnyvale
F. USFWS / CA Dept. F&G Endangered and Threatened Animals of California
   http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEAanimals.pdf
G. USFWS / CA Dept. F&G - Endangered Threatened and Rare Plants of California
   http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEPlants.pdf

Legislation / Acts / Bills / Resource Agency Codes and Permits:
A. Subdivision Map Act
B. San Francisco Bay Region Municipal Regional Stormwater NPDES Permit
C. Santa Clara County Valley Water District Groundwater Protection Ordinance
D. The Hazardous Waste and Substance Site List www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm
E. The Leaking Underground Petroleum Storage Tank List www.geotracker.waterboards.ca.gov
F. The Federal EPA Superfund List (www.epa.gov/region9/cleanup/california.html)

D. Section 404 of Clean Water Act

Transportation:
A. California Department of Transportation Highway Design Manual
B. California Department of Transportation Traffic Manual
C. California Department of Transportation Standard Plans & Standard Specifications
D. Highway Capacity Manual
E. Institute of Transportation Engineers - Trip Generation Manual & Trip Generation Handbook
F. Institute of Transportation Engineers - Traffic Engineering Handbook
G. Institute of Transportation Engineers - Manual of Traffic Engineering Studies
H. Institute of Transportation Engineers - Transportation Planning Handbook
I. Institute of Transportation Engineers - Manual of Traffic Signal Design
J. Institute of Transportation Engineers - Transportation and Land Development
K. U.S. Dept. of Transportation Federal Highway Administration Manual on Uniform Traffic Control Devices for Street and Highways & CA Supplements
L. California Vehicle Code
M. Santa Clara County Congestion Management Program and Technical Guidelines
N. Santa Clara County Transportation Agency Short Range Transit Plan
O. Santa Clara County Transportation Plan
P. Traffic Volume Studies, City of Sunnyvale Public works Department of Traffic Engineering Division
Q. Statewide Integrated Traffic Records System
R. Sunnyvale Zoning Ordinance – including Titles 10 & 13
S. City of Sunnyvale General Plan – land Use and Transportation Element
T. City of Sunnyvale Bicycle Plan
U. City of Sunnyvale Neighborhood Traffic Calming Program
V. Valley Transportation Authority Bicycle Technical Guidelines
W. Valley Transportation Authority Community Design & Transportation - Manual of Best Practices for Integrating Transportation and Land Use
X. Santa Clara County Sub-Regional Deficiency Plan
Y. City of Sunnyvale Deficiency Plan
Z. AASHTO: A Policy on Geometric Design of Highways and Streets
Note: All references are the most recent version as of the date the Initial Study was prepared:

Public Works:
A. Standard Specifications and Details of the Department of Public Works
B. Storm Drain Master Plan
C. Sanitary Sewer Master Plan
D. Water Master Plan
E. Solid Waste Management Plan of Santa Clara County
F. Geotechnical Investigation Reports
G. Engineering Division Project Files
H. Subdivision and Parcel Map Files

Miscellaneous Agency Plans:
A. ABAG Projections 2010
B. Bay Area Clean Air Plan
C. BAAQMD CEQA Guidelines

Building Safety:
A. California Building Code
B. California Energy Code
C. California Plumbing Code
D. California Mechanical Code
E. California Electrical Code
F. California Fire Code
G. Title 16.52 Sunnyvale Municipal Code
H. Title 16.53 Sunnyvale Municipal Code
I. Title 16.54 Sunnyvale Municipal Code
J. Title 19 California Code of Regulations
K. National Fire Protection Association (NFPA) standards

Guidelines and Best Management Practices
B. Sunnyvale Citywide Design Guidelines
C. Sunnyvale Industrial Guidelines
D. Sunnyvale Single-Family Design Techniques
E. Sunnyvale Eichler Guidelines
F. Blueprint for a Clean Bay
G. Santa Clara Valley Water District (SCVWD) Guidelines and Standards for Land Use Near Streams
H. The United States Secretary of the Interior 's Guidelines for Rehabilitation
I. Criteria of the National Register of Historic Places

Additional Project References:
B. Project Description
C. Sunnyvale Project Environmental Information Form
D. Project Development Plans dated ***/***
E. Memorandum on Project Trip Generation Estimates (FCE & Peers, October 14, 2011)
F. Project Noise Study
H. Field Inspection
I. Project Site Plan dated 09/30/2011
J. Project construction schedule
K. Project Draft Storm Water Management Plan
M. Project Tree Preservation Plan
N. Project Green Building Checklist
O. Project LEED Checklist
P. Phase I Environmental Site Assessment (United Soil Engineering, Inc., Nov. 2011)

Other
Attachment D is provided as two separate files (Part 1 and Part 2) on the website under “Attachments and Supplemental Information.”
To build a new 124,000 sf 5-story office building on an existing site occupied by a post office. And seek LEED Gold certification for FAR bonus increase to 55%.

This class A office building is designed with contemporary architectural vocabulary, high quality and high performance materials. the central boat-shape screen walls and the corner terraces provide an interesting variation of building heights and visual effects.

The configuration of the site and the design of the building make this project highly desirable to prime businesses and surrounding neighborhoods.

The new project will also comply with CalGreen Mandatory measure (chapter 5)/checklist.
Category I Community Character

A. The building site is ideally located proximate to the Hwy 237 and Hwy 101 off-ramp to minimize cross-city traffic impacts at intersections and roadway segments.

B. The proposed building has a high quality of design and excellent architecture. They are the type of building/development the City is hoping to attract to the area.

C. The proposed building includes greater security and fire safety through an upgraded non-combustible construction type, fire sprinklers/ fire alarm systems and exterior lighting.

D. The adjacent buildings in the area have the same zoning and land use. Potential adverse impacts to such adjacent sites have been minimized.

Category II Environmental Traffic and Air Quality

A. The building site is ideally located proximate to the Hwy 237 and Hwy 101 off-ramp to minimize cross-city traffic impacts at intersections and roadway segments. The proposed building replaces the existing post office. Despite the double in FAR, the number of parking spaces for new building is only increases 40%, while the overall parking ratio decrease from 6.0/1,000 to 3.3/1,000.

B. A Transportation Demand Management (TDM) Program will be adopted to reduce vehicle trips to the greatest extent feasible. A draft TDM Program has been prepared with a goal of at least 16% reduction in peak hour trips.

C. A prospective tenant has been identified for the building and will provide appropriate on-site amenities that minimize midday vehicle trips (e.g. break-room/lunchroom, cafeteria, fitness area, etc.).

D. The project is not a mixed-use project.

E. Bus stops are located along West Maude Avenue in both directions. Stops are located at Mary Avenue, only one block from the proposed project.

F. Capital facilities and city services are already being provided to existing buildings on the site. The additional requirement of such expenditures and services to justify the increased FAR is very small.
Category III Site Design and Architecture

A. This Class A office building is designed with contemporary architectural vocabulary, high quality and high performance materials. The central boat-shape screen walls and the corner terraces provide an interesting variation of building heights and visual effects.

B. The configuration of the site and the design of the building make this project highly desirable to prime businesses and surrounding neighborhoods.

C. The appearance of the proposed building/development complements the City image and community character.

D. Bulk and mass of the proposed building have been reduced by:
   a. Providing greater front setback than the existing (from 25 feet to 90 feet).
   b. Increasing landscaping by 18,000 sf.
   c. Providing floor terraces at the building corners.

E. Non-point source pollution for the project is controlled through implementation of a Stormwater Management Plan (SWMP). The SWMP will treat all of the site’s stormwater on-site using Low-Impact Development measures such as raingardens.

F. The number of parking spaces provided for the proposed building is based on the number of spaces required to attract prime businesses to the building. The proposed building provides lower parking ratio (3.3/1,000) than the existing building (6.0/1,000).

G. The proposed building is completely designed for its site with no phasing or future consolidation anticipated.

H. The new project will also comply with CalGreen Mandatory measure (chapter 5)/checklist and LEED Gold certification.

Category IV Economic, Fiscal and Community Benefit

A. The proposed building is designed to become desired locations for prime businesses. There is a prospective tenant identified for the building and will enrich the community benefit.
The new project will comply with CalGreen Mandatory measure (chapter 5)/ checklist.

**Alternative Transportation**
Showers/ Lockers will be provided for bicyclists. Bus stops at West Maude Avenue and North Mary Avenue are located within a block of the project.

**Reduced Site Disturbance**
The building coverage has been reduced by 4,500 sf. The landscaped area has been increased by 18,000 sf.

**Storm water Management**
Rain gardens will be provided to treat parking lot and roof drainage.

**Heat Island Effect (non-roof)**
Tree shading (50% min) will be provided for parking lot/ Light colors are provided for building materials.

**Heat Island Effect (roof)**
'Energy Star' high reflectance cap-sheet roof system is provided for roof.

**Light Pollution Reduction**
Lighting will not exceed Illuminating Engineering Society of North America requirements (1 foot candle/sf). Directional reflectors will be provided at perimeter light standards away from public roads.

**Water Efficiency**
Water closets will have 1.6 gallon flush valves and urinals will have 1 gallon flush valves. Sloan valves will be used on all fixtures. Showerheads will be water efficient and provide less than 2.5 gallons per minute.

**Energy and Atmosphere**
Building will meet or exceed the CalGreen Mandatory measure/ Title 24 Energy requirement. High performance glass (Viricon VS6-14) is being used. Terrace/ arcade provide shading to glass and reduce heat-gain. Landscaping is strategically planted adjacent to sun exposed glass areas. HVAC system will have an economizer cycle capability using outside cool air. The building will utilize digital main HVAC controls for its energy management system. Non-ozone depleting R-22 (versus R-12) refrigerant for HVAC will be used. Flourescent interior lighting vs incandescent lighting will be used.
Materials and Resources
Low VOC adhesives and sealants will be used. Entry frate/mats will be used at entries to capture particulates.

Storage and Collection of Recyclables
Trash enclosures include recyclables.

Construction Waste Management
Greater than 75% of demolished materials will be diverted from landfill.

Local/Regional Materials
Local/ regional materials such as glass and pavers are specified to use local suppliers to reduce transportation pollution. Fly ash will be used in concrete foundations and slabs.

Indoor Environmental Quality
Deferred to Tenant Improvement.
Attachment F is provided
as a separate file on the website under
“Attachments and Supplemental Information.”
580 North Mary Avenue
Existing Floor Area Ratios (FARs) in Surrounding Area

Legend
- Subject site
- <35% FAR
- 35-50% FAR
- >50% FAR

ATTACHMENT
Page 1 of 1
Office Class Levels

The following is a brief summary of the typical characteristics of Class A, B, and C office buildings, as well as examples of each building type in Sunnyvale. The attributes of the various class levels are somewhat subjective in their application and any specific building may exhibit characteristics of multiple classes, but overall these attributes work collectively to classify buildings with a reasonable degree of accuracy. This information was generated by the City's Economic Development Division using professional commercial real estate broker samples.

**Class A**
- Built after 1985 to qualify as Class A
- Setbacks from street are greater than other similar projects (typically include generous front landscaping and site features)
- At least two stories (one-story buildings do not qualify as Class A)
- Steel frame or higher-end concrete tilt-up with four sides of windows
- Aesthetically pleasing, “high image”
- Extensive window lines (made mostly of glass exterior)
- Buildings constructed with glass curtain-wall, granite, and/or glass fiber reinforced concrete (GFRC) are typically Class A

**Examples of Class A:**
- Most of the new buildings in Moffett Park including Moffett Towers, Yahoo!, Juniper Networks, Ariba, and Network Appliance
- HP/Palm campus
- AMD campus (on De Guigne Drive)
- Downtown – three Mozart buildings (Broadcom); Nokia

**Class B**
- Typically built between 1980 and present
- Limited setbacks
- One- and two-story buildings
- Limited window line: 2.5 to 3 sides made of glass exterior
- Limited landscaping with no special character

**Examples of Class B:**
- Sun buildings off Mary (formally Boeing); likely B+
- 333 West El Camino Real (corner of W. El Camino Real and Mathilda); likely B+
- “Horizontal Skyscraper” Building (Oakmead Pkwy. and Lakeside)
- OKI Semiconductor (corner of Mary and Almanor)
Class C

- Typically built prior to 1980
- Limited setbacks
- Typically one-story but may be two-story
- Limited or no glass exterior
- Buildings generally of concrete tilt-up construction
- Dated architecture (e.g. rock wall panels)
- Any architectural styling which obviously dates a building

Examples of Class C:

- Most of Peery Park industrial area
- Most of the buildings located on Elko Avenue (the “Woods” industrial area)
Evaluation and Survey of TDM Programs

Santa Monica Zoning Ordinance Update

Transportation Demand Management: Issues and Recommendations

Prepared for
The City of Santa Monica

By
DYETT & BHATIA
Urban and Regional Planners

January 2013
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Introduction and Overview

This paper discusses approaches to revising the provisions in Chapter 9.16, Transportation Demand Management, to implement the LUCE’s policies and proposals for reducing traffic congestion and associated impacts on the environment and the quality of life in Santa Monica by sharply reducing single occupancy vehicle trips. The existing requirements, which the City adopted in 1991 and substantially revised in 1996, are intended to comply with requirements of the South Coast Air Quality Management District and the Los Angeles County Metropolitan Transportation Authority’s Congestion Management Program. The proposed revisions are a major component of the City’s strategy for achieving the LUCE’s goal of No Net New Evening Peak Period Vehicle Trips.
Discussion and Key Policy Questions

The transportation sector is the largest source of emissions in California, contributing up to 36 percent of all statewide GHG emissions. Because the distribution of land uses has a major effect on Vehicle Miles Traveled (VMT), land use decisions also affect the proportion of GHG emissions generated by the transportation sector. VMT can, therefore, be translated into tailpipe emissions per mile traveled. Transportation emissions constitute about 40 percent of all GHG emissions in Santa Monica and, of that, about three quarters come from personal trips. Even though Santa Monica’s per capita emission rates are already about half that of more auto-dependent places in Southern California (LUCE p. 4.0-4), the LUCE creates a framework to achieve further reductions in GHG emissions through a variety of measures including programs and regulations that can reduce trips by managing transportation demand.

To discourage auto usage and promote the use of more sustainable means of travel, communities can create restrictions on new parking development. However, the effectiveness of parking reduction measures in reducing auto trips and traffic congestion ultimately depends on the alternatives available and choices made by individuals. If people decide to drive (instead of biking, walking, or using public transit) to a site with limited parking, they will end up increasing local congestion in their search for scarce available spaces. Thus, it is crucial to have a holistic transportation strategy to reduce automobile trips particularly during peak travel times. Transportation Demand Management (TDM) is the term given to a variety of measures that encourage people to change their mode or time of travel, with requirements or incentives to utilize alternatives to the single occupant vehicle to manage congestion and reduce GHG. TDM strategies are particularly appropriate for Santa Monica because they are one of the most cost-effective ways to allow new development in moderately dense areas without increasing traffic and parking demand. Even though it is impossible to eliminate congestion entirely in Santa Monica, especially near popular destinations, the City can promote additional changes that would improve the city’s livability. The TDM strategy is supposed to provide low-cost travel solutions that reduce or eliminate demand on roads and freeways.

REGIONAL REQUIREMENTS

The South Coast Air Quality Management District imposes GHG reduction requirements, and the Los Angeles County Metropolitan Transportation Authority’s Congestion Management Program imposes trip reduction requirements. However, these two regional agencies have different thresholds. The AQMD standards apply to employers with 250 or more employees, and the CMP standards apply to non-residential development projects over 25,000 square feet. Santa Monica’s Transportation Management Ordinance (SMMC Chapter 9.16) is intended to comply with both sets of requirements, which are described in more detail below.

South Coast Air Quality Management District

South Coast Air Quality Management District (SCAQMD) has adopted an air quality management plan to maintain the California Clean Air Act air quality standards. It has established regulations to reduce pollution generated by commuter travel. Rule 2202 applies to employers with 250 or more employees, and defines an Employee Commute Reduction Program (ECRP) to meet average vehicle ridership (AVR) goal of 1.3-1.75
(depending on geographic location) persons per vehicle in the AM peak period of 6:00-10:00 am. SCAQMD calculates AVR as the total number of employee trips divided by the total number of employees for a one-week survey period. Additionally, the SCAQMD requires employers subject to Rule 2202 to provide a survey to ascertain the level of success in achieving the goals of reducing vehicle trips in order to achieve corresponding reductions in emissions. An employer subject to this Rule shall annually register with the District to implement their emission reduction program for each worksite. Santa Monica’s Transportation Ordinance, with thresholds under 250 employees and also requiring an annual survey to demonstrate compliance with its worksite reduction target, meets and exceeds the District’s requirements and identifies compliance the Rule 2202 as one of the purposes of the Ordinance.

Los Angeles County Metropolitan Transportation Authority

Los Angeles County Metropolitan Transportation Authority’s (Metro) Congestion Management Program (CMP) coordinates land use and transportation policy for L.A. County. To comply with the Metro CMP, Santa Monica must report certain information on new development projects, follow the program’s guidelines for analyzing traffic impacts of new development, implement programs and regulation to discourage peak-hour auto travel, and monitor and enforce these programs and regulations. The City must also self-certify conformance. Metro monitors the success of TDM programs by requiring cities to submit information about the impact of new development by projecting the impact of new trips on the arterials and freeways that comprise the regional transportation system. Local jurisdictions are required to conform to the CMP requirements in order to continue receiving portion of state gas tax money and also to remain eligible for state and federal funding for transportation projects. While the primary objective of the CMP’s TDM program is to reduce regional congestion, it is also designed to complement SCAQMD’s Rule 2202, which calls on large employers to use TDM, as well as other strategies to reduce mobile source emissions.

LUCE FRAMEWORK

In addition to being responsible for meeting the requirements of regional air quality and congestion management agencies, the City must also implement its own land use and circulation policies set forth in the LUCE. The LUCE recommends a very aggressive program for TDM and sets high TDM targets, including a 35 percent reduction in peak trips per capita for residential uses and a 50 percent per capita reduction in peak period trips for commercial uses. Achieving the LUCE objectives would require the City to assume significant responsibilities for managing its transportation system through the establishment of new programs as well as continuing implementation of current ones. These provisions would exceed those that the City is obliged to implement in order to meet the CMP and SCAQMD requirements discussed in the previous sections.

In addition to strengthening existing TDM requirements, the LUCE proposes new Transportation Impact Fees (TIF) and the designation of TDM Districts that would make it easier to craft strategies tailored to the specific needs and circumstances in different areas of the city. Together with implementation of improvements to transit, pedestrian and bicycle facilities and land use policies that promote development along existing and proposed transit corridors, these measures are intended to help the City achieve the LUCE’s goal of No Net New Evening Peak Period Vehicle Trips. Along with the new TIF program, which Staff presented to the City Council in March, the City’s most powerful regulatory techniques for implementing the LUCE’s trip reduction policies are the transportation management requirements codified in Chapter 9.16 of the Zoning Ordinance and the identification of trip reduction and traffic management as one
of the five priority categories of the community benefits program, which is a key component of the LUCE approach.

The LUCE establishes a ministerial maximum allowable building height and density as the baseline for each of the plan's five land use categories--neighborhoods, boulevards, mixed-use centers, employment and commerce, and community and public uses. Applicants desiring to develop projects that exceed the base height and density are subject to a discretionary review and must provide community benefits in compliance with a new set of regulations that will be included in Chapter TBD of the new ordinance. Applicants proposing projects that exceed the Tier 1 base height and density for the applicable district will be subject to approval of a conditional use permit and have to provide benefits from one of the five categories the LUCE identifies including trip reduction and transportation management. These could include trip reduction measures such as bicycle facilities, dedicated shuttles, car-sharing, transit passes, parking “cash-out,” shared parking, and pricing parking separately from housing units. The measures will be in addition to other requirements applicable to the project such as traffic mitigation fees, trip reduction measures imposed by the TDM ordinance, and any transportation-related measures imposed to mitigate potentially significant environmental impacts identified through the CEQA review process.

The new TDM Districts, which would be established in transit-oriented mixed-use areas such as the Downtown, Bergamot Transit Village, and Memorial Park Activity Center Overlay, would capitalize on opportunities in these high-intensity land use area and tailor approaches to specific areas each of which will have different mode split targets and demand management strategies. (See LUCE pp. 4.0-58 to 4.0-62) The Districts are broken down into Highest Goal, Higher Goal, District-Wide Goal, and Major Transit Stop Zones. TDM strategies are then described for three sample land use types: Office, Commercial, Employment; Residential; and Schools. Strategies tailored to meet the specific characteristics of different areas could include Transportation Management Organizations (TMOs), parking pricing, universal transit passes, tailored transit, carpool and vanpool programs, personalized travel assistance, and parking management. In order to limit total peak VMT, there should be a combination of appropriate TDM requirements for new development, and incentives that encourage existing employers or multi-unit residences (for example by Home Owners Associations and property managers) to reduce VMT.

SANTA MONICA’S EXISTING TDM REGULATIONS

The current TDM ordinance, which the City adopted in 1991 to implement State-mandated requirements for implementing the Los Angeles County Metropolitan Transportation Authority’s Congestion Management Plan and last revised in 1996, includes requirements applicable to employers and to non-residential developers. Chapter 9.16 was intended to meet SCAQMD and CMP requirements but, as stated in the Findings (Section 9.16.010) it was also designed to implement policies of the City’s General Plan.

The requirements for employers distinguish among those with ten to 49 employees (Level 1), 50 to 249 employees (Level 2), and 250 or more employees (Level 3). Level 3 employers are also subject to the requirements of SCAQMD Rule 2202 for adoption of an Employee Commute Reduction Program (ECRP) to meet average vehicle ridership (AVR) goals. Level 1 employers must file a Worksite Transportation Plan that provides employees with information about alternative commute options. All employers of 50 or more employees must submit an Emission Reduction Plan. The ordinance includes several optional approaches for meeting the detailed requirements and all employers pay an annual fee for administration and enforcement.
In addition to requirements applicable to employers, the ordinance includes a separate set of regulations for developers of nonresidential projects expected to generate ten or more peak period trips who must submit plans for City approval before receiving a building permit. Additional requirements apply to projects of 25,000 square feet or more and those with 100,000 square feet or more. In addition to imposing annual fees to cover the cost of administration and enforcement of the employer requirements (Section 9.16.050 (a)), the existing code requires developers to pay a one-time impact fee intended to defray the costs of providing transportation facilities and services associated with new commercial development (Section 9.16.050 (b)). Fees are reduced for multi-story projects with supermarkets or pedestrian-oriented uses on the ground floor. As mentioned above, the Council has received a Staff recommendation for adopting a new Transportation Impact Fee (TIF) that would apply to both residential and non-residential development. The City has also completed a nexus study for the new fee program in compliance with the requirements of the State Mitigation Fee Act. The new TIF would presumably supplement the existing impact fee for non-residential projects, with limited fees retained to cover the costs of staff review of initial Transportation Demand Management plan and annual compliance reports.

**KEY POLICY QUESTIONS**

1. **How should TDM requirements be expanded to apply to residential and mixed-use development? Are the proposed thresholds appropriate?**

   LUCE Goal T21 states that the City should use all available tools to make the most effective possible use of the transportation system. The policies to achieve this goal include updating TDM requirements for new development, triggering TDM requirements for new development consistent with LUCE performance standards, and incentivizing new multi-family and nonresidential development to include design element that will enable price control for parking. (LUCE p. 4.0-64). The LUCE does not specifically propose to expand the applicability of the TDM requirements, but some cities are beginning to apply trip reduction requirements to residential and mixed-use development. While these are often incorporated in an incentive program, as design standards or under a development agreement, others are imposing requirements for submitting and implementing TDM plans as part of the zoning approval process especially for new development located close to transit.

   Pasadena's ordinance, for example, applies to residential development with more than 100 units and mixed-use development with more than 50 units if the nonresidential floor area exceeds 50,000 square feet. Sunnyvale, in Santa Clara County, requires all multi-family development within a third of a mile of a light rail station, Caltrain Station, or high activity commute to work bus stop to propose and implement TDM techniques. Contra Costa County requires trip reduction plans for residential and mixed-use projects that require a public hearing and include at least 13 dwelling units. It is reasonable to assume that more cities will begin requiring trip reduction or TDM plans for residential and mixed-use development as they implement the Sustainable Communities Strategies being adopted by the Southern California Association of Governments and other regional agencies under Senate Bill 375.

   In order to achieve the LUCE objectives for reducing per capita trips and ensure that new development under the LUCE does not generate a net increase in PM peak period vehicle trips, Staff has considered lowering the thresholds as follows:
• All public and private employers, including the City of Santa Monica, that have a permanent place of business in the City and ten or more employees;

• Developers of multi-family residential projects with 20 or more units;

• Developers of mixed-use projects with 20 more residential units or 7,500 sq. ft. or more of non-residential development;

• Developers of non-residential projects with 7,500 square feet of gross floor area or more; and

• Any property or business owner proposing a change in the use of non-residential property that would result in or accommodate an increase in the number of average daily trips by 10 percent or more or would increase the floor area of an existing building with at least 7,500 square feet of floor area by 10 percent or more.

2. How should TDM requirements be distinguished from provisions that are incorporated in the community benefits program?

The LUCE proposes to both strengthen the TDM requirements applicable across the board, and to provide incentives for developers who exceed these requirements as part of the community benefits program. The existing Ordinance already includes requirements that go beyond the measures necessary to comply with SCAQMD and CMP requirements. To implement the LUCE’s robust transportation management policies, the City needs to determine which additional measures should be specified as development standards or mandatory requirements and which should be identified as optional TDM programs or community benefits applicable to projects seeking to exceed Tier 1 development thresholds.

3. Should the TDM requirements identify and distinguish among different TDM Districts?

The LUCE identifies and maps TDM Districts that are broken down into Highest Goal, Higher Goal, District-Wide Goal, and Major Transit Stop Zones. It also describes TDM strategies for three sample land use types: Office, Commercial, Employment; Residential; and Schools. Strategies tailored to meet the specific characteristics of different areas could include Transportation Management Organizations (TMOs), parking pricing, universal transit passes, tailored transit, carpool and vanpool programs, personalized travel assistance, and parking management. Glendale has adopted a series of requirements that vary based on project size. Pasadena has established an Average Vehicle Ridership (AVR) goal of 1.5 for all projects and 1.75 for projects in the Transit-Oriented District. (Under the existing Santa Monica TDM, the AVR target for all worksites is 1.5.) South San Francisco provides flexibility by allowing an applicant to select nine trip reduction measures of their own choosing in addition to 14 that their ordinance requires.

4. Should TDM requirements apply to additions and changes of use? If so, what floor area thresholds would be appropriate triggers? Should the City also enact requirements to ensure that TDM programs continue to apply when there is a change of occupancy or use that does not require discretionary zoning approval?

Staff has proposed to extend the program to include additions to existing nonresidential buildings and changes of use. Examples from other jurisdictions include:
• South San Francisco requires approval of a new TDM plan if there is a change in an approved project that would result in the addition of 10 percent of the building area or a 10 percent increase in the number of average daily trips.

• San Carlos: Additions to nonresidential buildings that are 10,000 square feet or more in size that expand existing gross floor area by 10 percent or more and changes of use or operational characteristics in a building that is 10,000 square feet or more in size that results in an average daily trip increase of more than 10 percent above current use.
Transportation Demand Management Regulations

Purpose

This introductory session will consolidate and update provisions in Sections 9.16.010 and 9.16.020 of the existing Ordinance to make specific reference to LUCE goals and policies.

The purpose of this Chapter is to implement the goals and policies of the City’s General Plan to manage change through programs to create and maintain a more sustainable Santa Monica that will thrive without compromising the community’s unique character or the ability of future generations to meet their own needs and enjoy and benefit from living and working in a special place. More specifically, these provisions are intended to proactively manage congestion, reduce automobile dependence and enhance alternative modes of transportation by requiring trip reduction plans that will:

A. Ensure City compliance with the applicable requirements of the South Coast Air Quality Management District Rule 2202 and implement air quality control measures required of local governments by the District’s 1991 Air Quality Management Plan and subsequent updates and the Los Angeles County Metropolitan Transportation Authority’s Congestion Management Program to reduce air pollution and greenhouse gas emissions by reducing vehicle miles traveled and vehicle trips from new developments;

B. Accommodate growth and development allowed under the General Plan’s Land Use and Circulation Element (“LUCE”) while reducing peak-hour automobile commute trips from new and existing places of employment to achieve the LUCE’s goal of no net increase in PM peak hour vehicle trips;

C. Reduce traffic impacts within the community and region through a reduction in the number of vehicular trips and total vehicle miles traveled.

D. Reduce vehicular air pollutant emissions, energy usage and ambient noise levels through a reduction in the number of vehicular trips, total vehicle miles traveled and traffic congestion.

E. Minimize the percentage of employees traveling in single-occupant vehicles to and from work at the same time and during peak-hour periods.

F. Promote and increase work-related transit use, ridesharing, walking and bicycling to minimize parking needs, prevent critical intersections from severe overload, and protect the quality of life in Santa Monica’s neighborhoods and districts;

G. Improve the mobility and general efficiency of circulation and transportation systems by increasing reliance on public transit, ridesharing, cycling and focusing development in areas close to transit and employment;

H. Improve the quality and level of access for residents and for employees and patrons of local businesses by reducing congestion and the time of commute trips;

I. Decrease the City’s cost for transportation and parking facility construction and improvements.
J. Coordinating transportation systems management, transportation demand management and transportation facility development strategies with other cities and counties in the region and through regional agencies.

Definitions

This section will carry forward and, as necessary, revise the definitions of key terms such as “peak period” and “worksite,” that are unique to this Chapter. Terms will be defined according to the AQMD and County CMP requirements.

Applicability

The proposed provisions will maintain the current thresholds for employers and non-residential development but extend the scope of the program to residential and mixed-use projects and specify a floor area threshold for non-residential projects as proposed by Staff. The provisions describing the contents of TDM Program Plans will establish content requirements that vary based on the number of employees and size of projects.

Transportation Fees

This section will specify how to calculate fees the City imposes to defray the cost of providing transportation facilities and improvements needed to mitigate the impact of new development as well as the fees charged to employers for administering and enforcing the Chapter’s requirements. The provisions in Section 9.16.050 of the current Ordinance will be updated as necessary to reflect the 2012 Transportation Impact Fee Nexus Study and other relevant analyses and requirements. The section will also incorporate provisions regarding the deposit and use of fees, which are now in Section 9.16.060.

Employer Trip Reduction Plan Requirements

This section will consolidate and revise Sections 9.16.070 through 9.16.090 to establish the requirements for the worksite transportation plans (WTPs) and employee trip reduction plans (ETRPs), if the City decides to retain that nomenclature. Revisions will include incorporation of revised and additional mandatory and optional provisions based on the LUCE and best practices employed by other jurisdictions to achieve their trip reduction goals.

Developer Trip Reduction Plan Requirements

Sections 9.16.110 and 9.16.120 of the current Ordinance apply to developers of nonresidential projects that will generate ten or more peak-period trips upon completion. The proposed revisions will expand the requirements to cover residential and mixed-use projects and floor area additions if the Ordinance is revised to cover these projects. If the Ordinance is revised to apply TDM requirements to changes of use that will generate additional trips, those provisions could also be included in this section. Revisions will include incorporation of revised and additional mandatory and optional provisions based on the LUCE and best practices employed by other jurisdictions to achieve their trip reduction goals.
Required Findings

Chapter 9.16 of the existing Ordinance specifies requirements for TDM plans but does not list determinations that the Transportation Management Coordinator must make in order to find that a TDM plan complies with the applicable requirements of the Chapter. This new section would establish findings that the Coordinator must make in order to approve a TDM plan. The need for making findings will become more important if a wider range of employers and development projects are subject to the requirements of the TDM ordinance.

Modifications and Changed Plans

The LUCE supports including new TDP Plan triggers for additions, changes of use, and modified plans. In South San Francisco, a change in an approved project that would result in the addition of ten percent of the building area or a ten percent increase in the number of average daily trips requires a new TDM plan. In San Carlos, additions to nonresidential buildings that are ten thousand square feet or more in size that expand existing gross floor area by ten percent require a new TDM plan. Additionally, establishment of a new use, change of use, or change in operational characteristics in a building that is ten thousand square feet that results in an average daily trip increase of more than ten percent of the current use is treated as a new application.

Monitoring and Enforcement

The section specifies the procedures for audits, violations, and penalties. Staff has proposed requirements for an annual status report documenting the TDM measures undertaken by a property owner and their results to implement LUCE proposals for thorough monitoring and reporting requirements. This would allow the City to determine if the property owner has implemented and maintained the TDM plan, and whether the property has made progress toward achieving the applicable AVR target. A three- to five-year review report, with historical comparisons, would serve a similar function while also evaluating the overall effectiveness and allow the City keep track of which projects and measures work best. Pasadena has adopted similar requirements for property owners and their TDM coordinators to write a statement of commitment to conduct surveys in conformance with the AQMD. New provisions for TDM status reports could be included in this section or in the one that details requirements for submission of trip reduction plans.

Appeals

This section will carry forward the provisions in Section 9.16.140 of the existing Ordinance, which establish procedures enabling the City’s Emission Reduction Plan Appeals Board to hear appeals of decisions by the Transportation Demand Management Manager. Decisions by the ERP Appeals Board are final, except for judicial review, and may not be appealed to the City Council.

Transportation Management Associations

Transportation management associations are groups of employers, employees, developers, and building owners that are formed to provide a framework for TDM programs and services that promote more efficient use of transportation and parking resources. By allowing small employers to provide Commute Trip Reduction services comparable to those offered by larger companies they could be particularly important if the thresholds are lowered so requirements apply to a wider range of property owners and
projects. Section 9.16.100 of the existing Ordinance will be revised and expanded to reflect the range of projects to which the updated requirements of the Chapter will apply.
### Appendix A: Sample Trip Reduction Measures by DMD and Project Size

Required baseline (✓) and other recommended No Net New Trips (NNNT) measures by Demand Management District (DMD) and project size are intended to achieve the established project Average Vehicle Ridership (AVR). This list is not exhaustive and applicants would be encouraged to work with the City to select from the recommended measures and identify additional measures as appropriate to their location and tenant mix, to be specified in their individual Transportation Demand Management Plans. All elements required of larger developments in the highest goal Demand Management District are also recommended for consideration by smaller developments and those in the lower Demand Management Districts:

<table>
<thead>
<tr>
<th>Draft Recommended Strategies</th>
<th>Basic Requirements</th>
<th>Citywide DMD 1.5 AVR/Tier 1 up to 25,000 SF</th>
<th>Higher Goal DMD 1.6 AVR/Tier 1 over 25,000 SF and Tier 2</th>
<th>Highest Goal DMD 1.75 AVR/Tier 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locate New Development Near Transit</td>
<td>List the existing and planned transit facilities and their levels of service within a ½ mile and ¼ mile radius of the project boundaries.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>TDM – Physical Facilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connections/Access Points</td>
<td>Provide pedestrian, bicycle, and transit connections and new roads/pathways that provide access points between site and adjacent uses for large developments.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Short-Term Bicycle Parking</td>
<td>Racks, etc. for customer/visitor use that meet or exceed the standards in the Bike Action Plan.</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Long-Term Bicycle Parking</td>
<td>Secure, enclosed, per zoning code with location and design to be approved by City.</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Additional Bicycle Parking</td>
<td>Provision of long and/or short-term bike parking beyond code requirements.</td>
<td>Community Benefit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexible Access Bicycle Parking</td>
<td>Provide secure bicycle parking with flexible access that supports personal bicycle sharing services such as Spinlister.</td>
<td>Community Benefit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Draft Recommended Strategies

<table>
<thead>
<tr>
<th>Draft Recommended Strategies</th>
<th>Basic Requirements</th>
<th>Citywide DMD 1.5 AVR/Tier 1 up to 25,000 SF</th>
<th>Higher Goal DMD 1.6 AVR/Tier 1 over 25,000 SF and Tier 2</th>
<th>Highest Goal DMD 1.75 AVR/Tier 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Site Bike-Sharing Pod(s)</td>
<td>Community Benefit</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>On-site bike sharing vehicles available for public use.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Preferential Parking for Carpools/Vanpools</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reserve preferred parking spaces for carpool or vanpool vehicles.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Passenger Drop-off/Loading Area</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Van accessible passenger drop-off/loading area or per code, whichever is greater.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexible Access Auto Parking</td>
<td>Community Benefit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide flexible access automobile parking that supports personal car sharing services (i.e. Relay Rides, Rent My Car).</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Showers</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Showers for employees who actively commute. For development in Downtown, see IZO for requirements.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee Changing Room Lockers</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Parking Design Features</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Facilities that permit shared parking and parking charges (24/7 access, gates, etc.)</td>
<td></td>
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</tr>
<tr>
<td>TDM Signage</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Program providing directions to and clearly identifying TDM features such as bus stops, bike parking, carpool parking, etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-site Trip Reduction Services</td>
<td>Community Benefit</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>On-site provision of services that reduce the demand for additional vehicle travel such as childcare facilities, cafes, convenience stores, health/fitness clubs, bike repair, concierge services, etc.</td>
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<tr>
<td>TDM - Employee Trip Reduction</td>
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<td></td>
</tr>
<tr>
<td>On-Site Certified TDM Coordinator/ Contact</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Owner may engage a third-party to provide this function. The name and contact information will be provided to the City and updated as needed. The coordinator will be available for and participate in meetings, workshops and rideshare events conducted by the City or other organization approved by the City. The TDM Coordinator must be certified through the City’s certification process.</td>
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</tr>
</tbody>
</table>
### Draft Recommended Strategies

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<th>Highest Goal DMD 1.75 AVR/Tier 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commuter Information Board/Kiosk</strong>&lt;br&gt;Provision of a commuter information board/kiosk in a permanent and central location(s) including regularly updated information on transit services, carpool/vanpool services, biking and walking routes and facilities; ridesharing promotional materials; and TDM measures and support facilities on-site and within a ¼ mile radius.</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Marketing &amp; Promotional Support for Non-SOV Travel</strong>&lt;br&gt;Includes new employee commute packages; person trip planning assistance; distribution of rideshare information to all tenants/employees on at least an annual basis; a regular commute newsletter, contests, prizes and recognition; daily commute tracking tools which reward non-SOV travel; rideshare fairs, events and participation in regional activities such as Rideshare week and Bike to work Week/Day/Month. Marketing plan and promotional materials need to be provided prior to C of O.</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>New Employee Orientation</strong>&lt;br&gt;Include transportation information and personal trip planning through new employee orientation.</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Local Living Incentives</strong>&lt;br&gt;Provision of financial incentives (i.e. monthly subsidy, closing costs) for employees that live within a 1 mile radius of their worksite</td>
<td>Community Benefit</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Bike Commuting Training</strong>&lt;br&gt;Provision of bike training classes (education and hands-on training) to encourage employee bike commuting to be offered on-site or through a 3rd party provider.</td>
<td>Community Benefit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Transit Passes</strong>&lt;br&gt;Provide transit passes at full or partial subsidy (minimum subsidy value of 50% of ongoing Metro EZ Pass, interagency monthly pass or comparable transit pass) to employees. Passes shall be provided on-site and the requirement may be passed through to tenants in leases.</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>✓</td>
<td>✓ (100%)</td>
<td></td>
</tr>
<tr>
<td><strong>BBB Universal/Any Line Any Time Passes</strong>&lt;br&gt;Agree to provide transit passes to all employees through participation in BBB Any Line Any Time or similar “Eco-Pass” program.</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Ridematching</strong>&lt;br&gt;Proactively assist employees in identifying ridesharing opportunities, both within the development and with</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Draft Recommended Strategies</td>
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<tr>
<td>adjacent developments. Assistance may be provided through a third party such as Metro, a TMA, GoLoco.org, Zimride, NuRide, RideAmigos.com, or other similar providers.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Subsidized Vanpooling</td>
<td>Community benefit if developer subsidized</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Metro program provides vanpooling subsidies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Provision of Guaranteed Ride Home/Guaranteed Return trip services to those who use non-SOV travel. Service may be provided third party such as Metro or TMA.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>On-Site Car Sharing/Fleet Vehicle(s)</td>
<td>Community benefit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-site car share/fleet vehicle available for use during the workday for employees with non-SOV commutes.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Flexible Work Hours</td>
<td>Monitoring required to provide data</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Compressed workweeks, flexible work hours, and/or staggered work hours to reduce peak vehicle trips.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Telework Policies</td>
<td>Monitoring required to provide data</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Policies to permit and encourage employees to work from home or off-site.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Non-SOV Commute Financial Incentives</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial incentives for all employees who choose non-SOV commute mode, pre-tax as allowable by law, with minimum value equal to price of a Metro EZ Pass or comparable transit pass.</td>
<td></td>
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</tr>
<tr>
<td>Pre-tax Payroll Deduction for Non-SOV Commute Costs</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Provide pre-tax payroll deduction for non-SOV commute costs such as purchase of transit and vanpool benefits, Commuter Choice Benefit, etc.</td>
<td></td>
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<tr>
<td>Bikes@Work</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Bicycles available on-site for employee business and personal use.</td>
<td></td>
<td></td>
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<tr>
<td>Car-Sharing Memberships</td>
<td>Community benefit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide car-sharing memberships at a full or partial subsidy for employees.</td>
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<tr>
<td>Bike-Sharing Memberships</td>
<td>Community benefit</td>
<td></td>
<td></td>
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<tr>
<td>Provide bike-sharing memberships at full or partial subsidy for employees.</td>
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<tr>
<td>Bike Center Memberships</td>
<td>Community benefit</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Provide bike center memberships at full or partial subsidy for employees.</td>
<td></td>
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</tr>
<tr>
<td>Draft Recommended Strategies</td>
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<tr>
<td><strong>TDM - Customer and Visitor Trip Reduction</strong></td>
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<tr>
<td>Customer Incentive Program</td>
<td>Community benefit</td>
<td></td>
<td></td>
<td>✓ (for on-site retail)</td>
</tr>
<tr>
<td>Provide discounts and incentives for non-SOV customers</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Rideshare Direction Preference</strong></td>
<td>Monitoring required to provide data</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>When provide customers and visitors with directions, list rideshare information and directions (i.e. transit stops, bike parking) first followed by auto directions and information.</td>
<td></td>
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<tr>
<td><strong>Special Event / Destination Rideshare Services</strong></td>
<td>Community benefit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provision of TDM services for special events (i.e. Rose Bowl) or common destinations (i.e. airport) that reduces the demand for car rentals, SOV travel, and auto parking including shared ride and shuttle services.</td>
<td></td>
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<tr>
<td>Visitor Rideshare Memberships</td>
<td>Community benefit</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Provide rideshare services (i.e. transit, car-share, bike-share, bike center) at full or partial subsidy for visitors (such as hotel guests.)</td>
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<tr>
<td><strong>BikesAway</strong></td>
<td>Community benefit</td>
<td></td>
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<tr>
<td>Bicycles available on-site for checkout and use by visitors.</td>
<td></td>
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<tr>
<td><strong>TDM – Residential Trip Reduction (if on-site residential)</strong></td>
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<tr>
<td>Travel Information Board/Kiosk</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Provision of a travel board/kiosk in a permanent and central location(s) including regularly updated information on transit services, carpool/vanpool services, car and bike sharing services (both public and private), biking and walking routes and facilities; ridesharing promotional materials; and TDM measures and support facilities on-site and within a ¼ mile radius.</td>
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<tr>
<td><strong>Transit Passes</strong></td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>✓</td>
<td></td>
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<tr>
<td>Provide transit passes at full or partial subsidy (minimum subsidy value of 50% of ongoing Metro EZ Pass, interagency monthly pass or comparable transit pass) to residents. Passes shall be provided on-site.</td>
<td></td>
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<tr>
<td><strong>Local Living Incentives</strong></td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>✓</td>
<td></td>
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<tr>
<td>Provision of financial incentives (i.e. monthly rental subsidy, closing costs) for residents that work within a 1-mile radius of their residence.</td>
<td></td>
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</tr>
<tr>
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<tr>
<td>Car-Sharing Memberships</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>☑️</td>
<td>☑️</td>
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<tr>
<td>Provide car-sharing memberships at a full or partial subsidy for residents.</td>
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<tr>
<td>Bike-Sharing Memberships</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>☑️</td>
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<tr>
<td>Provide bike-sharing memberships at full or partial subsidy for residents.</td>
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<tr>
<td>Bikes@Home</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>☑️</td>
<td></td>
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<tr>
<td>Bicycles available on-site for checkout and use by residents.</td>
<td></td>
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<tr>
<td>Bike Center Memberships</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>☑️</td>
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<tr>
<td>Provide bike center memberships at full or partial subsidy for residents.</td>
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<tr>
<td>TDM - Parking Programs</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Unbundled &amp; Market Rate Parking</td>
<td>Per Santa Monica Municipal Code</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Leases shall identify parking costs as an unbundled, separate line-item at market rates no less than the current monthly cost of a Metro EZ Pass or equivalent.</td>
<td></td>
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<tr>
<td>Parking Lease Adjustments</td>
<td>Per Santa Monica Municipal Code</td>
<td>☑️</td>
<td></td>
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<tr>
<td>Tenants may adjust the amount of parking purchased on monthly basis.</td>
<td></td>
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<tr>
<td>Transportation Benefits &amp; Parking Cash Out</td>
<td>Per Santa Monica Municipal Code</td>
<td>☑️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation benefits for employees who choose not to drive (e.g., Commuter Choice Program), or parking cash-out at market value (calculated based on daily rates).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Courtesy/Occasional Use Parking</td>
<td>Per Santa Monica Municipal Code</td>
<td>☑️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provision of courtesy/occasional use parking for employees who primarily use Non-SOV travel but must drive to work on occasion.</td>
<td></td>
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<tr>
<td>Bike Valet</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>☑️</td>
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</tr>
<tr>
<td>If valet parking is offered, parking attendant accepts bicycles to valet park at no charge.</td>
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</tr>
<tr>
<td>Car Share Parking Space(s)</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>☑️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car share parking space(s) provided at no cost for car-sharing vehicles.</td>
<td></td>
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<tr>
<td>Management</td>
<td></td>
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</tr>
<tr>
<td>Coordinate Strategies by Area</td>
<td>Per Santa Monica Municipal Code if over threshold</td>
<td>☑️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation Management Association (TMA) formation and/or participation required of all tenants.</td>
<td></td>
<td></td>
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</tr>
<tr>
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</tr>
</tbody>
</table>
| **Shared Parking Agreements**  
Agree to participate in shared parking districts or agreements when established in area. | Per Santa Monica Municipal Code | ✓ | ✓ | ✓ |
| **Complete Neighborhoods** | | | | |
| **Locate All Needs of Daily Life Within Walking Distance**  
List the existing and planned daily needs within a ½ mile and ¼ mile of the project boundaries such as child care facilities, convenience stores, concierge services, etc. | Monitoring required to provide data | ✓ | ✓ | ✓ |
| **Community Benefits** | | | | |
| **Land/Facility Donation**  
Donation of land or facility space to the City for facilitating improved mobility and access including bicycle and pedestrian connections, bike sharing “pods”, bicycle centers, etc. | Community benefit | | | |
| **“Adopt a School”**  
Provide funding and ongoing support for nearby school Safe Routes programs including capital improvements to pedestrian and bike access, online matching service for carpool to school, walking and biking “trains, and promotion of WalkIt/BikeIt day and similar events (produce flyers, etc.). | Community benefit | | | |
| **Commuter Store**  
Public commuter store with rideshare information and on-site transit pass sales. | Community benefit | | | |
| **Shared Parking**  
Provide shared parking for neighborhood residents, events, adjacent uses, etc. | Per Santa Monica Municipal Code | ✓ | ✓ | ✓ |
| **SM Resident Universal Pass Purchase**  
Purchase of BBB Universal Passes for Santa Monica Residents. | Community benefit | | | |
| **Fees** | | | | |
| **Commit Funds to Mitigate Trips and Improve Choices for Existing Santa Monicans**  
Commitment of funding for programming and capital improvement projects citywide such that the net impact of the development project is ultimately zero such as improved bicycle and pedestrian connections, Expo light rail station enhancements, public car sharing, public bike | Community benefit if more than TIF | | | |
# Draft Recommended Strategies

<table>
<thead>
<tr>
<th>Draft Recommended Strategies</th>
<th>Basic Requirements</th>
<th>Citywide DMD 1.5 AVR/Tier 1 up to 25,000 SF</th>
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<th>Highest Goal DMD 1.75 AVR/Tier 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>sharing, public bike centers, TMA formation or operations, bus stop improvements and maintenance, the provision of new or expanded transit/shuttle services, universal transit pass funding, bike training courses, etc.</td>
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<tr>
<td><strong>Measurement</strong></td>
<td></td>
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<tr>
<td>Build a Better Future by Measuring Success, Not Failure AVR surveying, calculation and achievement; impact of project on total travel time, quality of transportation services, climate protection, housing affordability, public health, and local sales tax returns.</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Achievement of 1.5 Site AVR</td>
<td></td>
<td>✓</td>
<td></td>
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<tr>
<td>Achievement of 1.6 Site AVR</td>
<td></td>
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<td>✓</td>
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<tr>
<td>Achievement of 1.75 Site AVR</td>
<td></td>
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<td>✓</td>
<td></td>
</tr>
<tr>
<td>Parking Occupancy Evaluation</td>
<td>Per Santa Monica Municipal Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
MEMORANDUM

To: Mike Nilsson
From: Bonnie Nelson, Linda Rhine, Todd Vogel
Date: September 26, 2008
Subject: Policy Considerations for an updated TDM Ordinance

Introduction

The purpose of this memorandum is to provide policy guidance to the City of Glendale with the goal of strengthening its existing Transportation Demand Management (TDM) Ordinance and the successful implementation of TDM measures by Transportation Management Associations/Organizations (TMA/TMOs)\(^1\) in the downtown area and citywide. The overall objective is to reduce traffic congestion and improve access by all modes through a series of incentives and programs focusing on people who work in Glendale as well as new residents in larger residential developments.

The memo includes the following sections:

- A review of the existing TDM Ordinance
- A review of current functionality of the Glendale TMA
- A peer review of other TMAs and TDM Ordinances that could serve as models and/or references for the City of Glendale
- A discussion of characteristics of successful TMAs
- Recommendations for ways to improve the Glendale TDM Ordinance, especially as a tool to strengthen the role of TMAs in the City of Glendale to reduce vehicle trips and improve mobility in downtown Glendale and citywide.
- Detailed information about the TMAs reviewed is included in Appendix A of this memo. A summary of TDM ordinances is included as Figure 1. A draft revised TDM Ordinance for the City of Glendale, based on this analysis, is included as Appendix B.

\(^1\) TMA and TMO are interchangeable, though Transportation Management Association is most common.
Existing Conditions – Glendale TDM Ordinance

The City of Glendale enacted a TDM ordinance within the Parking and Loading Chapter (30.32) of the Title 30 Zoning Code of the Municipal Code.² The goal of the ordinance is “to minimize the number of peak period vehicle trips, promote the use of alternative transportation, and improve air quality.”

Key elements of the TDM ordinance include the following:

1. Review of Transit Impacts – prior to the approval of any development project for which an Environmental Impact Report (EIR) will be prepared under the California Environmental Quality Act (CEQ), the impacts of that project on regional and local fixed-route transit must be evaluated. Opportunities to mitigate impacts on transit service, while also still minimizing automobile trips on the Congestion Management Plan (CMP) network, should be identified. The ordinance does not, however, require that these mitigations be pursued or funding provided to support their implementation.

2. Development Standards – most new non-residential development (see below for exceptions) is required to make provision for the following transportation demand management measures:

   • Development that is 25,000 gross square feet or more: A bulletin board, display case, or kiosk displaying information about public transit, bicycling, carpooling and vanpooling, and ridesharing, as well as information about the Glendale TMA

   • Development that is 50,000 gross square feet or more: The above requirements, as well as the provision of preferential parking for carpools and vanpools, bicycle racks or other secure bicycle parking facilities (4 spaces plus an additional space for each additional 50,000 square feet of development)

   • Development that is 100,000 gross square feet or more: Above requirements plus a loading area for vanpools and carpools, sidewalks from public sidewalks to each building in the development, bus stop improvements (if deemed necessary by the director of public works), and access by bicycle from the external system to the parking facilities on-site.

   These standards apply to all non-residential development, at the levels indicated above, except projects for which a development application has been deemed “complete” by the City pursuant to Government Code Section 65943, or for which a Notice of Preparation for a Draft EIR had been circulated or an application for a building permit had been received, prior to April 1, 1993.

   Notably, the current TDM Ordinance does not have any requirements for residential development. This is an important consideration, because of the significant number of housing units being planned and built in downtown Glendale. Further, the requirements for non-residential development do not include participation in the Glendale TMA or other TMA, nor do they require any action on the part of the developer beyond making information available and making minor capital investments.

   • Monitoring – the City shall monitor compliance in a manner it deems appropriate and reasonable. No specific requirements are indicated in the ordinance, though examples are provided, including monitoring during review and approval of site plan development permits, before the issuance of a certificate of use and occupancy, in response to complaints, and/or annually. Building owners are required, to sign an “Annual TDM

Ordinance Compliance Form,” to certify that the on-going requirements of the ordinance are being met.

- Enforcement is delegated to the neighborhood services section of the community development and housing division of the City of Glendale. It does not appear that there are penalties for non-compliance or a formal process for enforcement of mitigation measures, except the requirement that the compliance form mentioned above be signed and submitted each year.

**Existing Conditions – Glendale TMA**

The Glendale TMA was formed in 1989 by businesses and community organizations in Glendale to assist employers in meeting the new South Coast Air Quality Management District Regulation XV. These regulations require all employers with 250 or more employees to implement a ridesharing program to increase their overall vehicle ridership. Although the Air District regulations have been modified over time, the TMA continues in its work as an association of Glendale businesses. The TMA is a city-wide organization, with members located in most of the major business areas of the City. The majority of the current membership is located in downtown Glendale, circumscribed approximately by South Brand Blvd to the north, North Central Avenue to the west, East Colorado Street to the south, and Highway 134 to the north, including businesses fronting on each of these streets. Some member companies are also located along the San Fernando Road corridor, including the Walt Disney Company and DreamWorks Animation SKG.

The TMA is a private not-for-profit organization with 12 members – business and property-owners – including the City of Glendale, which is one of the City’s largest employers. The TMA has a Board of Directors with seven members, including four “Founding Members” and three “Regular Members.” The City of Glendale is one “Founding Member,” with a voting seat on the Board. The Board makes all policy decisions and the general members vote for the Board of Directors and on changes to the bylaws that affect membership.

The TMA has one paid staff member, an Executive Director working an average of 32 hours per week. The Glendale TMA represents between 10,000 and 15,000 employees, including 2,200 City employees.

Between 2000 and 2006, the TMA received $40,000 grant funding through the Los Angeles County Metropolitan Transportation Authority (Metro). In 2007, it received a $36,000 grant from Metro. The grant program ended in September 2007 and currently all funding for the TMA is obtained through annual membership dues. Companies with less than 250 employees currently pay $7.30 per employee per year and those with 250 or more employees pay $10.40 per employee per year, with fees capped at 750 employees. For developers (e.g. property-owners), the fee is $0.015 per square foot of leasable space if their tenants are provided TMA services and pay TMA dues themselves, and $0.03 per leasable square foot if tenants do not pay TMA dues and are therefore not provided TMA services. The TMA does not have any other funding sources, but are provided in-kind office space by the City and occasionally in-kind services by the other member companies. The Glendale TMA last changed their fees in 1993. The expected revenue

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3 When first implemented, this regulation applied to employers with 100 or more employees, but subsequent amendments have reduced the threshold to employers with 250 or more employees.

4 The Founding Members of the TMA that are still doing business in Glendale are: City of Glendale, Glendale Galleria, The Walt Disney Company, Glendale Adventist Medical Center. Other members include: Catholic HealthCare West, CIGNA Healthcare, DreamWorks Animation SKG, Glendale Plaza, Nestle USA, and Person & Covey, Inc.

5 Per email communication received from the Executive Director of the Glendale TMA on August 6, 2008.
for the TMA in Fiscal Year 2008 is $94,000, with the City contributing $7,725 in membership dues.⁶

Programs and services currently provided by the TMA include:

- Immediate available resource for employees transportation needs
- Emergency Ride Home Program
- Marketing Material (including regular bulletin board material)
- New employee orientation materials
- Emergency information regarding transportation emergencies
- Monthly bus pass sales
- Consultation with regulatory programs
- Consultation with establishing transportation demand management programs
- Regular educational member meetings
- Vanpool listing and assistance
- Website
- Transportation updates
- Meeting with companies, including management presentations
- Onsite promotional events
- Other individualized programs to meet members needs
- A forum for businesses to work together to improve congestion
- Assistance with employee commute options compliance (per Air Quality Management District requirements)
- Parking management strategies to help employers reduce parking demand and costs to provide parking for employees.

Peer Review – TMAs

Nelson\Nygaard conducted a review of thirteen TMAs in California and Oregon to provide a point of comparison for Glendale. Criteria used in selecting the peer cities included the local geographic context and implementation of successful programs, strategies, and funding mechanisms that could be pursued in Glendale. Information gained by the peer review is included throughout the memo, and a matrix providing detailed information about each TMA is included in Appendix A of this memo.

The following TMAs were reviewed:

1. Lloyd District TMA (Portland, Oregon)
2. Gresham Regional Center TMA (Gresham, Oregon)
3. Westside TMA (Washington County, Oregon)
4. Emeryville TMA (Emeryville, California)
5. Moffett Park Business and Transportation Association (Sunnyvale, California)
6. Hacienda Business Park (Pleasanton, California)
7. South Natomas TMA (Sacramento, California)
8. North Natomas TMA (Sacramento, California)
9. Anaheim Transportation Network (Anaheim, California)
10. Burbank TMO (Burbank, California)
11. Irvine Spectrum TMA (Irvine, California)
12. Warner Center TMA (Los Angeles, California)
13. Downtown Denver TMA (Denver, Colorado)

⁶ Note that though membership dues are based on the number of employees, dues are capped at 750 employees, so dues are not assessed for any number of employees in excess of this.
Characteristics of Successful TMAs

The following characterize successful Transportation Management Associations, and will be important to consider to help reduce vehicle trips and improve multi-modal transportation access in downtown Glendale and citywide.

1. Coordination and support from Public Agencies

Most TMAs are private organizations, not public agencies. However, success is achieved through close coordination and communication with local cities and other government entities, and both the TMA and the City or other governing agency often have vested interests in the mission of the TMA. Thus, as in Glendale, it is common for public agencies to be members of the TMA board.

However, in most circumstances, public agencies have only an ex-officio non-voting position on the board of a TMA. This is to avoid a potential conflict of interest where the public agency must represent the interests of a broader, or somewhat different, constituency, compared to the membership of the TMA. Most of the TMAs reviewed in this memo have public agencies on their board. However, they are ex-officio members for almost all TMAs, except two:

(1) In the Lloyd District, the public agencies on the board with voting privileges have employees and/or own property in the District, but do not fund nor have direct influence over the TMA (e.g. one such member is the U.S. Department of Wildlife)

(2) The Westside TMA, represents an entire county, and according to TMA staff, they have had some difficulty recruiting new private members due to the strong presence of public agencies on the Board.

The City of Glendale is a voting “founding member” of the Board of the Glendale TMA. City employees represent a large proportion (about 20%) of all employees working in the TMA service area. Most TMAs reviewed have non-voting “ex-officio” members of the Board, due to concerns about there being a conflict of interest if a governing agency that has direct influence over the TMA also serves as a voting member of the Board. The determination of whether the City or another governing agency is a voting or non-voting member of the Board is currently determined in the by-laws, though it could be defined by the TDM Ordinance.

Public agencies can also play an important role in the determination of whether membership in a TMA is voluntary or mandatory, as described in the following section.

2. Voluntary versus Mandatory Membership

The existing TDM Ordinance does not require mandatory membership in a TMA. Membership requirements vary for the other TMAs reviewed. Some, such as the Lloyd District TMA and the Moffett Park Business and Transportation Association, have voluntary membership. Others, including the Burbank TMO, Emeryville TMA, and Irvine Spectrum TMA, require membership for new development and businesses in their service area. The policy process by which membership is required varies. The Irvine Spectrum TMA was formed when the property was initially developed, and thus new tenants and property owners must also join the TMA. The Emeryville TMA is citywide and funded by a Property-Based Business Improvement District, which assesses a property tax for all commercial land uses in the city. The Burbank TMO is not citywide, but the city has enacted a TDM Ordinance that specifically requires all new development to join the TMO.

Notably, the TMAs reviewed that require mandatory membership do so only for new development, or redevelopment. The Anaheim TMA has also added a covenant to the title of
some developed land so that if it changes ownership, the new property-owners will also be required to be members of the TMA. Mandatory membership for existing employers and property owners will require careful consideration of legal issues and exploration of examples where levies have been placed on existing property-owners to help pay for public benefits.7

3. Funding Sources
Funding sources for TMAs include fees assessed based on property size, building square footage, number of employees, etc. as well as “lump sum” grants from public agencies. Just as with the Glendale TMA, several TMAs collect annual fees based on the number of employees. This is the sole source of funding for the Burbank TMO, though they have mandatory participation and charge a higher rate than the Glendale TMA, at $18 per employee. It is important that higher fees be coupled with a TDM ordinance and TMA programs and activities that strongly encourage attainment of TDM goals.

Compared to a fee based on building square footage or property size, the per employee fee is more directly related to the goal to reduce the number of vehicle trips per employee.

4. Roles and Responsibilities
TMA members, public agencies, and the TMA itself each have important roles and responsibilities to help reduce vehicle trips in the TMA service area. An especially important opportunity for public agencies is to require, through policy decisions, membership in a TMA, and to require members to implement programs and strategies to reduce vehicle trips. Public agencies can also set trip reduction goals either for an entire TMA service area or separately for individual businesses/developments.

In some circumstances, new development is required to join a TMA as part of their development agreements. Such a process, however, can increase the planning and permitting process for new development, especially if terms are open for negotiation. In other circumstances, such as Burbank, a TDM or other trip reduction ordinance specifically requires all businesses and/or property owners to join the TMA and pay dues if they are located within the service area of the TMA. The increased costs from TMA dues are offset by the reduced costs of a streamlined development process as well as, of course, the benefits of the services offered by the TMA.

In Glendale, many employers have a relatively small number of employees (less than 100). Property managers of office parks and other development leasing to these employers can play a key role as members of the TMA, similar to the role of the management of the Galleria. This approach is used by the Irvine-Spectrum TMA. Similarly, housing associations could be members of the TMA, on behalf of individual residents.

5. Visibility and Identity
It is important for a TMA to have a strong identity and presence to be able to effectively reach out to potential new customers, especially when encouraging a shift in travel behavior. If staff from the TMA are interacting directly with potential customers, it is often helpful for their office to be located in a prominent highly visible location to attract passers-by whom they especially wish to target with their programs and services.

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7 Assessment Districts and Mello-Roos Districts are two examples of this in California, but both have become more limited in their application in recent years.
6. Monitoring and Enforcement

Travel behavior surveys and other evaluation methods are important to ensure efficient use of resources to maximize vehicle trip reductions and improved access for TMA members. A TMA can develop a single survey to administer to all members, through a website and/or distributed on paper through member representatives. Several of the peer TMAs conduct surveys, typically on an annual basis, including the Lloyd District TMA, Emeryville TMA, and Burbank TMO.

TMAs can also help ensure employers and other TMA members effectively implement programs that they have committed to. If an employer, for example, is not offering commuter checks to their employees, an employee can contact the TMA to help resolve the situation, rather than having to directly confront their employer. Penalties are rarely assessed. TMAs instead try to work collaboratively with employers and other members to help them pursue program objectives more effectively. If employers are unable to meet their targets TMAs work with employers to focus their efforts on strategies that may yield more effective results.

7. Performance Measures

The members of a TMA, including employers and public agencies, share a common mission and goals, and responsibility to pursue these goals. They also make a significant financial contribution towards this effort. Thus, it is prudent for members and governing agencies to monitor the progress of a TMA towards reaching its goals, and to be able to ensure that a TMA is pursuing these goals as effectively as possible. Specific performance measures can be defined to measure progress towards specific goals. TMAs often, for example, are able to help people become more aware of and comfortable with various transportation options available to them. A performance measure could therefore be defined confirming whether all new members of a TMA are contacted and offered the opportunity to learn more about the transportation options available to them.

In practice, performance measures are not defined for a TMA, despite a TMA often having performance measures for its members. Defining performance measures for a TMA, however, would help both TMA members and TMA staff understand how to adjust programs and strategies to better meet the goals of the TMA. If a TMA is having trouble reaching out to new employers or residents, then the success of its other programs will be compromised, no matter how effective they could be otherwise. Thus, a discrete set of performance measures defined in relationship to each activity of a TMA could help identify areas of success as well as goals which might require additional resources or a different approach to be more successful.

Recommendations to Strengthen TMAs

In consideration of the experiences of other TMAs and the context for the City of Glendale, Nelson\Nygaard recommends that the following strategies be pursued to strengthen the role of a TMA in reducing vehicle trips and improving multimodal access downtown and elsewhere in Glendale.

1. Coordination and support from Public Agencies

The City is a Founding Member of the TMA and continues to invest significant resources and time to create and support the TMA, and City employees currently constitute 20% of the employee base in the TMA. However, if the City strengthens the TDM ordinance and places additional reporting and compliance requirements on developments, the City of Glendale will represent a broader constituency than the employee base of the TMA. Furthermore, it is typically the responsibility of the City or other public entity to enforce certain requirements, such as program monitoring and implementation.
Thus, as is the experience of other TMAs, under most circumstances public entities such as the City of Glendale are better able to support the goals and programs of the TMA by serving as non-voting “ex-officio” members of the Board. Therefore, we recommend that the City reconsider whether a TMA could be more effective if they City were a non-voting ex-officio member of the Board.

Notably, public agencies do, however, continue to pay dues at the rate of other members of the TMA, typically based on the number of employees served by the TMA. This approach is also recommended for the City of Glendale.

2. Voluntary versus Mandatory Membership

As is common practice for other TMAs, the City should require new development and subsequent occupants to become dues paying members of a TMA or similar City-endorsed organization. This would yield a significant revenue stream from new development to be spent on programs to improve transportation, both for that new development and for all employees, residents, and visitors to the City of Glendale. This requirement would be best enacted through a revised TDM Ordinance.

An important consideration is the number of employees at an organization. It may be preferable to permit voluntary membership for employers outside of the downtown who have a smaller number of employees. Property owners citywide with employers as tenants that, in combination, have a greater number of employees should be required to join the TMA. Property managers in these circumstances could serve as a liaison between the TMA and their tenants. This policy would mirror the policy of the City of Los Angeles stating that new commercial properties of at least 30,000 square feet join a TMA serving their location. For example, this would require that the Americana be a TMA member even though their individual tenants might be small.

Additionally, all new residential development over a certain size, perhaps 6-10 dwelling units in a single development, should also be required to join the TMA. Typically these larger developments have a home-owners association or renters-association, which are excellent bodies through which residents can obtain representation on the TMA, and for the TMA to most effectively communicate with residents of the development.

3. Funding Sources

The effectiveness of TMA programs and activities is significantly dependent on the level of funding the TMA receives. Funding from member dues typically represents a significant (or sole) source of funding for a TMA. An increase in dues may be desirable for a TMA to be more successful, but this must be balanced by consideration of what members consider an appropriate level, especially voluntary members.

Therefore, Nelson\Nygaard recommends consideration of one or more of the following strategies to increase the ability of a TMA to improve mobility and reduce congestion in the City of Glendale:

- New market-rate housing development downtown should be required to join a TMA. Membership fees should be per dwelling unit or perhaps per bedroom. If per dwelling unit, a lower fee should be assessed for multi-family and rental units.
- New development over a minimum square footage (25,000 square feet) and ALL new development in the Downtown Specific Plan area could be required to join a TMA by ordinance. In addition, approval of any parking exception could be linked to participation in a TMA and development and implementation of an active TDM plan for the applicant.
• The Glendale TMA has received grant funding through the Los Angeles County Metropolitan Authority (Metro) for approximately $40,000 per year for the years 2000 through 2006, and $36,000 from the grant in 2007, to help support outreach activities to the community. Though this grant expired in September 2007, similar grant opportunities should be explored and pursued, especially in coordination with the City of Glendale, LA Metro, and other TMAs in the region.

• A member company could provide in-kind office space to reduce administration costs for a TMA in Glendale. The by-laws could be written to require voting member companies elected to the Board to provide in-kind office space for a TMA on a rotating basis.

• Furthermore, funding for expanded outreach efforts, combined with a more prominent physical location for the TMA office, and increased coordination with property managers leasing to smaller employers (two additional strategies noted below), could help a TMA recruit new members and increase funding from membership dues.

• In addition, the following two measures could be considered for non-voluntary members, or if supported comfortably by voluntary members of a TMA:
  ▪ The cap on membership dues from each employer could be raised to increase the fees paid by larger companies and shift the per employee fee (based on total number of employees) to be more equitable between large and small employers. The total revenue for the TMA could then be increased by 10 or 20% or more, to support expansion of its programs and services.
  ▪ The per employee fee could be raised to be closer to the level assessed by the Burbank TMO ($18 per employee). It also does not appear necessary for a TMA to charge a lower rate for smaller companies.

Glendale is considering a Business Improvement District (BID) in the downtown area, currently focused on improving security. It may be possible to expand the BID to include implementation of the Downtown Mobility Plan. Members of the BID could be automatically enrolled in a TMA serving the downtown, with the remainder of the funding generated from this element of the BID managed through the Downtown Transportation Fund (see separate report on the Downtown Transportation Fund).

4. Roles and Responsibilities

The primary role of a TMA is to help its members and the City achieve its TDM goals, including a reduction in vehicle trips and increased mobility. One way the City could support this by strengthening its TDM ordinance, to require membership in a TMA and define discreet trip reduction goals for TMA members.

There is an increasing number of small employers in downtown Glendale that may not have the resources to participate fully in a TMA compared to larger employers. In these circumstances, property managers should take on an increased role to support the programs and activities of a TMA. They should sponsor membership in the TMA for their tenants, representing their common interests and acting as a liaison between individual employers and the TMA. This requirement could be enacted through a revised TDM Ordinance, as discussed further below.

TMAs and the City should also work together with the Glendale Beeline to explore the potential to establish a universal transit pass that is sold at a deep bulk discount to residents and employees. Similarly, the City and TMAs could negotiate with MTA a deeper discount on their universal pass, especially as new service comes online. Some changes to the MTA bus route structure may also be worth discussing, to better serve downtown employees and residents.
5. Visibility and Identity
A TMA should be encouraged to discuss the pros and cons of various locations for the TMA office. It may be most beneficial to be located in a prominent location visible to downtown employees and residents, where they can talk to someone directly for information about TMA programs and other transportation questions they may have.

6. Monitoring and Enforcement
The TMA, with the City’s guidance, should conduct annual surveys of all downtown employees and residents, and ideally not just current members. The survey could be conducted online, and incentives offered to encourage people to participate. The cost to employers and property managers would be minimal, but would provide invaluable insight and information regarding travel behavior and transportation needs in downtown Glendale, and the success of various TMA programs in addressing these needs.

7. TMA Board Membership
Successful TMAs, especially with a smaller number of members having a large number of employees and/or residents, often have CEO’s, CFO’s and large developers on their board. Other TMAs may have board members representing smaller employers as well. In all circumstances, it is highly advantageous for board members to have a significant decision-making capacity in their organization, and such a requirement should be included in the by-laws developed for a TMA.

8. Performance Measures
The following are examples of performance measures that could be defined for the Glendale TMA, to measure its success in reaching out to its members, educating them about their transportation options, and supporting increased use of the variety of programs and activities of the TMA seeking to increase mobility and reduce congestion in the City of Glendale. The City or an independent organization could be enlisted to complete the evaluation on an annual basis.
Recommended TMA Programs and Strategies

The following programs and strategies should be considered as potential opportunities for a TMA to further increase mobility and reduce congestion in the City of Glendale.

1. City Carshare

Following on the merger of Flexcar and Zipcar, the presence of a carshare organization in the Los Angeles basin has declined dramatically. Zipcars are now only available at two university campuses (UCLA and USC). Recent successful experience in the City of Emeryville has demonstrated that there may be targeted potential to reopen the market in the Los Angeles area to carshare services, especially with increasing gas costs and new infill residential and office development occurring. In Emeryville, the TMA provided a partial subsidy to carshare services, to help test whether a viable market could be established. After less than a year of operation, this market has developed firmly, with some carshare pod locations no longer requiring a subsidy and others demonstrating potential to no longer need one with further outreach and adjustments to services.

2. Bikesharing

Though not firmly established in the United States, many cities are currently exploring the potential to provide shared bicycle services (similar to carshare). Washington D.C. has initially implemented a small bikeshare service this year, following on the tremendous success of bike sharing programs throughout Europe over the past several years. These experiences overseas, coupled with the work being done here in the United States, would provide useful information for the City of Glendale and the Glendale TMA to explore a pilot bikeshare program downtown or perhaps elsewhere in the City.

3. Travel Training and High-Touch Marketing

Transportation agencies around the world have been experimenting with travel training and face-to-face information sharing, often called high-touch marketing, where the focus is to personalize the experience and participation as much as possible. Rather than blanketing communities with transportation billboards or putting advertisements on radio stations, personalized travel information has demonstrated itself to often be the strategy of choice.

Many of the TMAs reviewed noted that this personal approach was their most effective strategy to recruit new members and encourage people to take advantage of TMA programs and other available transportation services. Activities include presentations to groups of employees and one-on-one conversations with individuals at a prominent and accessible office location for the TMA. Another successful strategy is to recruit people who already use TMA programs and are familiar with public transit to help others explore them as well.

4. Transit Passes

TMAs, especially those located in central locations, often are able to facilitate the purchase of transit passes by individuals represented by their member organizations. Sometimes, passes can be purchased at a bulk discount, to reduce the cost for each individual pass. This convenience, particularly if costs are reduced, can be a key incentive to encourage individuals to use public transit instead of driving.
Peer Review – TDM Ordinances

A peer review was conducted of TDM ordinances enacted by other cities in California. Ordinances from the following cities were reviewed:

- Burbank
- Pasadena
- Santa Monica
- West Hollywood
- Los Angeles
- South San Francisco

The City of Pleasanton was also reviewed, but is not included in the table because their ordinance is voluntary (for both existing and new development). Furthermore, several other cities investigated appear to have no TDM ordinance, including Irvine, Anaheim, Sacramento, Emeryville, and San Mateo (all in California), and the city of Portland, Oregon. A matrix providing summary information about each TDM ordinance is included as Figure 1 below.

Significant variations were found between the TDM ordinances reviewed. These variations lead to important questions about what type of ordinance would be appropriate for the City of Glendale, including:

1. To what types of development (land use and size) should the ordinance apply?
2. What target should be set for reduction in vehicle trips? How should the baseline rate be determined?
3. What facilities to support TDM should be required of new development?
4. What TDM programs should be required to help meet the trip reduction goal? Should they be prescriptive (e.g. parking cash-out) or performance-based (e.g. chosen by the developer or property manager)?
5. How should monitoring occur, and what level of enforcement should be applied if the target is not met? Who should pay for the monitoring and enforcement?
<table>
<thead>
<tr>
<th>City</th>
<th>South San Francisco</th>
<th>Pasadena</th>
<th>Pasadena</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voluntary or Mandatory?</td>
<td>Mandatory for new non-residential and expansions of existing non-residential projects to meet the 1.75 goal within a three year period from the adoption of the Trip-Reduction Ordinance.</td>
<td>Mandatory for new development, and expansion of existing development, or redevelopment, especially if prior use was nonconforming.</td>
<td>Mandatory for non-residential projects in TOD areas to meet the 1.75 goal within a three year period from the adoption of the Trip-Reduction Ordinance.</td>
</tr>
<tr>
<td>Trigger for TDM requirements</td>
<td>Greater than 100 average daily trips expected, or increase in FAR over base FAR.</td>
<td>Tier 1 - Projects exceeding 25,000 sq ft gross floor area</td>
<td>TDM Program Plans to be developed for: a) multifamily residential projects with 100 or more units, b) mixed use projects where number of residential units are 50 or more and/or non-residential part of the project is 50,000 sq. ft or more, and c) non-residential projects in TOD areas.</td>
</tr>
<tr>
<td>Fees</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TDM Plan Required?</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>TDM Programmatic Requirements</td>
<td>Long varied list required of all projects generating 100 or more trips (see below). Projects seeking increase in FAR must implement programs as determined by Chief Planner.</td>
<td>Trip reduction performance goal.</td>
<td></td>
</tr>
<tr>
<td>Opt-out? (e.g. in-lieu fee?)</td>
<td>With approval of Chief Planner, who must set alternative trip reduction target.</td>
<td>Applicant will be required to provide adequate information to demonstrate to the City and Metro that alternative TDM measures have equal or greater ability to reduce trips.</td>
<td></td>
</tr>
<tr>
<td>Alternative Approach?</td>
<td>Yes, or organization providing equivalent trip reduction support.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Must join TMA?</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trip Reduction Target</td>
<td>Non-drive-alone of at least 28%</td>
<td>Average vehicle ridership for non-residential projects to be 1.5 or 1.75 in TOD areas.</td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td>Submit annual surveys for all projects, Triennial Reports for Applicants Seeking an FAR Bonus (penalties for non-compliance).</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Enforcement</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Applicant to reimburse city for costs to monitor and enforce?</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>CEQA / EIR requirements</td>
<td>exempt from the California Environmental Quality Act (CEQA) pursuant to State CEQA Guidelines, Section 15061 and Section1 5378.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific Programmatic Requirements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle Facilities</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle Racks</td>
<td>Yes - specific number of spaces based on land use</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Bicycle Lockers</td>
<td>Yes</td>
<td></td>
<td></td>
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<tr>
<td>Shower and changing facilities</td>
<td>Yes</td>
<td></td>
<td></td>
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<tr>
<td>Pedestrian Facilities</td>
<td>Tier 2 - full sidewalk connectivity</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Transit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connectivity (Site Design)</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shuttle Services</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automobiles</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferential Parking (1)</td>
<td>Yes, At least 10% (plus drop-off area for Tier 2 projects)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Ridesharing Services</td>
<td>Yes, for companies with less than 25 employees on property owned and occupied by firms with over 25 employees must participate through the larger firm.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Programs and Activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation Coordinator/Contact</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Board/Kiosk</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budget</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Programs/Requirements</td>
<td>Yes</td>
<td>Commuter ridermatching, parking cash out programs.</td>
<td></td>
</tr>
</tbody>
</table>

(1) May include preferential parking for carpools and vanpools, and/or passenger drop-off zone
(2) Employers with less than 25 employees on property owned and occupied by firms with over 25 employees must participate through the larger firm.
<table>
<thead>
<tr>
<th>City</th>
<th>Santa Monica</th>
<th>West Hollywood</th>
<th>Burbank - Citywide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voluntary or Mandatory?</td>
<td>Mandatory for employers with 10 employees or more, both new and existing. Existing employers cannot be forced to develop trip reduction plans, but have alternative to purchase emission credits (most choose trip reduction plan however).</td>
<td>Mandatory for all employers of five or more employees at a worksite located in the city and in a development of ten thousand or more square feet of enclosed space after the ordinance comes into effect</td>
<td>Tier 1 programs mandatory for non-residential development over 25,000 sq ft; Tier 2 programs mandatory for non-residential development over 50,000 sq ft; Tier 3 for non-residential development over 100,000 sq ft</td>
</tr>
<tr>
<td><strong>Trigger</strong> for TDM requirements</td>
<td>Employers of 10-49 employees are required to attend a City-sponsored workshop and submit a Worksite Transportation Plan (WTP) to the City each year. Employers of 50 employees or more are required to designate a certified Employee Transportation Coordinator (ETC) and submit an annual Emission Reduction Plan.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fees</td>
<td>Employers of 10-49 employees to pay a fee of $11.38 per employee, and those of 50 or more employees to pay $8.87 per employee. (Those maintaining the AVR receive discount of 40-60%). Employers of 50 or more employees filing an MSERC plan to pay a flat fee of $550.00 per worksite located in the City.</td>
<td>To be established by the City Council</td>
<td></td>
</tr>
<tr>
<td>TDM Plan Required?</td>
<td>Yes</td>
<td>Yes, see below</td>
<td></td>
</tr>
<tr>
<td>TDM Programmatic Requirements</td>
<td>AVR attainment goal is 1.5 persons per vehicle for the morning &amp; evening commute periods. Current AVR citywide is 1.52, with 70% of employers meeting 1.5 target.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Split-out? (e.g. in-lieu fee?)</td>
<td>Employers may purchase Mobile Source Emission Reduction Credits from a certified Broker</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Alternative Approach?</td>
<td>Yes</td>
<td>No citywide TMA.</td>
<td></td>
</tr>
<tr>
<td>Must join TMA?</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Performance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trip Reduction Target</td>
<td>Employers must submit a plan that they believe will result in an AVR of 1.5 employees per vehicle.</td>
<td>AVR of 1.5 within twelve months after approval of a trip reduction plan</td>
<td>None</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Yes</td>
<td>Submit annual progress report to city</td>
<td>Validation that requirements have been met, prior to occupancy permit. No subsequent monitoring.</td>
</tr>
<tr>
<td>Enforcement</td>
<td>Yes</td>
<td>Any employer which fails to submit an initial trip reduction plan or annual report, or the revised ones within the time permitted, shall be in violation. Director to have power to inspect on-site and audit files. Employer to be deemed not in violation if he complies with all provisions of its approved plan, but fails to attain AVR of 1.5</td>
<td>Occupancy permit provided only if requirements have been met.</td>
</tr>
<tr>
<td>Applicant to reimburse city for costs to monitor and enforce?</td>
<td>The first violation of a plan year will result in a warning notice, carries a fine of $5.00 per employee per day, and possible revocation of City of Santa Monica business license. A few employers have received minor fines, and then worked to come into compliance.</td>
<td>Penalties to be established by the City Council (can be appealed, and can have a hearing)</td>
<td></td>
</tr>
<tr>
<td>CEQA / EIR requirements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Specific Programmatic Requirements</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle Facilities</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (Tier 2) (Tier 3) (no changing/shower)</td>
</tr>
<tr>
<td>Bicycle Racks</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (Tier 2) (Tier 3) (no changing/shower)</td>
</tr>
<tr>
<td>Bicycle Lockers</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (Tier 2) (Tier 3) (no changing/shower)</td>
</tr>
<tr>
<td>Shower and changing facilities</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (Tier 3)</td>
</tr>
<tr>
<td>Pedestrian Facilities</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (Tier 3)</td>
</tr>
<tr>
<td>Transit</td>
<td></td>
<td></td>
<td>Bus stop(s), if City determines necessary</td>
</tr>
<tr>
<td>Shuttle Services</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Automobiles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferential Parking (1)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (Tier 2) (Tier 3) (Drop-Off)</td>
</tr>
<tr>
<td>Rideharing Services</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Programs and Activities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation Coordinator/Contact</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Information Board/Kiosk</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (Tier 1)</td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budget</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other Programs/Requirements</strong></td>
<td></td>
<td></td>
<td>Parking cash out, employee AVR survey, identifies objectives of plan and proposed duration for achieving AVR levels, marketing plan about alternative commute options, carpooling / vanpooling options, bus stop improvements, emission reduction plan</td>
</tr>
</tbody>
</table>
### Burbank Center Overlay Zone

- **Voluntary or Mandatory?** Mandatory for employers with more than 25 employees or over 25,000 sq ft within the Media District Overlay Zone. (2) Voluntary for others within Zone. Multi-family residential excluded.

- **Trigger** for TDM requirements: See above

- **Fees**

- **TDM Plan Required?**

- **TDM Programmatic Requirements** Suggested strategies, but not required. See below

- **Opt-out?** (e.g. in-lieu fee?) Yes, for those with same requirements as above.

- **Alternative Approach?**

- **Must join TMA?**

- **Performance**

  - **Trip Reduction Target**: 9.5% reduction after first 5 years, additional 9.5% reduction each subsequent 5 years. If project build-out projections exceeded, any firm with 25 or more employees must achieve 38% reduction in first year of occupancy.

  - **Monitoring**: Annual report of programs and strategies and outcomes (PM peak-hour trips). Yes, by Department of Transportation

  - **Enforcement**: If targets not achieved. City may impose TDM programs to help achieve.

  - **Applicant to reimburse city for costs to monitor and enforce?** Yes - Sidewalk connectivity (Tier 3)

- **CEQA / EIR requirements**

<table>
<thead>
<tr>
<th>Specific Programmatic Requirements</th>
<th>Burbank Center Overlay Zone</th>
<th>Los Angeles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicycle Facilities</td>
<td>Yes (Tier 2 and 3)</td>
<td></td>
</tr>
<tr>
<td>Bicycle Racks</td>
<td>See section 12.21A19</td>
<td></td>
</tr>
<tr>
<td>Bicycle Lockers</td>
<td>See section 12.21A19</td>
<td></td>
</tr>
<tr>
<td>Shower and changing facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrian Facilities</td>
<td>Yes - Sidewalk connectivity (Tier 3)</td>
<td></td>
</tr>
<tr>
<td>Transit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connectivity (Site Design)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shuttle Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automobiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferential Parking (1)</td>
<td>Yes (Tier 2 and 3)</td>
<td></td>
</tr>
<tr>
<td>Ridesharing Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Programs and Activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation Coordinator/Contact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Board/Kiosk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budget</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Programs/Requirements</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Recommendations for a Revised TDM Ordinance**

The peer review demonstrates that a key strategy for a strong TMA is through a more robust and comprehensive TDM Ordinance. An updated TDM Ordinance could enable a TMA to:

- Increase their membership base and revenue
- Increase the impact of existing programs and pursue new programs and strategies
- Provide for monitoring of programs and ensure enforcement.

An updated TDM Ordinance could also support other TDM strategies the City wishes to pursue, including improved bicycle, pedestrian, and public transit facilities, more strategic use of the existing parking supply, and an overall increase in mobility in downtown Glendale.

Nelson\Nygaard therefore recommends the following elements be included in an updated TDM Ordinance for the City of Glendale. A draft ordinance based on these recommendations is included as Appendix B.

- **Objectives and Purpose.** State the objectives and purpose of the TDM Ordinance. Objectives should include defining what types of development are subject to the ordinance and who is required join a TMA and pay membership dues. The ordinance should also define a targeted reduction in vehicle trips, and have monitoring and enforcement provisions to ensure participation by all that are subject to the ordinance.

- **Definitions.** Clearly define the meaning of Terms such as “Transportation Demand Management” and “Carpool.”

- **Applicability.** Define what types of development will be subject to the terms of the ordinance. Overall, all new development of a minimum size and expansions of existing development should be subject to the ordinance. Opportunities to incentivize TMA membership and/or participation in TDM programs and activities should be explored.

- **Requirements.** Stipulate what facilities and programs will be required of new development, or what performance level is required. Facilities include bicycle parking and pedestrian, bicycle, and transit access requirements, and preferred parking for carpools and vanpools. Programs include designation of an on-site transportation coordinator, information sharing and outreach, ridesharing and parking cash out.

- **Monitoring and Enforcement.** Require an annual survey and report to City staff by participants. The City should enforce requirements by levying a fine until compliance is achieved. Compliance with the State of California’s parking cash out law should also be demonstrated by participants.

- **Reimbursement for City Costs.** Stipulate which party or parties will pay for monitoring and enforcement actions. Participants should pay for monitoring costs, whereas the City would provide staff time for review and enforcement activities.

- **Performance Measures.** The following set of performance standards should be required of any TMA in the City of Glendale. The City should withhold any dues or other funding provided to the TMA until such measures are met.
  - Conduct an annual AVR survey for all member organizations
  - All members of the board should be decision makers or their designees, for the organizations they represent
  - The Board should meet at least four (4) times per year with a quorum of at least 50% at all meetings.
Appendix A - TMA Peer Review
### Lloyd District TMA

<table>
<thead>
<tr>
<th>Year Founded</th>
<th>1994</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Membership</strong></td>
<td></td>
</tr>
<tr>
<td>Number of Companies/ Property Owners Represented</td>
<td>85 member businesses</td>
</tr>
<tr>
<td>Number of Employees and Residents Represented</td>
<td>Approx. 10,000 employees</td>
</tr>
<tr>
<td>Composition</td>
<td>Office and retail development in the Lloyd District of Portland, Oregon</td>
</tr>
<tr>
<td>Voluntary or Required Membership</td>
<td>Voluntary</td>
</tr>
<tr>
<td>Board Structure</td>
<td>19 members: 16 voting, 3 ex-officio. Voting members include: property owners; large, medium, and small employers, neighborhood associations, public sector employers with offices in the Lloyd District. Non-voting members include Portland Development Commission, Department of Transportation, and TriMet. Public agencies with voting privileges have offices or own property within the Lloyd District, but do not fund TMA or have direct influence. Ex-officio members do not have offices in the Lloyd District.</td>
</tr>
<tr>
<td><strong>Financial Information</strong></td>
<td></td>
</tr>
<tr>
<td>Fees / Membership Dues</td>
<td>No fee.</td>
</tr>
<tr>
<td>Other Funding Sources</td>
<td>The LDTMA derives its funding from the following sources: Business Improvement District (private sector contribution of $90,000), Parking Meter Revenue from the District (City of Portland contribution of $75,000), a commission from the sale of transit passes (TriMet contribution of $40,000), and Regional grant (Metro regional government contribution of $25,000).</td>
</tr>
<tr>
<td>Annual Operating Budget</td>
<td>The LDTMA maintains an annual operating budget of approximately $230,000.</td>
</tr>
<tr>
<td>Programs and Strategies</td>
<td></td>
</tr>
<tr>
<td>Services Offered</td>
<td>LDTMA PASSport annual transit pass program, Commuter Connection Transportation Store, District bike locker program, District pedestrian infrastructure fund, Policy &amp; Advocacy, 14 annual district outreach and educational events</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Annual reporting to both the Board of Directors and to the regional government.</td>
</tr>
<tr>
<td>Trip Reduction Target</td>
<td>Trip targets are set for 2015. The goals are set as mode split goals. 2015 targets are: 42% transit, 10% bike, 5% walk, 10% rideshare and 33% drive alone.</td>
</tr>
<tr>
<td>Enforcement</td>
<td>No penalties if not achieved</td>
</tr>
<tr>
<td>Actual Trip Reduction</td>
<td>32% reduction in vehicle trips, compared to base year, before TMA established. Current mode split is 39% transit, 4.8% bike, 2.4% walk, 16.6% rideshare, and 40.5% drive alone.</td>
</tr>
<tr>
<td>Overall Effectiveness</td>
<td>Each program has been very successful and supported by results from the annual district survey. The transit program is successful because businesses purchasing the program for their employees receive (a) a business tax credit for the purchase and (b) a discount on the price of the pass. The Bike program is successful because of the coordination of the program through the Bike Committee, the availability of secure bike lockers and the ability to manage all the services through the Commuter Connection Transportation Store.</td>
</tr>
<tr>
<td>Successful Recruitment and Outreach Efforts</td>
<td>Free membership provided through Business Improvement District and funding partnership with the public sector. Direct outreach to businesses and one-on-one assistance to employees</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.lloydtma.com">www.lloydtma.com</a></td>
</tr>
</tbody>
</table>

### Gresham Regional Center TMA

<table>
<thead>
<tr>
<th>Year Founded</th>
<th>1991</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Membership</strong></td>
<td></td>
</tr>
<tr>
<td>Number of Companies/ Property Owners Represented</td>
<td>50 member businesses in the downtown area</td>
</tr>
<tr>
<td>Number of Employees and Residents Represented</td>
<td>Not available</td>
</tr>
<tr>
<td>Composition</td>
<td>Office and retail development, and public sector employees in the downtown district in the City of Gresham</td>
</tr>
<tr>
<td>Voluntary or Required Membership</td>
<td>Voluntary</td>
</tr>
<tr>
<td>Board Structure</td>
<td>Not known</td>
</tr>
<tr>
<td><strong>Financial Information</strong></td>
<td></td>
</tr>
<tr>
<td>Fees / Membership Dues</td>
<td>No fee.</td>
</tr>
<tr>
<td>Other Funding Sources</td>
<td>Business Improvement District: A portion of the larger GDDA BID is directly allocated to the TMA. During the last renewal of the BID, the BID formula was specifically calculated to show funders the percentage breakout of their assessment going to the TMA and that going to GDDA for more general economic development purposes. Annual city of Gresham Contribution: The City of Gresham makes an annual contribution to both the TMA and to GDDA as a “matching” contribution for the private sector’s BID investment. Regional Grant Funding:</td>
</tr>
<tr>
<td>Annual Operating Budget</td>
<td>Approximately $75,000.</td>
</tr>
<tr>
<td>Programs and Strategies</td>
<td></td>
</tr>
<tr>
<td>Services Offered</td>
<td>Advocacy for downtown transportation issues, Assisting businesses to comply with State ECO Rule</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Annual reporting to both the Board of Directors and to the regional government.</td>
</tr>
<tr>
<td>Trip Reduction Target</td>
<td>None.</td>
</tr>
<tr>
<td>Enforcement</td>
<td>None.</td>
</tr>
<tr>
<td>Actual Trip Reduction</td>
<td>Not known.</td>
</tr>
<tr>
<td>Overall Effectiveness</td>
<td>The GRC-TMA has been most successful in advocating with developers to better plan and coordinate their developments to support reduced auto trips. The tie between the GRC-TMA and the Gresham Downtown Development Association allows for close coordination of transportation priorities at the front end of development.</td>
</tr>
<tr>
<td>Successful Recruitment and Outreach Efforts</td>
<td>Not known.</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.gdda.org/transit.htm">www.gdda.org/transit.htm</a></td>
</tr>
<tr>
<td>TMA</td>
<td>Westside TMA</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Year Founded</td>
<td>1997</td>
</tr>
<tr>
<td>Membership</td>
<td></td>
</tr>
<tr>
<td>Number of Companies/ Property Owners Represented</td>
<td>30 members (public and private entities)</td>
</tr>
<tr>
<td>Number of Employees and Residents Represented</td>
<td>Almost 32,000 employees</td>
</tr>
<tr>
<td>Composition</td>
<td>Office and retail development, and public sector employees in Washington County</td>
</tr>
<tr>
<td>Voluntary or Required Membership</td>
<td>Voluntary</td>
</tr>
<tr>
<td>Board Structure</td>
<td>8 member Board of Directors, including private sector employers (4), City of Beaverton, City of Tigard, Washington County, and TriMet TriMet (1)</td>
</tr>
<tr>
<td>Financial Information</td>
<td></td>
</tr>
<tr>
<td>Fees / Membership Dues</td>
<td>Ranging from $5-10 per empl. (based on the package of services business desires). Dues capped at $15,000 for any member. Public entities pay dues at the same rate as private sector members.</td>
</tr>
<tr>
<td>Other Funding Sources</td>
<td>The organization also receives CMAQ grant funding through METRO, the regional government</td>
</tr>
<tr>
<td>Annual Operating Budget</td>
<td>The WTA’s annual operating budget is approximately $150,000.</td>
</tr>
<tr>
<td>Programs and Strategies</td>
<td></td>
</tr>
<tr>
<td>Services Offered</td>
<td>Transportation Policy and Advocacy</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Annual reporting to both the Board of Directors and to the regional government.</td>
</tr>
<tr>
<td>Trip Reduction Target</td>
<td>The WTA focuses on the State of Oregon’s Employee Commute Options (ECO) Rule that establishes a 10% commute trip reduction goal for all businesses in the Portland Metropolitan Area with more than 50 employees.</td>
</tr>
<tr>
<td>Enforcement</td>
<td>None.</td>
</tr>
<tr>
<td>Actual Trip Reduction</td>
<td>Not known.</td>
</tr>
<tr>
<td>Overall Effectiveness</td>
<td>The WTA's annual Carefree/Carfree event is now being expanded to become a regional event, focusing on challenging businesses and employees to try alternative modes during September of each year. Competitions and prizes are awarded. The event has grown in scale and popularity largely because of the partnership the WTA has established with the regional government to expand marketing, communication and outreach for the event.</td>
</tr>
<tr>
<td>Successful Recruitment and Outreach Efforts</td>
<td>Not known.</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.wts-tma.org">www.wts-tma.org</a></td>
</tr>
</tbody>
</table>
### Moffett Park Business and Transportation Association

**Year Founded**: Not known  
**Members**: 9 businesses, including: Yahoo, Juniper Networks, Jay Paul Company, Network Appliance, cgfx, Lockheed Martin, Labcyte, and Infinera. City of Sunnyvale also a dues paying member, and operates SMART recycling station in Park.  
**Number of Companies/Property Owners Represented**: Not known.  
**Number of Employees and Residents Represented**: Not known.  
**Composition**: Office development and public sector employees  
**Voluntary or Required Membership**: Voluntary.  
**Board Structure**: Nine voting board members (representatives from private businesses who are members of the TMA) and two ex-officio members representing public agencies (Valley Transit Authority and Sunnyvale Chamber of Commerce)  
**Fees / Membership Dues**: Specifics not available, but fees range from $550 to $15,500 and approximately $25,000 for Founding members.  
**Other Funding Sources**: City of Sunnydale originally funded the organization's feasibility study and provided a startup contribution. Now, the City pays a membership rate as they have offices in the Park. Staff receive in-kind office space, with computer and IT assistance.  
**Annual Operating Budget**: Approx. $140,000 per year. Approximately $250,000, exclusive of administration costs.  
**Services Offered**: Guaranteed Emergency Ride Home; Transportation Consulting; Advocacy for local and regional transportation projects and commute services that affect companies and employees; Employee Commute Survey; Network of Commute Coordinators (monthly meeting of TMA director with transportation coordinators from each member company).  
**Monitoring**: Annual surveys and reports. Use of transit system by employees and residents is monitored.  
**Trip Reduction Target**: 20% vehicle trip reduction target for new companies  
**Enforcement**: If a company fails to meet trip goals and does not demonstrate a good-faith effort, they can then assess penalties, though this has not yet occurred (nor, perhaps, been necessary).  
**Actual Trip Reduction**: 20% reduction in 2007, due to efforts of individual companies.  
**Overall Effectiveness**: 1) Network of Commute Coordinators and 2) Advocacy/lobbying to maintaining transit services to the Park. Coordination of many companies provides a greater impact than they could achieve individually. Bus services are most successful, especially by employees who live nearby and use the routes to go to more than work locations.  
**Successful Recruitment and Outreach Efforts**: Can be difficult initially, but once they become members, companies find that the networking opportunities and communication with the City that the TMA facilitates is invaluable.  
**Website**: [www.mpbta.org](http://www.mpbta.org)  

### Hacienda Business Park

**Year Founded**: 1984  
**Members**: Not known  
**Number of Companies/Property Owners Represented**: 8 businesses, including: Yahoo, Juniper Networks, Jay Paul Company, Network Appliance, cgfx, Lockheed Martin, Labcyte, and Infinera. City of Sunnyvale also a dues paying member, and operates SMART recycling station in Park.  
**Number of Employees and Residents Represented**: Not known.  
**Composition**: Mix of office, R&D, retail, and residential uses.  
**Voluntary or Required Membership**: Mandatory for all property owners, not necessarily business owners.  
**Board Structure**: Not known.  
**Fees / Membership Dues**: Fees levied per square foot of land; thus, higher density projects pay less per square foot of leasable space.  
**Other Funding Sources**: Not known.  
**Annual Operating Budget**: Not known.  
**Services Offered**: Free EcoPasts on WHEELS Public Transit for employees and residents; Guaranteed Ride Home; First-Time Riders Program on Public Transit; preferential parking for carpools/vanpools, commute alternative programs and customized commute assistance.  
**Monitoring**: Use of transit system by employees and residents is monitored.  
**Trip Reduction Target**: None.  
**Enforcement**: None.  
**Actual Trip Reduction**: Not known.  
**Overall Effectiveness**: Not known.  
**Successful Recruitment and Outreach Efforts**: Not known.  
**Website**: [www.hacienda.org](http://www.hacienda.org)
<table>
<thead>
<tr>
<th>TMA</th>
<th>South Natomas TMA</th>
<th>North Natomas TMA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year Founded</strong></td>
<td>Not known</td>
<td>c. 2001</td>
</tr>
<tr>
<td><strong>Membership</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Companies/ Property Owners Represented</td>
<td>180 members</td>
<td>Unknown</td>
</tr>
<tr>
<td>Number of Employees and Residents Represented</td>
<td>7,500 employees</td>
<td>32,500 dwelling units with 66,000 residents and 71,000 employees at build-out. Currently, approximately 35,000 residents and 10,000 employees</td>
</tr>
<tr>
<td>Composition</td>
<td>Office and retail development in South Natomas</td>
<td>Office, retail, residential, and industrial development in North Natomas</td>
</tr>
<tr>
<td>Voluntary or Required Membership</td>
<td>Primarily, membership is required. Some members, however, are voluntary.</td>
<td>Required</td>
</tr>
<tr>
<td>Board Structure</td>
<td>The South Natomas TMA is governed by a Board of Directors which elects a President, Vice-President, Secretary and Treasurer.</td>
<td>9 board members with representatives from residential, commercial, industrial, and office interests. Board chooses replacement(s).</td>
</tr>
<tr>
<td><strong>Financial Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fees / Membership Dues</td>
<td>Member companies pay $0.07 per rentable square foot per year (minimum $250). Developers pay $0.04 per entitled square foot.</td>
<td>Dedicated property tax, through City of Sacramento &quot;Community Financing District&quot;: Single-Family $21.32/du; Multi-Family $16.58/du; Office $0.07/sq ft; Commercial $0.12/sq ft; Industrial $0.04/sq ft; Sports Complex $228/net acre</td>
</tr>
<tr>
<td>Other Funding Sources</td>
<td>CMAQ funds through SACOG</td>
<td>Donations from founding sponsors, development impact fee (until 2010), SACOG grant, shuttle service fares.</td>
</tr>
<tr>
<td><strong>Annual Operating Budget</strong></td>
<td>$225,000</td>
<td>Approx. $758,000 (FY 2006-2007)</td>
</tr>
<tr>
<td><strong>Programs and Strategies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services Offered</td>
<td>Subsidized regional transit passes, Amtrak subsidy. Emergency Ride Home Program. Network and monthly programs for Employee Transportation Coordinators, Bike Users Group (benefits include: bi-monthly lunches with informative programs, bike forums and safety training, Bike to Work Day breakfast and activities, and bike subsidies, when available); Rideshare Express (regional carpool database), advocacy, and a periodic newsletter for members.</td>
<td>• Advocacy - infrastructure improvements, increased support for transit, bike, ped; Bike/Ped Elementary School Programs; Smart Routes to School children's web-based program; $1 Commuter Shuttle daily to downtown, Mon-Fri; Guaranteed Ride Home program; Commuter Club - web-based rideshare, travel training; vanpool subsidies</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Sporadic surveys of employee travel behavior, but none conducted recently.</td>
<td></td>
</tr>
<tr>
<td>Trip Reduction Target</td>
<td>City ordinance encourages a 35% trip reduction goal.</td>
<td>35% reduction in vehicle trips and 35% reduction in air pollution (reactive organic gases). The firm objective is for non-residential uses to reduce trips by 50% and residential uses to reduce trips by 20%.</td>
</tr>
<tr>
<td>Enforcement</td>
<td>No penalties.</td>
<td>None</td>
</tr>
<tr>
<td>Actual Trip Reduction</td>
<td>Not available.</td>
<td>Not known.</td>
</tr>
<tr>
<td>Overall Effectiveness</td>
<td>Fully subsidized transit pass - progressive workforce desires to use transit. 1400 out of 7500 employees currently in possession of an annual pass (approx. 20%).</td>
<td>Just starting Commuter Club and elementary schools programs. School programs will be successful, but need hands-on physical motivation to continue work in the schools. Schools are stretched to take on more. Shuttle stands out as most valued by residents and City politicians, as North Natomas is all but forgotten in the public transit arena. Huge issue with senior development projects located out here who public transit.</td>
</tr>
<tr>
<td>Successful Recruitment and Outreach Efforts</td>
<td>Not applicable - most members are required to join and pay dues.</td>
<td>Difficult to reach out to new and smaller employers, and to convince new employees and residents to try services. Also, some people are surprised to find additional property taxes on their first bill, so an increased effort is being made to notify them in advance.</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.southnatomasma.org">www.southnatomasma.org</a></td>
<td><a href="http://www.northnatomasma.org">www.northnatomasma.org</a></td>
</tr>
<tr>
<td>TMA</td>
<td>Anaheim Transportation Network</td>
<td>Burbank TMO</td>
</tr>
<tr>
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</tr>
<tr>
<td><strong>Year Founded</strong></td>
<td>c. 2000</td>
<td>c. 1991</td>
</tr>
<tr>
<td><strong>Membership</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Companies/ Property Owners Represented</td>
<td>125 members, approx. 50% hotel properties and the rest are office, retailers, and other employers</td>
<td>120 members</td>
</tr>
<tr>
<td>Number of Employees and Residents Represented</td>
<td>Approx. 50,000</td>
<td>Not known.</td>
</tr>
<tr>
<td>Composition</td>
<td>Tourist and recreation uses, office and retail uses. Platinum Triangle will have residential development as well.</td>
<td>Not known.</td>
</tr>
<tr>
<td>Voluntary or Required Membership</td>
<td>Required.</td>
<td>Mandatory membership of select employers</td>
</tr>
<tr>
<td>Board Structure</td>
<td>11 Board Members (must be odd number and at least 5 but no more than 11); 3 non-voting ex-officio members - City Planning Commissioner (new projects) and City of Anaheim Staff, Contracted service provider.</td>
<td>Private.</td>
</tr>
<tr>
<td><strong>Financial Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fees / Membership Dues</td>
<td>Primarily development agreements: $1.45 for “event center”/visitor/year; $1.75 per room per year, plus $0.48 per room/day, for lodging establishments; $1.35 per employee per year (specifically for rideshare programs). Rest of funding comes from fares collected on transit system (4 million one-way trips per year). Platinum Triangle will have residential development, which probably will also be accessed.</td>
<td>Members pay $18/employee. No cap on dues.</td>
</tr>
<tr>
<td>Other Funding Sources</td>
<td>No public funding. NTD funding in 2009.</td>
<td>None.</td>
</tr>
<tr>
<td><strong>Annual Operating Budget</strong></td>
<td>$6 million (90% for transit operations)</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Programs and Strategies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services Offered</td>
<td>Anaheim Resort Transit Service and complimentary ADA Paratransit Service; Rideshare programs, including: commuter survey, transit pass sales assistance, bicycle locker facilities at commuter rail stations, guaranteed ride home, and a carpool incentive program (“Clean Air Team”).</td>
<td>Free shuttle service for all members</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Demand response shuttle for in-city employees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Employee education, training, and Ridematching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Commuter discount coupon book</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Guaranteed ride home</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One-fare taxi program and home-to-work taxi program</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marketing and Promotional Materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Membership Resource Center</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Not monitored.</td>
<td>Annual survey.</td>
</tr>
<tr>
<td>Trip Reduction Target</td>
<td>None.</td>
<td>38% below base rates (determined by ITE trip generation rates) by 2010.</td>
</tr>
<tr>
<td>Enforcement</td>
<td>None.</td>
<td>If goals are not met, employers are required by City to work with TMO to develop a TDM and trip reduction plan.</td>
</tr>
<tr>
<td>Actual Trip Reduction</td>
<td>Not known.</td>
<td></td>
</tr>
<tr>
<td>Overall Effectiveness</td>
<td>Transit service is main business (90% of resources); Rideshare (10%); Expansion into “Platinum Triangle” Metrolink service going to 30 minute headways in 2010.</td>
<td>-</td>
</tr>
<tr>
<td>Successful Recruitment and Outreach Efforts</td>
<td>Not applicable (mandatory membership).</td>
<td></td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.atnetwork.org">www.atnetwork.org</a></td>
<td><a href="http://www.btmom">www.btmom</a></td>
</tr>
<tr>
<td><strong>TMA</strong></td>
<td><strong>Irvine Spectrum TMA</strong></td>
<td><strong>Downtown Denver TMA</strong></td>
</tr>
<tr>
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<td>------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td><strong>Year Founded</strong></td>
<td>Not known.</td>
<td>1995</td>
</tr>
<tr>
<td><strong>Membership</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of Companies/ Property Owners Represented</strong></td>
<td>More than 2,600 businesses</td>
<td>All businesses and property owners in downtown Denver</td>
</tr>
<tr>
<td><strong>Number of Employees and Residents Represented</strong></td>
<td>More than 55,000 employees</td>
<td>All employees in downtown Denver (approx. 110,000), and increasing number of residents as well.</td>
</tr>
<tr>
<td><strong>Composition</strong></td>
<td>Mostly office, retail, tourism. Increasing residential development.</td>
<td></td>
</tr>
<tr>
<td><strong>Voluntary or Required Membership</strong></td>
<td>Required</td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Board Structure</strong></td>
<td>Private.</td>
<td>TMA is really the Connections Program of the Downtown Denver Community Partnership, which has multiple other non-transportation oriented programs as well, and a Board of Directors that seeks to implement a broader mission.</td>
</tr>
<tr>
<td><strong>Financial Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fees / Membership Dues</strong></td>
<td>Semi-annual property assessment for property owners</td>
<td>None</td>
</tr>
<tr>
<td><strong>Other Funding Sources</strong></td>
<td>None.</td>
<td>City ($75,000), RTD (up to $20,000), CMAQ (varies by year), Downtown Denver Partnership and Downtown Denver Business Improvement District</td>
</tr>
<tr>
<td><strong>Annual Operating Budget</strong></td>
<td>Not available</td>
<td>Approx. $350,000 (incl. $129,000 from CMAQ)</td>
</tr>
<tr>
<td><strong>Programs and Strategies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Services Offered</strong></td>
<td>Information and marketing to support alternative modes; guaranteed ride home; free transit pass and rideshare membership for 1 month available to people who currently drive alone to work.</td>
<td>Transit Pass Sales; Free On-Site Transportation Consultation; Customized Transportation Plans; Building and Employer Transportation Fairs</td>
</tr>
<tr>
<td><strong>Monitoring</strong></td>
<td>Not known.</td>
<td>Annual Commute Survey</td>
</tr>
<tr>
<td><strong>Trip Reduction Target</strong></td>
<td>Not known.</td>
<td>None</td>
</tr>
<tr>
<td><strong>Enforcement</strong></td>
<td>Not known.</td>
<td>None</td>
</tr>
<tr>
<td><strong>Actual Trip Reduction</strong></td>
<td></td>
<td>FY 07-08 survey found that 56% of Downtown employees are using alternative transportation options to get to work. Most successful is &quot;Get Downtown Unconventionally&quot;- program instituted for Democratic National Convention (Aug 2008). $100-$150 gift card available for commuters to Downtown who reduce use of a car to no more than 1 day per week for entire month. Funding available for 1,100, with more than 2-3,000 applicants having expressed interest.</td>
</tr>
<tr>
<td><strong>Overall Effectiveness</strong></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Successful Recruitment and Outreach Efforts</strong></td>
<td>See above.</td>
<td></td>
</tr>
<tr>
<td><strong>Website</strong></td>
<td><a href="http://www.spectrumotion.com">www.spectrumotion.com</a></td>
<td><a href="http://www.downtowndenver.com">www.downtowndenver.com</a></td>
</tr>
<tr>
<td>TMA</td>
<td>Warner Center TMO</td>
<td>Glendale TMA</td>
</tr>
<tr>
<td>-----</td>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Year Founded</strong></td>
<td>1989</td>
<td>1989</td>
</tr>
<tr>
<td><strong>Membership</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of Companies/Property Owners Represented</strong></td>
<td>39 (22 employer members and 17 multi-tenant commercial properties)</td>
<td>12 members - businesses and property owners, and City of Glendale. Also, Glendale Community College, as pro bono member.</td>
</tr>
<tr>
<td><strong>Number of Employees and Residents Represented</strong></td>
<td>40,000 (over 95% of the total work force).</td>
<td>15,000-20,000 employees</td>
</tr>
<tr>
<td><strong>Composition</strong></td>
<td>70% Office, 20% Retail, 5% Manufacturing, 5% Residential</td>
<td>Voluntary, except Glendale Plaza, which is required to be a member (though shops within Plaza not required to be a member)</td>
</tr>
<tr>
<td><strong>Voluntary or Required Membership</strong></td>
<td>Voluntary for most, but City of LA requires TMO membership for commercial properties of at least 30,000 sq ft. Some larger new residential development also required to join.</td>
<td>Board of Directors (7) - each representing their respective company, with 4 &quot;Founding Members&quot; and 3 &quot;Regular Members.&quot; City is one of the &quot;Founding Members,&quot; currently with voting privileges.</td>
</tr>
<tr>
<td><strong>Board Structure</strong></td>
<td>Five board members. City of LA is not a member of the board.</td>
<td></td>
</tr>
<tr>
<td><strong>Financial Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fees / Membership Dues</strong></td>
<td>Annual member dues, ranging from $2100 to $4800 per year, depending on employer size and property size.</td>
<td>Companies &lt; 250 employees = $7.30 per empl per year; Companies with more than 250 employees (and therefore regulated by AQMD) = $10.30 per employee per year (capped at 750 empl.). For developers, $0.015 per sq ft of leasable space if tenants provided TMA services and TMA dues paid, $0.03 per sq ft if not.</td>
</tr>
<tr>
<td><strong>Other Funding Sources</strong></td>
<td>$85,000 annually from City of LA transportation impact fees collected from new development.</td>
<td>None currently. TMA received approx. $40,000 per year in grant funds through LA MTA until Sept. 2007.</td>
</tr>
<tr>
<td><strong>Annual Operating Budget</strong></td>
<td>$250,000</td>
<td>$94,000 (FY 2008)</td>
</tr>
<tr>
<td><strong>Programs and Strategies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Services Offered</strong></td>
<td>All-day shuttle service connecting to Metro Orange Line; Ridematching for carpools; subsidized vanpool fleet (19 vehicles); promotion and sale of LA Metro bus passes and five other transit agencies; Guaranteed Ride Home; Rideshare incentive program; celebrations and promotional activities; consultation with large employers to help them develop trip reduction plans for their organization and provide individualized ridesharing recommendations for employees; represent members and their employees in local and regional discussions and planning with the general public, government agencies, and special interest groups.</td>
<td>Immediate available resource for employees transportation needs; Emergency Ride Home Program; Marketing Material (including regular bulletin board material); New employee orientation materials; Monthly bus pass sales; Vanpool listing and assistance; Outreach to member and potential member companies</td>
</tr>
<tr>
<td><strong>Monitoring</strong></td>
<td>Metro AVR Survey</td>
<td>None</td>
</tr>
<tr>
<td><strong>Trip Reduction Target</strong></td>
<td>1.5 AVR for large employers and 1.4 for multi-tenant properties</td>
<td>None</td>
</tr>
<tr>
<td><strong>Enforcement</strong></td>
<td>Responsibility of the City of LA Dept of Transportation/Planning.</td>
<td>None</td>
</tr>
<tr>
<td><strong>Actual Trip Reduction</strong></td>
<td>Drive-alone has decreased over twenty years from 85% to 68%, carpooling has increased from 10% to 23%, public transit from 0.4% to 5%, and walking and bicycling from 0.5% to 2%. Overall rideshare participation is 32% (compared to 22% for LA region.</td>
<td>Not known.</td>
</tr>
<tr>
<td><strong>Overall Effectiveness</strong></td>
<td>In 2007, ridesharing participation saved commuters $6.8 million, reduced vehicle miles traveled by 31,277 miles each day, and reduced mobile source emissions by 164 tons. Vanpools provide 200 people round-trip rides each day. 1,000 requests were received for RideGuides (individualized rideshare information and recommendations).</td>
<td>Courtesy of facilitating bus pass sales and personalized attention for member companies has been particularly successful approach.</td>
</tr>
<tr>
<td><strong>Successful Recruitment and Outreach Efforts</strong></td>
<td>For voluntary members, the most successful method is having CEOs of members directly contact CEOs of other companies. For regulated members, having the City contact them is very effective.</td>
<td>It is a challenge to recruit smaller employers - enlisting property managers could help with this. Loss of grant funding has reduced ability to do more outreach.</td>
</tr>
<tr>
<td><strong>Website</strong></td>
<td><a href="http://www.glendaletma.net">www.glendaletma.net</a></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B – Draft TDM Ordinance for the City of Glendale

Objectives and Goals
Adopted policies, through the General Plan and other commitments, have affirmed the desire of the City of Glendale to reduce traffic congestion, improve air quality, and improve overall mobility for residents, employees, and visitors. These goals apply to travel within Glendale, regional travel with origins or destinations within the City, as well as travelers passing through the City.

This ordinance establishes a quantitative trip reduction goal for new and existing development in the City of Glendale, defines what types of development are subject to the requirements of the ordinance, and identifies specific facilities, programs and strategies that must be implemented by employers and property managers to pursue this goal.

Definitions of Terms
For the purpose of this section, certain words and terms are defined as follows:

**Carpool.** A vehicle carrying two to five persons to and from work on a regular schedule.

**Development.** The construction of new non-residential floor area.

**Gross Floor Area.** That area in square feet confined within the outside surface of the exterior walls of a building, as calculated by adding the total square footage of each of the floors in the building, except for that square footage devoted to vehicle parking and necessary interior driveways and ramps.

**Preferential Parking.** Parking spaces, designated or assigned through use of a sign or painted space markings for Carpools or Vanpools, that are provided in a location more convenient to the entrance for the place of employment than parking spaces provided for single-occupant vehicles.

**Transportation Demand Management (TDM).** The alteration of travel behavior through programs of incentives, services, and policies, including encouraging the use of alternatives to single-occupant vehicles such as public transit, cycling, walking, carpooling/ vanpooling and changes in work schedule that move trips out of the peak period or eliminate them altogether (as in the case in telecommuting or compressed work weeks).

**Trip Reduction.** Reduction in the number of work-related trips made by single-occupant vehicles.

**Vanpool.** A vehicle carrying six or more persons to and from work on a regular schedule, and on a prepaid basis.

**Vehicle.** Any motorized form of transportation, including but not limited to automobiles, vans, buses and motorcycles.
Applicability

The TDM ordinance shall apply to the following developments (hereafter referred to as Tier 1):¹

1. All new non-residential development in the City of Glendale to exceed 25,000 square feet or gross floor area or having 25 employees.

2. Any expansion of existing non-residential development exceeding 25,000 square feet of gross floor area or having more than 25 employees, either prior to or subsequent to the expansion.

3. Any change of use for an existing non-residential development that currently has a nonconforming use, and for which the new use will require a conditional use permit, variance, or amendment to the zoning code or General Plan.

4. All new residential development with 100 or more units, or mixed-use projects with 50 or more residential units and 25,000 gross square feet or more of non-residential floor area.

5. All new development with multiple employers on one site that in combination have more than 25 employees, with the TDM ordinance thereby applying to the property manager of that site.

6. All projects meeting the above criteria or any other project that joins a Business Improvement District in the City of Glendale.

7. Other projects to which the ordinance shall be applicable, based on a covenant, development agreement, or other such binding agreement with the City or another governing organization.

Developments greater than 50,000 square feet in gross floor area or an expansion resulting in a development greater than 50,000 square feet shall be subject to further requirements defined by this ordinance (Tier 2).

Furthermore, this ordinance defines additional requirements of development exceeding 100,000 square feet, or an expansion resulting in a development greater than 100,000 square feet (Tier 3).

Requirements

New or existing development, for which the TDM ordinance is considered applicable according to the above criteria, shall incorporate each of the listed facilities into the design of the project, and implement each of the listed programs.

Facilities shall be maintained in clean, functional condition for the duration of the project, and programs shall continue to be implemented except by arrangement with the Director of Planning for the City to define alternate strategies expected to be more effective at achieving the goals of this ordinance.

¹ These criteria are a synthesis of requirements in the cities of Burbank, Pasadena, and Los Angeles. The criteria for other cities include a threshold of expected daily trips, an applicant’s desire to develop at higher densities, or companies with a fewer number of employees (see Figure 1).
Transportation Demand Management Plan

Prior to obtaining a development agreement or other permits for a project subject to this ordinance, a Transportation Demand Management plan must be developed, with a detailed list of facilities and programs that will be implemented, to meet the requirements of this ordinance, as indicated below. A schedule of implementation for TDM programs, and budget for both programs and facilities, must be included with the Plan. All programs shall be implemented within one year of initial occupancy.

Transportation Management Association / Organization

All projects subject to this Ordinance shall become dues paying members of the designated Transportation Management Association (TMA) or Transportation Management Organization (TMO), and eligible for participation in the programs and activities of the TMA/TMO. Rates shall be set by the Board of the TMA/TMO and adopted by the City Council, with the provision that they may be increased annually, based on changes to the Consumer Price Index. Prior to the issuance of a certificate of occupancy, annual dues for the first year of membership shall be paid to the City and then transferred to the designated TMA/TMO.

Performance Standards

The City shall define performance standards for the designated TMA/TMO, to ensure effective administration of the TMA/TMO and communication with and between members of the TMA/TMO. These standards shall include:

1. Completion of an annual AVR survey for all member organizations, with a report provided to the City documenting the results of this survey
2. Assurance that all members of the board are decision makers or their designees, for the organizations they represent
3. At least four (4) meetings of the Board each year, with a quorum of at least 50% at all meetings.

Facilities

The following facilities shall be implemented as indicated before a certificate of occupancy may be issued for a development.

Bicycle Facilities

- Secure bicycle parking should be provided for all development subject to the bicycle parking ordinance, at the following rates for various land uses:2

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Long-term</th>
<th>Short-term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single family and residential with private garage</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Multifamily Residential</td>
<td>1 space per 4 units</td>
<td>1 space per 20 units</td>
</tr>
<tr>
<td>Retail</td>
<td>1 space per 12,000 sq ft</td>
<td>1 space per 5,000 sq ft</td>
</tr>
<tr>
<td>General Food Sales</td>
<td>1 space per 12,000 sq ft</td>
<td>1 space per 2,000 sq ft</td>
</tr>
<tr>
<td>Office</td>
<td>1 space per 10,000 sq ft</td>
<td>1 space per 20,000 sq ft</td>
</tr>
</tbody>
</table>

"Long-Term" bicycle facility means a locker, individually locked enclosure or supervised area within a building providing protection for each bicycles therein from theft, vandalism and weather.

"Short-Term" bicycle facility means a rack, stand or other device constructed so as to enable the user to secure by locking the frame and one wheel of each bicycle parked therein. Racks must be easily usable with both U-locks and cable locks. Racks should support the bikes in a stable upright position so that a bike, if bumped, will not fall or roll down.

2 Some cities require bicycle parking as a ratio of automobile parking. However, Nelson\Nygaard recommends against this. A development which reduces its parking supply, in anticipation of generating fewer vehicle trips, might also then reduce its bicycle parking supply, rather than increase it to support a shift from auto to bicycle.
• Tier 2 development shall also provide a changing room and shower facilities.

Pedestrian Facilities
• Tier 1 and Tier 2 facilities shall provide full pedestrian access as required by other sections of the zoning code and design guidelines as adopted by the City.
• Tier 3: Sidewalks or other designated pathways following direct and safe routes from the external pedestrian circulation system to each building in the development.

Transit Facilities
• The design of all projects should enable safe and convenient access to nearby transit stops and facilities.
• For Tier 3 projects, if so determined by the Director of Planning for the City, a bus stop with shelter and other amenities may be required.

Auto Facilities
• Preferential parking shall be provided for carpools and vanpools (most proximate to main entrances and/or at a reduced price)
• For Tier 3 projects, and for Tier 2 projects at the discretion of the Chief of Planning, a convenient drop-off point for carpools and vanpools should be provided onsite.

Programs
The following programs shall be implemented within one year of project completion, following the schedule included in the TDM Plan for the project. All employers shall:

• Designate an on-site transportation coordinator to be a point of contact with the City of Glendale and the designated TMA/TMO regarding transportation demand management facilities and programs. For Tier 1 development with multiple employers that in combination have 25 or more employees, the property manager shall designate an on-site transportation coordinator.
• Provide an information board or kiosk in a prominent location for employees, residents, and/or visitors, with information about access to all modes of transportation, as well as the activities of the designated TMA/TMO.
• Tier 2 and 3 employers shall either provide on-site transit pass sales or a pre-tax transit pass program.
• Participate in the Guaranteed Ride Home program of the designated TMA/TMO.
• Demonstrate proof of compliance with the State of California’s parking cash out law.
• Develop or participate in a ridesharing program to encourage carpooling and vanpooling.

Monitoring and Enforcement
Each project subject to this ordinance shall strive to achieve an average vehicle ridership (AVR) of at least 1.5. AVR is the ratio of the total number of employees or residents to the average daily number of vehicles used.3

3 http://www.metro.net/riding_metro/commute_services/avr_services.htm
All projects subject to this Ordinance shall submit an annual performance report to the City to validate continue compliance with the requirements of the Ordinance. A statistically-valid survey shall be conducted of employees and/or residents of the project, to ascertain the level of success in achieving the goals of the Ordinance, including a determination of the AVR for that project. The AVR shall be determined according to the requirements of the South Coast Air Quality Management District (AQMD). The AQMD currently requires such a survey, amongst other requirements, of all employers with 250 or more employees. This ordinance further stipulates that the survey shall be conducted for all projects subject to this ordinance.

The costs to conduct the survey and produce the report shall be borne by the employer, property owner, or homeowners association, as appropriate.

City staff shall confirm to the City Council on an annual basis that all projects subject to this ordinance are in compliance with its requirements. If a project subject to this ordinance is not in compliance, a nominal fine per employee per day shall be assigned by the City until compliance is achieved.

Staff shall also prepare a summary report evaluating the overall success of achieving the goals of the TDM ordinance. If goals are not being met, staff shall propose alternate programs or strategies that could be pursued to achieve these goals. Costs for preparation of staff reports shall be borne by the City.

Furthermore, Tier 2 and Tier 3 projects that fail to achieve an AVR of at least 1.25, the City will work with the designated TMA/TMO and the employer to modify their TDM plan to include programs and strategies that are expected to better support achievement of an AVR of at least 1.25. The City may mandate the implementation of certain programs and strategies until this goal is reached.
TDM Research Reports

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by federal Moving Ahead for Progress in the 21st Century (MAP-21), local government, and State of Oregon funds.

The contents of this document do not necessarily reflect views or policies of the State of Oregon.
INTRODUCTION AND PURPOSE

Some Transportation Demand Management (TDM) measures require large-scale system changes (e.g., high occupancy vehicle lanes), while others can be implemented on a local or site-by-site basis. When TDM is implemented on a site-by-site basis through land use and zoning, the focus is typically on creating supportive infrastructure. In many communities, some form of TDM is already required by the development code. Because the land use process usually involves a one-time decision, it lends itself more easily to reviewing these types of built improvements. More challenging to implement through land use review are those programmatic TDM measures that require ongoing monitoring. This guide is intended to help local jurisdictions who are considering expanding their TDM efforts to incorporate programmatic TDM measures into the land use permit process.

Examples of Development-Related TDM Measures

<table>
<thead>
<tr>
<th>TDM-Supportive Infrastructure</th>
<th>Programmatic TDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>° Requirements for pedestrian or transit oriented design</td>
<td>° Subsidized transit passes for employees</td>
</tr>
<tr>
<td>° Parking maximums</td>
<td>° Parking cash-out programs</td>
</tr>
<tr>
<td>° Minimum bicycle parking standards</td>
<td>° Provide bicycle safety education classes</td>
</tr>
<tr>
<td>° Requirements for transit amenities</td>
<td>° Transportation Management Associations</td>
</tr>
</tbody>
</table>

More specifically, this guide outlines one mechanism to incorporate programmatic TDM strategies in the land use review process: requiring applicants to prepare a TDM Plan that details how the applicant (and subsequent owners and/or tenants) will accomplish measures to reduce transportation impacts from the development over time.

This guide contains background information about TDM, a step-by-step approach for local governments interested in implementing a TDM Plan program, and model code language compatible with the Model Development Code for Small Cities.
WHY MANAGE TRANSPORTATION DEMAND?

Our personal, economic, and environmental health are all heavily influenced by how we travel. Driving less or choosing alternatives to single-occupancy vehicle (SOV) travel can contribute to environmental and public health. Reducing SOV trips also helps the state, regional, and local economies by freeing scarce roadway capacity for freight and transit use; retains money in the economy that would otherwise be exported to pay for fuel; and reduces the need to build expensive roadway, highway, and parking infrastructure.

Transportation Demand Management (TDM) can be a cost-effective way to reduce SOV trips. TDM entails a host of relatively low-cost strategies aimed at reducing the demand for transportation infrastructure and/or improving the efficiency of transportation systems. Benefits of TDM include efficient use of transportation resources, enhanced livability, and improved environmental quality and public health, among others. The State of Oregon has been helping local communities achieve these benefits through such programs as the Transportation and Growth Management (TGM) Program, ODOT's Transportation Options Program, and the state’s first statewide Transportation Options Plan under development in 2013 – 2014.

TDM is more than individual solutions to individual problems, such as road pricing to reduce congestion or transit improvements to reduce pollution. TDM is most effective if implemented as an integrated program that includes improved transportation options and incentives to use the most efficient option for each trip.

What is a TDM Plan?

A “TDM Plan” (as the term is used in this guide) is a written document that outlines targets, strategies, and evaluation measures to reduce vehicle miles traveled (VMT) and reduce single-occupancy vehicle (SOV) mode share to and from a specific site.

TDM PLANS FOR DEVELOPMENT

The purpose of a TDM Plan is to monitor and mitigate the transportation impacts of a specific site over time. A TDM Plan details the process through which a developer and subsequent tenants commit to measures that decrease SOV travel to the facility over time. This process provides a menu-based approach for...
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developers and tenants to implement supportive programs that encourage and educate employees and residents about travel options. A TDM Plan includes targets (e.g., mode split, emissions, or reduced vehicle miles traveled), a description of TDM strategies used to meet those targets, and evaluation measures to assess progress towards those targets.

Things to keep in mind
Local jurisdictions should consider the following questions:

- Do adopted plans provide an adequate policy basis for requiring TDM Plans?
- What are appropriate targets for TDM Plans? How might these targets be applied over time and support identified policy goals?
- When and where might TDM strategies be required? What are appropriate geographic locations (e.g., downtown) and thresholds (e.g., building square footage or number of employees)?
- Which types of TDM strategies typically work best for which types of projects?
- What types of regulations and procedures are needed to ensure successful TDM Plans?

The following sections of the guide provide a step-by-step approach for local governments interested in implementing a TDM Plan program.
ESTABLISHING A POLICY FOUNDATION

Expanding application submittal requirements and approval criteria for development review can be controversial. The first step is to determine whether existing plans provide an adequate policy basis for additional TDM requirements or if new policies need to be adopted.

Local policy documents, including the Comprehensive Plan, Transportation System Plan (TSP), and Climate Change Action Plan (if available), should be reviewed. These plans may already provide sufficient support for an expanded local TDM program. If not, they may need to be amended.

**Examples of TDM supportive policies:**

**Portland Plan (2012):** By 2035, Portland residents have reduced the number of miles they travel by car to 11 miles per day on average and 70 percent of commuters walk, bike, take transit, carpool or telecommute to work. Portland’s transportation-related carbon emissions are 50 percent below 1990 levels, and effective strategies to adapt to climate change are in place and being implemented.

**Tualatin’s TSP (2013)**

- TDM Policy 1: Support demand reduction strategies, such as ride sharing, preferential parking, and flextime programs
- TDM Policy 2: Partner with the Chamber of Commerce, the Westside Transportation Alliance, major employers, and business groups to implement TDM programs
- TDM Policy 3: Explore the use of new TDM strategies to realize more efficient use of the City’s transportation system

In some cases there may not be local policy support for requiring TDM Plans. However, requiring TDM Plans in conjunction with an incentive or bonus, such as increased Floor Area Ratio (FAR) or reduced parking requirements, may be an alternative.

Additionally, Oregon’s Transportation Planning Rule recognizes TDM as an option for reducing traffic projections from a proposed zoning amendment.

**Transportation Planning Rule OAR 660-012-0060(1)(c)** “...As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management....”
While this guide is focused on establishing requirements for TDM Plans for development, much of the information is also applicable to developing an incentive-based TDM program or TDM requirements triggered by a zone change.

**SETTING TARGETS AND EXPECTATIONS**

Setting targets and expectations for any TDM effort – and relating those targets back to local or regional goals – is essential. By connecting targets to vehicle miles traveled, emissions, and/or mode share goals, a jurisdiction can strengthen its case for requiring the implementation of a TDM Plan because it aligns with the community’s broader goals.

**Case study research** illustrates the effectiveness of TDM in reducing drive alone trips and vehicle miles traveled (VMT). Washington State achieved a 2.8% reduction in drive alone rate and 2.6% VMT reduction at Commute Trip Reduction worksites from 2007-2009 (as well as a 1% reduction in drive alone rate and 9.3% reduction in VMT for those within Growth and Transportation Efficiency Centers).

In Portland and the surrounding areas, employers with 100+ employees are subject to Oregon Department of Environmental Quality (DEQ) Employee Commute Options (ECO) program. This rule requires employers to submit a TDM Plan to reduce the number of trips to the worksite and to survey their employees. ECO survey data shows a 6.5% decrease in SOV mode-split. This equates to an average reduction of 273 annual VMT per employee (among all covered employees). NOTE: Jurisdictions that are subject to the ECO Rule should ensure that TDM Plan requirements match Eco Rule requirements to avoid overburdening employers.

**Community TDM Targets**

Communities require TDM strategies as part of the development process to help meet a range of goals, including reducing the number of vehicle miles traveled, vehicle-related emissions, and SOV travel:

- **Vehicle Miles Traveled (VMT):** VMT is a calculation of the number of miles traveled from an origin to a destination. In this context, the calculation of VMT would be measured by surveying the number of vehicle miles traveled for employees or users at the specific development site. Communities often have a total or per capita regional or local VMT target. A VMT-based target emphasizes the need to reduce the length of trips, in addition to reducing the number of single occupancy vehicle trips in general. An example of a target might be to “reduce the number of vehicle miles traveled to 1990 levels by 2020.”

- **Emissions:** Related to vehicle miles traveled, a transportation-related emissions target sets a goal to reduce the amount of transportation-
related emissions in a specific timeframe. A sample target might be to “reduce transportation-related emissions to 1990 levels by 2020.”

- **Mode share:** Mode share is the percentage of trips by type (i.e., biking, walking, transit, SOV, etc.). Communities often have mode share targets, especially for downtown areas. A sample mode share target might be to “achieve 50% non-single-occupancy vehicle travel by 2035.”

Having measurable targets that relate to local and/or regional policy goals adds validity and purpose to the TDM Plan process.

**Identifying TDM Targets**

Once the community’s overall vehicle miles traveled, emissions, or mode share goals have been defined, the next step is to identify goals or targets specifically for a TDM Plan that support the broader community goals. The metrics by which the TDM Plan will be evaluated have a direct impact on how TDM is approached.

As a first step, the applicant will need to establish a baseline estimate of the VMT, emissions, or mode share for the development. In most cases, employees or tenants will not be occupying the building at the time the TDM Plan is being prepared; therefore, the applicant will have to rely on recent comparable data. Comparable data may either be from a similar nearby development that has established a TDM Plan or, in the case of mode share, the applicant may use the community-wide mode share determined by the American Community Survey or another local source.

Once the baseline data is documented, phased targets will be set showing how the program will work toward meeting the community targets. As noted above, VMT, mode share, and emissions targets are often long-term community goals set over two or three decades. To be effective, the TDM Plan process must set realistic annual or two year targets that will achieve the long term goals over time. For example, if the community has a mode share goal to reach 50% SOV mode share by 2020, the TDM Plan will detail interim targets to meet those goals based on the.

As noted in the Monitoring and Enforcement section below, the applicant (or property owner) will be required to survey employees every year or every two years to report on progress toward the mode share goal. For example, as shown below, if the baseline mode share is 75% in 2013 and the 2020 target is 50%, the 2015 target would be 69%, the 2017 target would be 63%, and so on until the 2020 target is met.
Example Interim Mode Share Targets

<table>
<thead>
<tr>
<th>Year</th>
<th>Interim Mode Share Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013 baseline</td>
<td>75% SOV</td>
</tr>
<tr>
<td>2015 target</td>
<td>69% SOV</td>
</tr>
<tr>
<td>2017 target</td>
<td>63% SOV</td>
</tr>
<tr>
<td>Etc…..</td>
<td>Etc…..</td>
</tr>
<tr>
<td>2020 target</td>
<td>50% SOV</td>
</tr>
</tbody>
</table>

APPLICABILITY – WHEN AND WHERE SHOULD TDM PLANS BE REQUIRED?

One of the first steps is to determine when and where TDM Plans should be required. Not all locations and development projects are equally well suited to TDM. Creating and monitoring TDM Plans is not without cost, both for the developer and the jurisdiction, so requirements should focus on areas where real benefits can be achieved.

TDM Plans could be required citywide, within regional or town centers, in employment centers, or in Multimodal Mixed Use Areas. TDM Plans can also be required based on the type of use, the projected number of trips to the site, the number of parking spaces, the number of employees, or the square footage of the development (or redevelopment). In some cases, the type of land use approval is also a factor (e.g., TDM Plans are required for master plan or conditional use approval).

Ideally, requirements reflect both appropriate geography and size or magnitude of the development. Defining the requirement solely based on the type of use, for example, may mean that commercial buildings in outlying industrial sites have the same TDM requirements as a commercial building in downtown where there are bicycle facilities, transit service, and high pedestrian connectivity. Similarly, a trigger that relies solely on geographic location may overburden very small buildings that will likely have very little impact on the transportation system. Therefore, selecting multiple triggers from the list below is recommended, depending on the community’s goals and land use context. Determining which triggers initiate the requirement of a TDM Plan will be an important policy decision for each community.

---

1 The Multimodal Mixed Use Area (MMA) designation is applied by local governments to downtowns, town centers, main streets, or other areas where the local government determines that there is: (1) high-quality connectivity to and within the area by modes of transportation other than the automobile, (2) a denser level of development of a variety of commercial and residential uses than in surrounding areas, (3) a desire to encourage these characteristics through development standards, and (4) an understanding that increased automobile congestion within and around the MMA is accepted as a potential trade-off.
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Types of Triggers or Thresholds for a TDM Plan

<table>
<thead>
<tr>
<th>Type of Trigger</th>
<th>Example Triggers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographic</td>
<td>Citywide, regional/town centers, employment centers, corridors, multimodal mixed use areas</td>
</tr>
<tr>
<td>Type of Use</td>
<td>Office, institutional, multi-family residential</td>
</tr>
<tr>
<td># of Trips</td>
<td>Based on a traffic impact study, those developments estimated to generate 100+ peak daily trips</td>
</tr>
<tr>
<td># of Employees</td>
<td>Developments expected to house 100+ employees</td>
</tr>
<tr>
<td># of Residential Units</td>
<td>Developments with 50+ residential units</td>
</tr>
<tr>
<td>Square Footage</td>
<td>Developments that exceed 50,000 square feet</td>
</tr>
<tr>
<td>Parking</td>
<td>Developments that will add more than 20 non-residential parking spaces</td>
</tr>
<tr>
<td>Land Use Approval</td>
<td>Master plan approval, conditional use permits</td>
</tr>
</tbody>
</table>

Once it is determined where TDM Plans will be required, it must be determined how they will be required. The approach outlined in this guide suggests that TDM Plans be handled in a manner similar to Transportation Impact Analyses and other technical reports. Where required, an applicant would submit a TDM Plan prepared in accordance with the jurisdiction’s requirements as part of a complete development application.

WHICH TDM STRATEGIES SHOULD BE INCLUDED IN A TDM PLAN?

This section provides an overview of TDM strategies that can be used to reduce the transportation impacts of new development (or major redevelopment) and allow the applicant to meet the targets set in the section above.

TDM strategies can be infrastructure-based (e.g., bicycle parking and shower facilities) or programmatic (e.g., Guaranteed Ride Home program, subsidized transit passes, or rideshare program sponsorship). While infrastructure-based TDM measures can be implemented at the time of construction, a TDM Plan focuses on the programmatic elements that will be implemented by the building manager or employer throughout the lifetime of the building (see the section “TDM Plans Last for the Life of the Development” for guidance on how to ensure that TDM Plans are implemented and monitored throughout the lifetime of the development).

The table below provides a menu of TDM strategies. TDM strategies listed below are not all created equal; the effectiveness of the strategies depends on the land use context and existing infrastructure and programs. The TDM strategies listed
do not represent an exhaustive list, but rather a sampling of strategies. Jurisdictions should tailor the list of applicable TDM strategies based on the local context. However, it is important to provide a menu of options for developers to choose from given that the land use context, type of development, and location will vary greatly. In all cases, city staff will need to work with the developer through the TDM Plan process to ensure that the TDM strategies selected will help achieve the identified goals and targets.

**Example Menu of TDM Plan Strategies**

<table>
<thead>
<tr>
<th>Category</th>
<th>TDM Strategy</th>
<th>Program Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking</td>
<td>Market-priced parking</td>
<td>Charging the market price for parking instead of subsidizing employee parking encourages employees to use alternative modes. Under the right conditions (i.e., in parking-constrained areas), priced parking can be a highly effective strategy.</td>
</tr>
<tr>
<td></td>
<td>Preferential parking for rideshare vehicles</td>
<td>Priority and designated parking for carpools, vanpools, and bike share stations can help encourage the use of rideshare, particularly in areas that are not well served by transit or biking and walking facilities.</td>
</tr>
<tr>
<td></td>
<td>Parking cash-out program</td>
<td>Parking cash-out is a program by which employers who offer free or reduced-price parking to their employees are required to offer an equal transportation fringe benefit to employees who use modes other than driving alone to get to work.</td>
</tr>
<tr>
<td>Transit</td>
<td>Universal transit pass</td>
<td>Universal transit pass systems typically require a partnership between the city, the transit provider, and potentially a local university. Universal passes typically allow unlimited rides on local or regional transit for a low monthly fee, which are often absorbed entirely by the employer, school, or developer. The universal transit pass system typically requires that the participating agency purchase passes at a discounted rate for all employees, students, or residents. Universal transit pass programs can benefit developers if implemented along with reduced parking requirements, which consequently lowers construction costs.</td>
</tr>
<tr>
<td>Category</td>
<td>TDM Strategy</td>
<td>Program Description</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Transit</td>
<td>Transit pass pre-tax purchase</td>
<td>The Internal Revenue Service allows up to $245 of a transit pass to be deducted from an employee paycheck pretax. This benefit reduces the amount of federal taxable income for the employee and reduces the amount of payroll taxes for the employer. (There are also permitted deductions for bicycle commuting and carpooling.)</td>
</tr>
<tr>
<td></td>
<td>Transit pass subsidy</td>
<td>Employers, building managers, or developers can provide a subsidized transit pass to employees or residents. In this case, the employee or resident purchases a transit pass from the employer or building manager at a discounted price.</td>
</tr>
<tr>
<td>Rideshare</td>
<td>Sponsored rideshare programs</td>
<td>Rideshare programs include both carpooling and vanpooling. Rideshare programs work particularly well in areas that are not well-served by transit, bicycling, or walking facilities. Rideshare – particularly vanpools – are also best supported in employment areas where employees are traveling more than 10 miles each way to work. Employer sponsorship of a vanpool program in the form of coordination, ridematching, and/or monetary subsidy significantly increases the success of the program.</td>
</tr>
<tr>
<td></td>
<td>Vanpool pre-tax deduction</td>
<td>The Internal Revenue Service allows up to $245 to be deducted from an employee paycheck pretax for vanpool costs.</td>
</tr>
<tr>
<td></td>
<td>Shuttle service</td>
<td>Employment sites that are not close to transit service can benefit from an employer-sponsored shuttle service. Shuttle programs are typically sponsored by the employer and provide transportation between the employment site and major transit stops.</td>
</tr>
<tr>
<td></td>
<td>Guaranteed Ride Home program</td>
<td>A Guaranteed Ride Home program provides a set number of subsidized rides to commuters who use alternative modes to work. Rides are typically provided by a local taxi company.</td>
</tr>
<tr>
<td>Telecommute</td>
<td>Telecommute program</td>
<td>Telecommute programs allow employees to work from home for a certain number of hours per week or shift the time of day when employees travel to work to shift peak-hour travel.</td>
</tr>
<tr>
<td>Category</td>
<td>TDM Strategy</td>
<td>Program Description</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Information</td>
<td>Information kiosk</td>
<td>An on-site information kiosk provides information on transit routes, schedules, and fares; carshare and vanpool ridematching services; bicycle maps and resources; and other ways to help people travel by using alternative modes.</td>
</tr>
<tr>
<td>Transportation Coordinator</td>
<td>Transportation Coordinator</td>
<td>A Transportation Coordinator is a trained, designated employee on-site who is responsible for providing transportation options information to employees and facilitate employee surveying.</td>
</tr>
<tr>
<td>Individualized marketing</td>
<td>Individualized marketing</td>
<td>Individualized marketing campaigns typically target a neighborhood, corridor, or employment site. These campaigns provide individualized marketing travel options materials in a designated area to encourage people to use alternative modes.</td>
</tr>
<tr>
<td>Other</td>
<td>TMA membership</td>
<td>A Transportation Management Association (TMA) is a member-supported organization that provides transportation services to employers in a specific area. A TMA membership typically provides hands-on support from the TMA to help the employer survey the commute patterns of its employees and provide transportation information.</td>
</tr>
<tr>
<td></td>
<td>Bicycle commuter tax reimbursement</td>
<td>Participating employers may provide up to $20 per month reimbursement to commuters for qualified bicycle commuting expenses. See more information here.</td>
</tr>
<tr>
<td>Promotion</td>
<td>Sponsor events to promote alternative modes</td>
<td>Promotional events and competitions help to promote alternative modes of travel. These events include competitions such as Bike to Work Week, during which employees compete with themselves or other companies to ride the most number of miles in a week.</td>
</tr>
<tr>
<td>Shared Mobility</td>
<td>Bikeshare</td>
<td>Bikeshare programs provide a fleet of bicycles typically available to the public through a membership program. Bikeshare bikes help residents and employees take more trips by bike.</td>
</tr>
</tbody>
</table>
### Transportation Demand Management Plans

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<table>
<thead>
<tr>
<th>Category</th>
<th>TDM Strategy</th>
<th>Program Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Carshare</td>
<td>Carshare programs allow carshare members to reserve a car for a short period of time – typically a number of hours or a day. Carshare vehicles reduce the need for people to need to own their own vehicle, and therefore can reduce the need to build parking.</td>
</tr>
</tbody>
</table>

The types of TDM strategies selected for the TDM Plan will vary based on the proposed use. For example, residential developers should select TDM strategies that support all types of trips, such as bikeshare and carshare memberships, subsidized transit passes, and an information kiosk onsite. Commercial developers will select strategies that are geared towards employees, such as a TMA membership, telecommute programs, and parking cash-out programs. The target audience and types of trips must also be considered when selecting the TDM strategies. For example, TDM strategies for a large institution, such as a hospital, will focus on the travel patterns of both the employees and the visitors.

**WHAT TYPES OF REGULATIONS ARE NEEDED TO ENSURE SUCCESSFUL TDM PLANS?**

A TDM Plan is the document submitted by a developer as part of the development review process to demonstrate compliance with TDM targets. Similar to a transportation impact analysis or other technical report, in order to ensure quality submittals and a fair process, submittal and procedural requirements for TDM Plans should be specified. The minimum specifications for TDM Plans can be included in the jurisdiction’s development code or engineering standards or other administrative rules; however, the regulations establishing when and where TDM Plans are required should be included in the development code.

This section provides an overview of TDM Plan requirements. These concepts are further illustrated by the attached model code which outlines one approach to establishing TDM Plan requirements.
**Seattle Children’s Hospital – A case study in TDM Implementation**

The Seattle Children’s Hospital has a renowned TDM Plan that focuses on changing the travel patterns for employees and visitors through the following strategies:

- Paid employee parking: employees have to pay $50/month to park; employees are also paid $50/month if they choose not to park
- Robust shuttle-to-transit system linking Children’s to regional transit hubs
- Innovative bicycle programs including Flexbike (shared bicycle program) and Company Bikes which offers free bicycles to employees committed to cycling at least two days per week
- Financial rewards for employees who commute without driving alone
- Guaranteed Ride Home program
- Subsidized bicycle tune-ups
- Onsite showers and lockers
- Secure bike parking
- Cover 100% of vanpool fares and provide incentives to vanpool drivers

The Seattle Children’s Hospital has also made investments in Supportive Infrastructure:

- Campus design and near-site improvements to encourage alternative transportation
- Intelligent Transportation Systems (ITS) for NE 45th Street / Montlake Boulevard / Sand Point Way NE to optimize the performance of key intersections and reduce vehicle delay and travel time (for more information about ITS see [http://www.its.dot.gov/](http://www.its.dot.gov/))
- Contributions to capital projects that will improve the northeast Seattle transportation network
- Investments in walkable and bikeable northeast Seattle

The Seattle Children’s Hospital TDM program has seen marked success. Between 1995 and 2010, the drive-alone rate of employees has decreased considerably from 73% to 38%.

**Submittal Requirements**

As outlined in this guide, TDM Plans would be implemented as part of the land use review process. At minimum, TDM Plans should include the following:

- Project description
- Trip forecasts: volumes, times of day, modes, origins/destinations (if known), methodologies
- Performance targets that conform to those set by the jurisdiction
- TDM strategies proposed for implementation
- Performance Monitoring & Adaptive Management Plan
Transportation Demand Management Plans
For Development

- Copies of documentation to ensure deed notification of mandatory participation in the final TDM program to all subsequent purchasers and owners of the project

**Review Process**

If the TDM Plan will be submitted and reviewed concurrently with the land use application, a timeline for the internal review of the process should also be included. Under this approach, the implementation of the final TDM Plan can be made a condition of a project’s approval.

**TDM Plans Last for the Life of the Development**

The TDM Plan will be submitted at the time of the development review process, and in many cases, the developer will not be occupying the building post-development. For this reason, the regulations should specify how the requirements in the TDM Plan will be passed on to the tenants for the lifetime of the building.

**Monitoring and Enforcement**

As noted above, setting targets in the TDM Plan that relate to community mode split, VMT, or emissions goals is preferred to enhance the validity of the process and ensure progress is being made towards the identified targets over time.

The developer – and subsequently the employer or building manager – will be required to implement the strategies agreed upon in the TDM Plan and survey the employees and/or residents in the building annually to document progress towards the identified targets. For example, if the target is to reach a 50% SOV mode split by 2020, the employer or building manager will survey employees or residents in year one to document a baseline mode split. Employees or residents

---

**Case study research** reveals that monitoring and enforcement are among the biggest challenges of implementing a TDM Plan program. Surveying employees or tenants to monitor the progress made toward the identified mode share goals can be time consuming and expensive. Implementation of a TDM Plan over time requires coordination between the jurisdiction, the developer, the landowner, and ultimately the tenant. The cost of monitoring for compliance should be taken into consideration when establishing the applicability of the TDM Plan requirements.

In Portland, Oregon, the Lloyd District Transportation Management Association (TMA) helps employers meet the requirements of the state-mandated Employer Commute Options (ECO) rule which requires employers with more than 100 employees to track mode split every two years. The Lloyd TMA assists over seventy-five employers and 9,000 employees adhere to ECO requirements.
will then be surveyed again in years three, five, etc. to document progress towards the identified goal. Monitoring every other year is recommended.

If targets are not being met, it will be up to the local jurisdiction to determine an enforcement or “adaptive management” strategy to ensure TDM strategies are appropriately matched to reach the identified target. An “adaptive management” strategy is recommended over stringent enforcement in order to avoid deterring development. Affecting travel behavior takes time, and TDM strategies may need to be adjusted based on the initial surveys of the employees, residents, or visitors. Ultimately, a jurisdiction may need to consider enforcement in those cases where there is a lack of significant progress towards identified goals and a good faith effort is not being made. If the TDM Plan was approved as part of a land use decision, the zoning enforcement provisions of the code could be applied.

REFERENCES AND RESOURCES

The following resources are also available:

- Victoria Transportation Policy Institute Online TDM Encyclopedia: [www.vtpi.org](http://www.vtpi.org)
- University of South Florida TDM Effectiveness Research: [www3.cutr.usf.edu/tdm/](http://www3.cutr.usf.edu/tdm/)
TDM PLANS FOR DEVELOPMENT - MODEL CODE LANGUAGE

This section outlines the minimum specifications for TDM Plans. The language below has been formatted as an additional module for inclusion in the TGM program’s Model Development Code for Small Cities, 3rd Edition as a new subsection “Q.” within Section 3.6.020 (Transportation Standards). However, these specifications could be included with a jurisdiction’s engineering standards or other administrative rules.

3.6.020 Transportation Standards

Q. Transportation Demand Management Plans

1. Purpose.

Transportation Demand Management (TDM) Plans are intended to help achieve State, [regional,] and City policies to: improve health and safety, reduce travel delay by reducing discretionary drive-alone trips, strengthen the economy by reducing money exported for fuel, reduce greenhouse gas emissions, and improve community livability by reducing vehicle trips and providing attractive options to driving alone.

Effective TDM requires collaboration between transportation system users, employers, developers, builders, building managers, residents, and the City government. This subsection outlines the process to prepare an effective TDM plan.

2. Applicability.

These standards apply to all new [non-residential] development [and redevelopment] within [designated multimodal mixed use areas (MMAs) and mixed use corridors] as shown on Map 3.6.020.Q.1.

3. Exemptions.

Projects projected to generate fewer than [100 trips] on a peak day are exempted from the TDM Plan requirement.

NOTE: The requirement to provide a TDM Plan (Applicability) and any exemptions should be included in the development code even if the other specifications are maintained in a separate Administrative Rule.
4. TDM Plan Requirements.

At a minimum, TDM Plans shall include the following:

- Project description
- Trip forecasts: volumes, times of day, modes, origins/destinations (if known), methodologies
- Performance targets (per section 3.6.020.Q.5 below)
- TDM program strategies proposed for implementation (per section 3.6.020.Q.6 below)
- Performance Monitoring & Adaptive Management Plan (per section 3.6.020.Q.7 below)
- Copies of documentation to ensure that notice of the deed restrictions requiring mandatory participation in the final TDM program is provided to all subsequent purchasers and owners of the project (see Section 3.6.020.Q.9 below)

5. Performance Targets.

Long term modal performance targets are established in the City Transportation System Plan (TSP). Targets vary based on Design Type.

The applicant will propose a baseline (opening year) mode share using recent and accurate data for the location and types of trips to and from the proposed development.

The applicant will propose a [2040] modal target consistent with at least the mid-point of the modal targets in Table 3.6.020.Q.1. The applicant will also propose interim targets for three, six, and nine years from project opening.

Table 3.6.020.Q.1: 2040 Non-SOV Modal Target by Design Type

<table>
<thead>
<tr>
<th>Design Type</th>
<th>Non-SOV Modal Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multimodal Mixed Use Area (MMA)</td>
<td>60 percent</td>
</tr>
<tr>
<td>Mixed Use Corridors</td>
<td>45 percent</td>
</tr>
</tbody>
</table>

6. TDM Program Strategies.

Applicants shall identify strategies to achieve the [2040] and interim modal targets. The effectiveness of each TDM strategy varies based on land use, scale of
development, and the range of travel options currently, and projected to be, available. Parking pricing and financial incentives are often the most effective strategies.

The TDM Program Strategies Menu in Table 3.6.020.Q.2 below provides potential TDM strategies for applicants to consider and evaluate.

Applicants shall identify when strategies are proposed to be implemented and provide evidence of the combined effectiveness and likelihood of achieving the modal targets consistent with the location and availability of travel options.

The menu in Table 3.6.020.Q.2 provides suggested strategies or guidance; it does not represent a comprehensive list of TDM strategies.

### Table 3.6.020.Q.2  TDM Program Strategies Menu

<table>
<thead>
<tr>
<th>Category</th>
<th>TDM Strategy</th>
<th>Program Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking</td>
<td>Market-priced parking</td>
<td>Charging the market price for parking instead of subsidizing employee parking encourages employees to use alternative modes. Under the right conditions (i.e., in parking-constrained areas), priced parking can be a highly effective strategy.</td>
</tr>
<tr>
<td>Parking</td>
<td>Preferential parking for rideshare vehicles</td>
<td>Priority and designated parking for carpools, vanpools, and bike share stations can help encourage the use of rideshare, particularly in areas that are not well served by transit or biking and walking facilities.</td>
</tr>
<tr>
<td></td>
<td>Parking cash-out program</td>
<td>Parking cash-out is a program by which employers who offer free or reduced-price parking to their employees are required to offer an equal transportation fringe benefit to employees who use modes other than driving alone to get to work.</td>
</tr>
</tbody>
</table>
## Transportation Demand Management Plans
### For Development

<table>
<thead>
<tr>
<th>Category</th>
<th>TDM Strategy</th>
<th>Program Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit</td>
<td>Universal transit pass</td>
<td>Universal transit pass systems typically require a partnership between the city, the transit provider, and potentially a local university. Universal passes typically allow unlimited rides on local or regional transit for a low monthly fee, which are often absorbed entirely by the employer, school, or developer. The universal transit pass system typically requires that the participating agency purchase passes at a discounted rate for all employees, students, or residents. Universal transit pass programs can benefit developers if implemented along with reduced parking requirements, which consequently lowers construction costs.</td>
</tr>
<tr>
<td>Transit</td>
<td>Transit pass pre-tax purchase</td>
<td>The Internal Revenue Service allows up to $245 of a transit pass to be deducted from an employee paycheck pretax. This benefit reduces the amount of federal taxable income for the employee and reduces the amount of payroll taxes for the employer. (There are also permitted deductions for bicycle commuting and carpooling.)</td>
</tr>
<tr>
<td>Transit</td>
<td>Transit pass subsidy</td>
<td>Employers, building managers, or developers can provide a subsidized transit pass to employees or residents. In this case, the employee or resident purchases a transit pass from the employer or building manager at a discounted price.</td>
</tr>
<tr>
<td>Category</td>
<td>TDM Strategy</td>
<td>Program Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Rideshare</td>
<td>Sponsored rideshare programs</td>
<td>Rideshare programs include both carpooling and vanpooling. Rideshare programs work particularly well in areas that are not well-served by transit, bicycling, or walking facilities. Rideshare – particularly vanpools – are also best supported in employment areas where employees are traveling more than 10 miles each way to work. Employer sponsorship of a vanpool program in the form of coordination, ridematching, and/or monetary subsidy significantly increases the success of the program.</td>
</tr>
<tr>
<td></td>
<td>Vanpool pretax deduction</td>
<td>The Internal Revenue Service allows up to $245 to be deducted from an employee paycheck pretax for vanpool costs.</td>
</tr>
<tr>
<td></td>
<td>Shuttle service</td>
<td>Employment sites that are not close to transit service can benefit from an employer-sponsored shuttle service. Shuttle programs are typically sponsored by the employer and provide transportation between the employment site and major transit stops.</td>
</tr>
<tr>
<td></td>
<td>Guaranteed Ride Home program</td>
<td>A Guaranteed Ride Home program provides a set number of subsidized rides to commuters who use alternative modes to work. Rides are typically provided by a local taxi company.</td>
</tr>
<tr>
<td>Telecommute</td>
<td>Telecommute program</td>
<td>Telecommute programs allow employees to work from home for a certain number of hours per week or shift the time of day when employees travel to work to shift peak-hour travel.</td>
</tr>
<tr>
<td>Category</td>
<td>TDM Strategy</td>
<td>Program Description</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Information</td>
<td>Information kiosk</td>
<td>An on-site information kiosk provides information on transit routes, schedules, and fares; carshare and vanpool ridematching services; bicycle maps and resources; and other ways to help people travel by using alternative modes.</td>
</tr>
<tr>
<td></td>
<td>Transportation Coordinator</td>
<td>A Transportation Coordinator is a trained, designated employee on-site who is responsible for providing transportation options information to employees and facilitate employee surveying.</td>
</tr>
<tr>
<td></td>
<td>Individualized marketing</td>
<td>Individualized marketing campaigns typically target a neighborhood, corridor, or employment site. These campaigns provide individualized marketing travel options materials in a designated area to encourage people to use alternative modes.</td>
</tr>
<tr>
<td>Other</td>
<td>TMA membership</td>
<td>A Transportation Management Association (TMA) is a member-supported organization that provides transportation services to employers in a specific area. A TMA membership typically provides hands-on support from the TMA to help the employer survey the commute patterns of its employees and provide transportation information.</td>
</tr>
<tr>
<td></td>
<td>Bicycle commuter tax reimbursement</td>
<td>Participating employers may provide up to $20 per month reimbursement to commuters for qualified bicycle commuting expenses. See more information <a href="#">here</a>.</td>
</tr>
<tr>
<td>Promotion</td>
<td>Sponsor events to promote alternative modes</td>
<td>Promotional events and competitions help to promote alternative modes of travel. These events include competitions such as Bike to Work Week, during which employees compete with themselves or other companies to ride the most number of miles in a week.</td>
</tr>
</tbody>
</table>
### Transportation Demand Management Plans

#### For Development

<table>
<thead>
<tr>
<th>Category</th>
<th>TDM Strategy</th>
<th>Program Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared Mobility</td>
<td>Bikeshare</td>
<td>Bikeshare programs provide a fleet of bicycles typically available to the public through a membership program. Bikeshare bikes help residents and employees take more trips by bike.</td>
</tr>
<tr>
<td></td>
<td>Carshare</td>
<td>Carshare programs allow carshare members to reserve a car for a short period of time – typically a number of hours or a day. Carshare vehicles reduce the need for people to need to own their own vehicle, and therefore can reduce the need to build parking.</td>
</tr>
</tbody>
</table>

7. **TDM Performance Monitoring & Adaptive Management Plan.**

   a. Annual Performance Monitoring. The applicant will propose a plan for annual performance monitoring; including when and how travelers to and from the site will be surveyed; who will provide the Annual TDM Performance Report to the City (per section 3.6.020.Q.9); an annual due date for submitting the data; and how the survey response threshold, consistent with the Oregon Employee Commute Options requirements, will be met.

   b. Adaptive Management Plan. The applicant will propose additional TDM actions, likely to achieve performance thresholds, to be evaluated and implemented if interim mode share targets are not achieved.

8. **Review Process.**

   TDM Plans will be reviewed concurrently with the land use application. The design and implementation of the final TDM Plan shall be a condition of a project’s approval.

   The [Planning Official] will provide applicants with information on the TDM requirements at a pre-application conference.
NOTE: Internal review of TDM Plans should follow the same general process that is used for the review of Transportation Impact Analyses and similar technical reports. However, if the requirements for TDM Plans are adopted into Administrative Rules, language specifying how the review will be conducted may need to be included. See example below.

[Following receipt of an application, including a draft TDM Plan, the [Planning Official] will provide the draft plan to the [City Engineering Department] within five days. The [City Engineering Department] will respond with comments and recommendations to the [Planning Official] within five days. If additional changes are needed, the [City Engineering Department] will provide comments and recommendations to the [Planning Official] within five days of receiving the changes.]


a. Annual Transportation Demand Management Performance Report. The property owner shall submit an annual "TDM Performance Report" to the [Planning Official] beginning one year from initial occupancy and at one year intervals thereafter. If the site is not meeting modal performance targets, the property owner will propose additional TDM actions as outlined in the Adaptive Management Plan and document why they are likely to achieve the modal targets within the next year.

Consistent with the Oregon Employee Commute Options (ECO) Survey, questions at a minimum shall cover the type and frequency of modes of transportation used in a typical week (e.g., walk, cycle, drive alone, carpool, vanpool, use public transit, etc.), reasons for driving alone (e.g., availability of free parking, needing privacy, flexibility to assist family members, etc.), strategies that would lead drive alone respondents to use alternative modes (e.g., a guaranteed ride home program, subsidized transit passes, parking pricing, etc.), and whether or not respondents participate in telecommuting and/or flex work hour arrangements.

The [Planning Official] may provide the property owner with written notification indicating whether the TDM Performance Report and Adaptive Management Plan are deemed acceptable within 60 days of their receipt. The [Planning Official] may request auditable documentation to determine compliance.

b. Commitment to Maintain Transportation Demand Management for the Life of a Project. Applicants are required to incorporate the TDM Plan modal performance targets and performance monitoring reporting into deed restrictions, such as Covenants, Conditions & Restrictions (CC&Rs), to ensure that the TDM Plan runs with the land. Wording of the deed restrictions must ensure that the property, as well as every owner and
occupant, shall be subject to, abide with, and satisfy all of the provisions and obligations contained in the TDM Plan. This includes any obligation to provide funding and resources to implement the TDM Plan, and all requirements of associated conditions of approval imposed by the City. It is important to clarify that the TDM Plan requirements apply equitably to all portions of the property. They also apply to all owners and tenants, as well as their successors, in case the property is transferred, sold, or leased.
UNDERSTANDING TDM AND ITS ROLE IN THE DELIVERY OF SUSTAINABLE URBAN TRANSPORT

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Contemporary Transport, UK

Eric N. Schreffler
ESTC, USA

ABSTRACT

Outdated notions of TDM (transport demand management) as a collection of vaguely related initiatives are constraining the true potential of the concept. This paper explains how TDM is far more effective when framed as a philosophical approach which in time is likely to become a cornerstone of sustainable urban transport systems. A new paradigm in transport planning, internationally recognised as TDM, is emerging which embraces concepts commonly referred to as Mobility Management, Smarter Choices, and Active Travel Management under its umbrella. Transport professionals worldwide have been collaborating to update understanding of TDM as a philosophy that underpins our approach to improving the sustainability of transport.

A review of TDM internationally has demonstrated the importance of combining a number of key aspects to an effective strategy. Key to successful policy transfer of sustainable urban transport is integrating the TDM philosophy into urban transport planning, as well as the daily management and operation of transport services and infrastructure. The paper presents a powerful policy tool, developed to help assist this process of integration - METRIC© (Mobility Enhancement and Trip Reduction Index to aide Comparison), being used internationally to benchmark comparative progress on TDM implementation.

ABOUT THE AUTHORS

**Dr. Colin Black** is the founder of specialist independent consulting firm Contemporary Transport, providing advice on TDM strategies, sustainable transport policy, strategic organizational change, and travel behavior modification programs to clients across the world. His doctorate explored the meaning, the implications and the key challenges of implementing a more sustainable system of transport in the UK. This provided a useful background in behavioral research and an in-depth understanding of the concept of sustainability. He has played an instrumental role in developing strategic policy guidance in the UK. He served for 2 terms as President of the Association for Commuter Transport and currently sits on a number of advisory committees and steering groups. Over the last two decades he has developed a wealth of practical knowledge leading high-profile transport projects establishing new visions underpinned by bespoke TDM strategies for a wide range of applications, from development sites to towns and cities. He is passionate about his work and finds great reward in inspiring others to think more innovatively about transport.

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**Eric Schreffler** is independent consultant located in San Diego, California. He is perhaps best known for his work developing quantification methods for measuring the impacts of demand management strategies on travel and air quality. He has also authored or co-authored several seminal reference documents on TDM effectiveness for the Federal Highway Administration, Environmental Protection Agency, European Commission, and the Organization for Economic Co-operation and Development. He is the chair of the Transportation Research Board’s Transportation Policy Section and serves on several advisory groups, including: the European Conference on Mobility Management, the National Center for Transit Research, the ACT TDM Institute and the Transportation Planning Council of the Institute for Transportation Engineers. He holds an M.S. in Transportation from M.I.T. and a B.A. in Urban Studies from the University of California at San Diego.
estc@san.rr.com

1 INTRODUCTION
1.1 Why Manage Demand?

There is a broad and growing recognition that future plans to address urban mobility and accessibility needs cannot rely solely on expansion to transport infrastructure, be it roads, rails or even smart cars.

A sustainable transport system will need to address near term needs in a manner that does not compromise future generations' ability to meet theirs. Therefore, the days of “predict and provide” transport planning and management are likely behind us.

Many tools are available to address urban mobility and accessibility without expensive and environmentally controversial capital projects. It is astonishing that, despite the seemingly empowering policy rhetoric of European countries in particular, most major capital projects are still funded and implemented without drawing upon the range on proved initiatives and measures, that are capable of significantly increasing return on investment.

One set of these tools is broadly titled Transport Demand Management (TDM). Related concepts include:

- Mobility management;
- Travel awareness;
- Smarter Choices;
- Travel planning;
- Trip reduction programs; and
- Active Traffic Management.

All of these concepts are part of a system to manage travel demand within a Sustainable Urban Transport approach. (1) The European Commission and many of its member states are working to adopt and integrate this approach. (2)

1.2 What is TDM?

Traditionally in the United States, TDM has involved strategies to induce commuters to shift to higher occupancy modes, such as carpooling, vanpooling, and public transport.

In recent years the concept of TDM has become confused as a range of professionals specialising in different disciplines have attempted to redefine it in relation to their relevant sphere of knowledge. Whilst they are effectively dealing with the same issue, namely managing demand, each discipline has become rather too narrowly focussed. So, for example, engineers might view the issues from a traffic flow or reducing congestion perspective, the economists may view the issues from a pricing perspective, the computer specialists could view the issues as a technological challenge, whilst the marketing specialists frame the issues from a behaviour change perspective. To date, there has been little appreciation of the concept of TDM as a philosophical approach which combines the specialism’s of all disciplines to address policy objectives.

The traditional view of TDM is no longer consistent with the broad variety of measures being implemented in the United States and Europe to manage demand. According to a recent FHWA report:

“demand management is designed to better balance people’s needs to travel a particular route at a particular time with the capacity of available facilities to efficiently handle this demand.” (3)

A contemporary understanding of demand-side strategies is broader in scope than prior, more traditional views of TDM. Managing demand in the 21st century is about providing travelers,
regardless of whether they drive alone, with travel choices, such as work location, route, time of travel, and mode.

The European Commission has taken this concept further in its Green Paper on Urban Mobility, calling for policy-makers, planners and transport managers to:

"search for innovative and ambitious urban transport solutions with a view to arriving at a situation where towns and cities are less polluted and more accessible and where traffic within them flows more freely. Working together, we must seek ways of achieving better urban and suburban mobility, sustainable mobility, and mobility for all the inhabitants of Europe, while allowing economic operators to play their role in our towns and cities." (4)

Finally, TDM is recognized, internationally, as a supportive tool for mitigating the impacts of greenhouse gas (GHG) emissions. With the transport sector comprising almost a quarter of energy-related GHG emissions (with three-quarters of that from road vehicles), TDM is viewed as an important means to reduce private car use. (5)

Recently the UK, like many international governments, has started to embrace a wider perspective on the way to tackle transport issue, by recognising in particular the need to combine technological and behavioural change initiatives alongside each other (6). Whilst the political intention is clearly expressed, understanding and commitment to implement the broad range of policy interventions required to realise the full benefits of TDM are less evident (7). The UK, like most other governments, still appear far more comfortable dealing with technological approaches than the broad range of complementary initiatives required to deliver an effective TDM strategy. This apparent fixation with technology is evident across the range of initiatives designed to help tackle climate change (including those orientated towards the transport system), and evidenced by the composition of the UK Committee on Climate Change.

It is vital to broaden the understanding and thus adoption of TDM policies in more cities. This paper will to suggest reasons for this current failure to realize the potential of TDM and offer some key recommendations for tapping into the benefits of TDM. This is intended to help illuminate the circumstances upon which an overall TDM philosophy might be adopted at the sustainable urban transport policy in a city or metropolitan area.

1.3 Paper Structure

The remainder of this paper presents a TDM as a new paradigm for sustainable urban transport. This concept is then expanded further with reference to a range of international experiences with managing travel demand. The paper then explores the importance of effective policy transfer through integration. To assist with this process a new tool for benchmarking is presented, METRIC®, which is intended to help cities gauge their progress in maximizing the potential of their TDM strategy. The paper then concludes with practical recommendations for transferring more holistic policy approaches to assist the implementation of more sustainable systems of transport.

2 A NEW PARADIGM

Managing travel demand has largely been compartmentalized as a set of “soft measures” to promote sustainable travel options or programs to promote and offer shared ride arrangements. Demand management means different things to different disciplines. To Information Technology (IT) specialists, managing demand is new technology to provide information; to operations managers, managing demand is controlling the flow onto highways; to economists, it is pricing the system to find equilibrium with capacity; to marketers, it is promoting innovative campaigns; and worst of all, to policy-mangers is a largely unknown. It is perhaps therefore not surprising that the concept has become confused as each discipline tries to mold the concept to their set of tools.
This “silo” thinking inhibits the kind of policy integration that is needed to craft a truly sustainable urban transport solution strategy.

But travel demand management is a much broader concept than that assigned to mobility management or ridesharing. Implicit in the use of the term is the assumption that it is accompanied by the implementation of sustainable mobility, introduction of full cost pricing and organizational or structural measures to ensure a broad range of complementary interventions work effectively together to realize the benefits of sustainable transport. It is the unifying philosophy of TDM, not specific measures associated with it, that underpins the policy objective of a more sustainable system of transport.

This philosophy of managing demand accepts that meeting unfettered demand for travel is impractical and that therefore the system needs to be managed. That demand for travel needs to be managed by:

- Expanding the supply and availability of (more sustainable) alternatives;
- Controlling demand for the use unsustainable modes;
- Providing incentives and rewards for undertaking sustainable travel habits; and
- Imposing full-cost pricing on the use of the automobile.

Perhaps this philosophy is better understood simply as ‘urban transport management’ – i.e. obtaining a more appropriate balance in favour of needs over wants. Put simply, where transport used to be supplied to accommodate travel demand, travel must now be managed to use the available transport supply most efficiently. The following describes TDM’s key contributions to transportation sustainability:

- **TDM reduces the need for new or wider roads**
  By persuading people to drive less often, to closer destinations, outside of rush hours or using less busy routes, TDM can reduce the demand for new road infrastructure.

- **TDM makes personal travel decisions more efficient**
  Many drivers make travel decisions based on poor information and a lack of experience with non-automobile options. TDM improves their awareness and understanding of options, and their willingness to try them.

- **TDM maximizes return on infrastructure spending**
  Studies have shown that good information can significantly increase ridership on new transit infrastructure and services.

- **TDM makes the most of our current assets**
  It saves people money and time by helping them make efficient travel decisions. It improves health by promoting physical activity and less-polluting modes. It benefits employers by increasing productivity, reducing parking costs, and helping to attract and retain workers. It promotes economic development by reducing congestion and enhancing worker mobility.

- **TDM is a versatile and dynamic management tool**
  TDM measures can be customized for specific audiences (e.g. business park commuters), destinations (e.g. major hospitals), travel modes (e.g. cyclists), travel corridors (e.g. a busy highway), trip purposes (e.g. school) or specific timeframes (e.g. major events). They can be delivered in months, rather than years.

- **TDM initiatives have multimodal benefits**
It recognizes that people see alternatives to driving as a “suite” of options. Non-drivers tend to be public transport users, car-poolers, pedestrians or cyclists at different times, for different reasons.

**TDM works at the scale of individuals, but has huge power across a community**

If every person who drives to work in a community decided to leave their car at home just one day a month, the 5% reduction in commuter traffic could significantly ease daily congestion.

### 2.1 Components of a Broader Concept of TDM

A more comprehensive view of managing travel demand goes beyond traditional means to provide and promote commute alternatives (US) or new soft measures in communication tools and partnership-building (Europe) to fulfill the broader definition of balancing peoples travel (and activity) needs with the capacity of available facilities and services to met these needs. In this broader approach, four types of strategies can be considered:

- Operational (such as dynamic route information on highways);
- Physical (such as auto restrictions in city centers or HOV lanes);
- Financial/pricing (such as congestion charging); and
- Organizational (such as sustainable travel planning).

The next section provides a litany of examples of each of the strategies, from Europe, the U.S. and elsewhere in the world. Individually, the specific measures within each category can have a significant impact on localized traffic at a worksite, new development, corridor, or event venue. However, as will be argued in the following section, it is the integration of these measures into urban transport plans and the management and operation of the overall mobility system that is paramount.

### 3 INTERNATIONAL EXPERIENCE WITH MANAGING TRAVEL DEMAND

An international scanning study on managing travel demand to address congestion identified European examples of TDM strategies, organized into the four categories listed in the last section: operational, physical, financial and institutional. (8) This scanning study, along with US and Japanese examples, forms the basis of the experienced provided here.

#### 3.1 Operational Measures

At the heart of operational measures to manage demand are enhanced choices and traveler information about these choices. Among the interesting strategies the scan team made a number of key observations summarized in box 3.1.

**Box 3.1: Operational TDM Measures**

| Traffic management centers use real-time, dynamic information to manage the system and provide users with route choices during their trip. The way they provide individualized and customized data from the centers to users varies among public, public-private, and private providers. Newer innovations include the provision of door-to-door pre-trip, near-trip and en route information on time, route, and mode choice. Integrated examples of real-time multimodal information systems include: Stadtinfoköl in Cologne, SWINGH in The Hague and several “511” systems in the U.S. |
| Demand management is a key part of highway reconstruction to mitigate the impacts of the disruption. In the Netherlands, the reconstruction of the A10 and A9 near Amsterdam have included comprehensive mobility management programs to induce mode, time, and route shifting and have included information on and incentives to use public transport to get to work during the construction period. |
| Travel time prediction, based on recent (the past few hours) or archived (historic) data, is being developed in many |
countries. The national traffic information website includes both real-time and predicted traffic conditions in terms of average speeds. The system in the Netherlands provides users with predictions of travel times on the highway at a given time of day. The system also informs the user of travel times during periods before and after the desired time. The system in Cologne, developed as part of Stadtinfoköln, predicts travel times on public transit and roads and provides a comparison to users via in-vehicle or hand-held information or signs near park-and-ride facilities. A similar system is in place and being enhanced in the San Francisco Bay Area. In all, travel time reliability is a significant issue and performance indicator in Europe, as in the United States.

Planning for demand and traffic management during large-scale events has been undertaken in a comprehensive, coordinated fashion using many management techniques. This includes traveler information, traffic flow and diversion strategies (Silverstone Grand Prix event in England), use of closed highway segments as park-and-ride facilities (World Youth Day in Cologne), integrated event and public transport tickets (Rotterdam Marathon and soccer matches in Germany), and schedule changes to free buses for use in shuttling visitors (in Rome after the death of Pope John Paul II).

It has been common in Europe to use overhead changeable signs for speed harmonization for many years. Changeable speed signs and explanatory icons warn motorists before they reach queuing or incidents. Variable speed limits for speed harmonization have recently been implemented in the U.S., in Northern Virginia, Orlando and St. Louis.

Speed harmonization, use of the hard shoulder during congested period, ramp metering, incident management, and real-time travel information are all being used together under the concept of Active Traffic Management (such as on the M42 near Birmingham) or Dynamic Traffic Management (the Netherlands).

New public transport and shared ride services are being developed, such as taxi-sharing (Bristol, England) and car-sharing (Rome, Cologne, etc.). The implementation of supportive park-and-ride facilities and improved express bus and rail services are being implemented. Carpooling, vanpooling, and teleworking are still not widespread in Europe, but remain a significant share for commute trips in the U.S.

3.2 Physical Measures

Physical measures either restrict the use of cars in certain areas or during certain times of the day, or involve strategic improvements to the transportation network to enhance system efficiency or provide new capacity for public transport or high occupancy vehicles. The physical measures observed in Europe and elsewhere to influence demand are summarized in box 3.2 below.

<table>
<thead>
<tr>
<th>Box 3.2: Physical TDM Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access control system</strong> in Rome operates as a physical barrier by restricting vehicles from the historic core during much of the day. A limited number (150,000) of permits are sold that allow access by some vehicles. Rome also bans all cars without a catalytic converter from the core. The access control zone has resulted in a 20 percent reduction in traffic during the restricted part of the day, but has had an unintended effect of increasing the use of higher polluting motor scooters. Access control is also being implemented on a more limited basis, such as weekend road closures (e.g., Ciclovia) to accommodate bicycling and walking in places such as Bogotá, New York City, Mexico City.</td>
</tr>
<tr>
<td>Many cities are making improvements to their public transport system by building extensive park-and-ride facilities on the periphery of the city and offering express bus or rail service into the city center. The Ferrytoll park-and-ride system in Edinburgh includes dedicated access lanes to the facility and traffic queue management on the bus route to optimize bus travel times. Winchester in England, offers parking price discounts for lower emission vehicles at its main park-and-ride facility. Rome has built park-and-ride lots outside its “green area” and added 350 km of new urban rail lines.</td>
</tr>
<tr>
<td>An HOV lane has been constructed on the M62 /M606 in England in to the city of Leeds to demonstrate the efficiency and effectiveness of such a facility to encourage ridesharing (2+ carpools). Bus lanes (using red pavement in the United Kingdom) serve buses and other high occupancy vehicles (HOVs) to Heathrow and Schipol airports. In the U.S. some HOV lanes are being converted to High Occupancy Toll lanes to allow single occupant drivers to pay for unused capacity and cross-subsidize new public transport services.</td>
</tr>
<tr>
<td>The Dutch are using the hard shoulder as rush hour lanes and narrower plus lanes in the median to enhance capacity during the most congested periods. These are accompanied by slower speed limits and have not resulted in any fatal accidents since being implemented. The hard shoulder is used as a bus-only lane during peak periods in Minneapolis.</td>
</tr>
</tbody>
</table>

3.3 Financial/Pricing Measures

Congestion pricing is widely acknowledged as an effective demand management tool, but it is also being used to address environmental concerns, fund new public transport improvements, and preserve historic city centers. A summary is provided in box 3.3 below.
**Box 3.3: Physical TDM Measures**

**Congestion pricing** schemes are being implemented to reduce congestion (London) and emissions (Stockholm and Rome), not primarily to raise revenue for transport or other uses. The alternative to driving a car into the city center is mainly public transport, which carries 80 to 85 percent of peak-hour commuters in London and Stockholm.

In Stockholm, the national legislature enacted a law requiring the city to implement a congestion tax for cars entering the city center. The pilot program was implemented in early 2006 for 7 months, although the enhanced transit component (which amounts to half of the US$400 million budget) was implemented in August 2005. Users pay the tax daily. A national referendum was held in September 2006 making the congestion tax permanent. An extensive evaluation effort was used to assess the pilot program and it reported 20-25% percent reduction in traffic entering the core and resulting improvements in overall accessibility (travel times reduced 30-50%) and air quality (CO2 decreased in core by 14% and in region by 2.5%). (1)

**Truck pricing systems** have been implemented for trucks over 12 metric tons (European law, with plans to lower the limit to 3.5 tons) in several central European countries, including Switzerland, Austria, and Germany. The German system is complicated in terms of payment and enforcement and was plagued by implementation delays, but is designed to reduce road damage resulting from wear and tear on the German autobahn network and to reduce environmental and energy impacts of the growth in truck volumes throughout central Europe.

Financial incentives are also being used as a demand management strategy. As part of a highway reconstruction project near Amsterdam, **free monthly transit passes** were distributed to area residents and workers to complement transit service improvements and employer-based TDM initiatives. Commuter incentive programs, provided to those using alternative modes, has been shown to be a popular and cost effective means from reducing car trips in the U.S. in places like Atlanta and Los Angeles.

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**3.4 Institutional Measures**

Demand management requires new partnerships, planning processes, and approaches to addressing traffic congestion. The ability to institutionalize a demand management philosophy in supply-oriented organizations is a key factor in the success of the endeavor.

**Box 3.4: Institutional TDM Measures**
Partnerships

Traveler information is often gathered and compiled by the public sector and disseminated by public and private operators. The Utrecht traffic control center, for example, manages the system on one side of the building and disseminates information to providers through the information center on the other side. A new regional partnership, SWINGH, has been formed in The Hague to coordinate traveler and traffic management and information.

New public/private partnerships have formed to address employee and visitor parking and commuting issues, such as the Transport Forums at all major UK airports and Transportation Management Associations in the U.S.

One strategy to manage demand is to better coordinate the timing and nature of travel, even in goods movement. The British, among others, have experimented with consolidated delivery schemes in which a subsidized carrier assembles deliveries from participating delivery companies at a peripheral location and delivers them to downtown merchants. This has resulted in a 65 percent reduction in delivery vehicles in Bristol.

Planning

The Swedish and British are integrating travel demand management planning into transport and land use plans. The Swedish Road Administration has adopted a four-stage principle that requires consideration of (1) demand management and mode shifting before considering (2) efficiency or systems management, 3) minor improvements, or (4) new investment or major rebuilding. Finally, the U.K. and Swedish governments have developed best practice and planning guidelines for integrating demand management into new development site planning and approval and many countries are requiring or recommending Sustainable Urban Transport Planning for larger urban areas.

Individualized travel planning, also called travel blending, individualized marketing or travel feedback services are provided to residents in areas with the potential for increased public transport use, bicycling and walking in many countries, including: Japan, the UK, Germany, Australia and the U.S.

The United Kingdom and Italy require all municipalities and large employers to develop and implement travel plans or trip reduction or travel plans at worksites, as is the case in Washington State and Arizona. These regulations are implemented through local government and provide funding and technical assistance to local agencies. The British government has a school travel initiative to develop travel plans for all school sites in the United Kingdom by 2010. The smarter choices program in the UK projects that high-intensity “soft” demand management measures could reduce overall traffic levels by as much as 11 percent and lower intensity measures by 2 to 3 percent. These soft measures include travel planning (sustainable travel plans) for towns, employer worksite, schools, hospitals, and new developments.

4 KEY TO POLICY TRANSFER: THE NEED FOR INTEGRATION

The TDM measures cited in the previous section seems impressive in terms of the range of techniques, application settings, impacts, and international scope. However, many TDM programs are viewed as a “foot in the door” and way to get people to try a more sustainable behavior in the hopes that they can lead up a virtuous ladder to even more far-reaching behavioral changes. Some commentators suggest that an emphasis on changing attitudes to particular initiatives is flawed and that strategies should instead be re-focussed on influencing values. Compton (9) highlighted the importance of engaging values and self-identity as basis for motivating pro-environmental behavioural change. He argues that individuals who engage in behaviour in pursuit of ‘intrinsic goals’ (of personal growth, emotional intimacy or community involvement) tend to be more highly motivated and more persistent in engaging in this behaviour, when compared to individuals motivated by ‘extrinsic goals’ (for example, of acquisition of material goods, financial success, image and social recognition). He suggests therefore that motivations which are intrinsic are more likely to lead to pro-environmental behaviour.

Indeed, the measures typically associated with TDM, when considered in isolation, can be fraught with contradictions. Car sharing, for example, may not lead to net environmental benefits if the money that an individual saves by selling their own car and joining a car-share scheme is spent on say purchasing a time-share apartment in a distance place resulting in a larger carbon footprint. Likewise, efforts to provide more flexibility to when and where employees work, make it harder to serve them with public transport and may break-up existing shared ride arrangements.

Therefore, TDM needs to be set into context. We can no longer rely on forecasts of future travel demand, with no policies in place to modulate that demand, that require us to meet all that desired (and presumed) travel. The TDM philosophy must rely on “back-casting” to determine the
nature of the sustainable future we want for progenies and ourselves. Once we know what this sustainable future might look like, we can develop plans and projects to achieve and work toward this. The gasoline price spike of 2008 reveal that drivers are willing to reduce auto use, if given a rational reason for doing so.

How do we create this future vision of sustainable urban transport, plan for it, and then operate the transportation system with this new TDM philosophy. The answer may lie in the integration of these strategies into a cohesive, comprehensive approach in order to maximizing intended effects.

TDM Integration in Planning - In the U.S. TDM is often an afterthought to highway and public transit improvements. In some long-range planning exercises, unmet demand that cannot be satisfied with funded infrastructure is assumed be reduced via TDM, without specifying how or integrating predicted behavior responses into the planning process.

One place that has created a vision of a sustainable transport future and implemented a plan to reach it, is Lund, Sweden. Comprehensive, sustainable transport planning has been successfully undertaken in Lund, Sweden (so-called LundaMaTs or Lund Environmentally-Friendly Transport plan), where travel growth (expressed as vehicle kilometers of travel) has been arrested while economic growth continued (decoupling traffic from economic growth). The integrated program included transit service improvements (a new bus rapid transit line), traffic management, bicycle and pedestrian improvements, and individualized marketing efforts to increase bus and bike use. The city of Lund bought land adjacent to the right-of-way of the bus line and is reselling the land to private interests for sustainable developments. The result of this process was a 2-4% reduction in per capita vehicle travel. Given Lund is still growing, LundaMaTs showed that economic growth can be decoupled from transport growth. Increases in employment and population were accommodated by growth in transit and bicycle use. The key to the success of the integrated plan was the involvement of stakeholders, including elected officials, early in the process. (10)

TDM Integration in System Operations - Congested highway networks and public transport system have prompted transport managers to become more mobility managers than highway or transit operators. Efforts to provide pre-trip traveler information, incentives for traveling in the shoulders of the peak period, ramp metering, and congestion charging are more about managing demand than operating a facility.

But, this role of demand manager comes on a rather ad hoc basis, as most traffic engineers and managers do not see themselves as such. This philosophy of managing demand needs to be built into the plans and operating procedures at a systemic level. The urban transport system needs to be grounded in managing demand rather than fall back on it as a default.

One city that has embraced the philosophy of managing demand is Rome. Rome’s Mobility Policy includes four key components:

- Managing demand management with access control and parking management;
- New institutional structure for public transport and traffic management;
- Complementary measures: land use integration, clean fuels and mobility management; and
- Transport management of buses and cars using technology to provide real-time information.

The plan is based on concentric rings that place greater restrictions on the automobile as one gets closer to the historic core (see Figure 1 on next page). Cars are intercepted at suburban park-and-ride facilities as travelers transfer to regional trains. Higher polluting cars are not allowed into the region without a “blue permit” (Bollino Blu). Parking is managed and priced within
the next inner ring. Finally, Rome’s access control zone prohibits most cars from entering the historic core during the day. Holders of an entry permit must prove that they have an off-street parking space. Public transport operations and the traffic management center are both within the same city agencies, enabling better control of relative automobile and transit travel times.

Based on our review of the need for and experience with integrating the demand management philosophy into urban transport, we believe that the following represent characteristics of effective integration in a city:

- A genuine desire to reduce car use by reducing trips and VMT;
- A pervasive belief that economic growth can be “decoupled” with transport growth;
- A consensus-building process to garner buy-in by politicians, technicians and the traveling public;
- Regional goals to manage demand that are realistic and measurable;
- Serious treatment of both demand and supply solutions;
- Commitment to implement a comprehensive package of strategies;
- Targeting to various travel markets recognizing that travelers are not generic;
- Active management of the transport system and information on on-going basis;
- An evolution from project/site/corridor programs to region-wide effort;
- Evaluation of each strategy, synergistic impacts and comparative cost effectiveness; and
- Feedback loop to improve plans and programs.

These characteristics may be part of the recipe for policy transference to other cities, beyond those named here or others, such as the recipients of the IDTP Sustainable Transport Award (New York, Bogotá, Seoul, Guayaquil). Of course, the ultimate test of integration would be that case that managing demand is simply the normal way so planning and operating the transport system and meeting the true needs of people. We have a long way to go to realize the TDM philosophy as “the norm,” but it begins with recognizing that a sustainable future requires a different approach to urban travel. The METRIC© tool, described in the next section, offers a means to evaluate the progress of a city in adopting this overall philosophy of effectively managing demand.

5 A NEW TOOL FOR ASSESSING TDM INTEGRATION: METRIC©

One means for assessing the ability, readiness and capability of cities to adopt the TDM philosophy and resulting policy framework is to compare cities progress toward some standard that fulfills the characteristics enumerated in the last section. Such a comparison can be aided by some sort of a progress “report card.” Ultimately, a comparative system will help formulate a common set of criteria for success.

Why benchmark cities progress with a report card? Not to judge good or bad, but to elicit dialog to seek improvements in work towards a sustainable transport approach. Such a comparative tool is now available in the form of METRIC©, the Mobility Enhancement and Trip Reduction Index to aide in Comparison.

Such tools have been used in transit peer reviews and assessments of bicycle-friendly communities, but METRIC© is intended to bridge modal and disciplinary constructs to assess the full range of requirements for a sustainable transport system.
Using our growing understanding of TDM, within the broader definition offered earlier in this paper, seven key components of a sustainable urban transport policy can be enumerated for the purposes of benchmarking, along with the type of enablers to see them implemented:

- **Physical Measures** – infrastructure to make demand management measures work
  The “enlightened engineers”
- **Operational Enhancements** – processes to manage /influence trips
  The “applied IT’ers”
- **Financial Mechanisms** – using economics of affect trip choice
  The “exciting economists”
- **Organisational Support** – institutional integration
  The “marvellous marketers”
- **Political Will** - commitment to address obstacles and provide adequate funding
  The “progressive politicians”
- **Research Program**- analysis to evaluate performance –
  The “reality researchers”
- **Integration** - application across broad range of operational levels
  The “out-the-box thinkers”

The METRIC© assessment process involves a detailed internal review of local experience in the seven areas enumerated above. This review includes several hundred individual measures that can contribute to sustainable transport. Each initiative or measure, with the category can be evaluated on a seven-point differential scale, or less formally if desired. Weighting is then applied to specific sections, as agreed by recognised international experts on the METRIC© panel. The assessment includes both qualitative and quantitative data and each of the seven sections is summarized into a report card.

The report card is a “consumer reports” type summary to show, at a glance, how a city is doing in implementing a full range of demand management strategies in an integrated approach. METRIC© has been applied to several cities in which the developers of the tool are working and more cities have voiced interest, as well as some corporate interests looking to assess which cities are moving toward sustain transport in an integrated fashion.

In time, the report cards are intended to demonstrate the particular strengths and weaknesses of TDM strategies being implemented in city regions. This will help transport practitioners identify opportunities to transfer knowledge and assist the implementation of more holistic policy approaches, which will help facilitate the implementation of more sustainable systems of transport.

An example of the METRIC© report cards is provided below for two cities that the authors are particularly familiar with.
### 6 CONCLUSIONS AND RECOMMENDATIONS

It is evident that outdated notions of TDM as a jumble of tenuously linked policies, initiatives, measures and schemes is constraining the true potential of the concept. TDM is far more effective when framed as a philosophical approach representing a paradigm shift from the past where a philosophy of ‘predict and provide’ prevailed. In time this broader definition of TDM will become a cornerstone of sustainable urban transport systems.

The effectiveness of TDM becomes most diluted when the philosophies are confused. Where, for example, a new road bypassing a town is constructed without consideration of how the capacity benefits might be locked in, and enhanced return on investment achieved, through an effective TDM strategy.
The first comprehensive review of international experience has discovered that there are now examples of a broad range of new and innovative strategies TDM being implemented throughout the world. From this scan of TDM internationally it is evident that the approach is most effective when implemented to include four main types of strategy, namely: Operational; Physical; Financial; and Organizational. Effectiveness of a holistic TDM strategy is bolstered further when combined with strong political support which helps to address institutional obstacles and ensures adequate funding is allocated. The momentum of implementation is maintained which combined with a robust research program which enables analysis to evaluate the program performance and provide evidence of a strong return on investment.

The key to successful policy transfer of sustainable urban transport is integrating the TDM philosophy into urban transport planning as well as the daily management and operation of transport services and infrastructure. Unlocking the potential of TDM relies on effective integration. TDM strategies operating independently in a specific disciplinary silo, such as traffic engineering for example, are less effective as they are unable to tap into the complementary benefits of parallel TDM initiatives, such as travel planning. Understanding TDM as a broader concept has enormous potential to improve integration, by encouraging transport professionals across the spectrum to work together towards common objectives.

To assist this process of integration, a useful policy tool has been developed. METRIC©, has been developed to help cities gauge their progress in maximizing the potential of their TDM strategy. Initial response to using METRIC© has been very positive and it has been employed in a wide range of strategic transportation studies in North America and Europe to date. The TDM evaluation process it employs helps foster greater practical understanding of the potential to enhance the effectiveness of TDM at the local level. The resulting report card provides a graphical illustration of this potential which can quickly be compared to other cities and regions. This has proved to be a particularly powerful way to garner political support, and to discourage leading world cities from resting on their laurels.
7 REFERENCES


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CHAPTER 19

Employer and Institutional TDM Strategies

Traveler Response to Transportation System Changes
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Chapter 19—Employer and Institutional TDM Strategies

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The Institute of Medicine was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, on its own initiative, to identify issues of medical care, research, and education. Dr. Harvey V. Fineberg is president of the Institute of Medicine.

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COOPERATIVE RESEARCH PROGRAMS

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TDM (transportation demand management or travel demand management) is a process that can encompass a variety of measures intended to influence travel choices. TDM is used to manage heavy traffic demand and parking requirements, and to enhance the effectiveness of transit services. Employer and institutional TDM actions within the scope of this chapter can be classified into four major categories: employer or institutional support actions, provision of transportation “services,” financial incentives or disincentives, and alternative work arrangements.

In this report, new as well as synthesized research is presented. Using a collection of 82 cases as an analysis platform, the authors evaluate the relative importance of particular categories of TDM strategies (e.g., support versus incentives), and even, to some degree, of particular strategies (e.g., a transit subsidy versus an HOV parking discount), through pair-wise comparisons from the sample.

TCRP Report 95: Chapter 19, Employer and Institutional TDM Strategies will be of interest to transit, transportation, and land use planning practitioners; land developers, business associations, employers, institutions, and employees; educators and researchers; and professionals across a broad spectrum of transportation and planning agencies, MPOs, and local, state, and federal government agencies.

The overarching objective of the Traveler Response to Transportation System Changes Handbook is to equip members of the transportation profession with a comprehensive, readily accessible, interpretive documentation of results and experience obtained across the United States and elsewhere from (1) different types of transportation system changes and policy actions and (2) alternative land use and site development design approaches. While the focus is on contemporary observations and assessments of traveler responses as expressed in travel demand changes, the presentation is seasoned with earlier experiences and findings to identify trends or stability, and to fill information gaps that would otherwise exist. Comprehensive referencing of additional reference materials is provided to facilitate and encourage in-depth exploration of topics of interest. Travel demand and related impacts are expressed using such measures as usage of transportation facilities and services, before-and-after market shares and percentage changes, and elasticity.

The findings in the Handbook are intended to aid—as a general guide—in preliminary screening activities and quick turn-around assessments. The Handbook is not intended for use as a substitute for regional or project-specific travel demand evaluations and model applications, or other independent surveys and analyses.

The Second Edition of the handbook Traveler Response to Transportation System Changes was published by USDOT in July 1981, and it has been a valuable tool for transportation professions.
sionals, providing documentation of results from different types of transportation actions. This Third Edition of the *Handbook* covers 18 topic areas, including essentially all of the nine topic areas in the 1981 edition, modified slightly in scope, plus nine new topic areas. Each topic is published as a chapter of TCRP Report 95. To access the chapters, see the project write-up on the TCRP website: http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1034.

A team led by Richard H. Pratt, Consultant, Inc. is responsible for the *Traveler Response to Transportation System Changes Handbook, Third Edition*, through work conducted under TCRP Projects B-12, B-12A, and B-12B.

**REPORT ORGANIZATION**

The *Handbook*, organized for simultaneous print and electronic chapter-by-chapter publication, treats each chapter essentially as a stand-alone document. Each chapter includes text and self-contained references and sources on that topic. For example, the references cited in the text of Chapter 6, “Demand Responsive/ADA,” refer to the Reference List at the end of that chapter. The *Handbook* user should, however, be conversant with the background and guidance provided in *TCRP Report 95: Chapter 1, Introduction*.

Upon completion of the *Report 95* series, the final Chapter 1 publication will include a CD-ROM of all 19 chapters. The complete outline of chapters is provided below.
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**NOTES:**


* Primary cutoff was first year listed, but with selected information up into second year listed.

* The source data cutoff date for certain components of this chapter was 1999.

* Deferring for a future TCRP project effort.

* The edition in question addressed only certain aspects of later edition topical coverage.
CHAPTER 19 AUTHOR AND CONTRIBUTOR ACKNOWLEDGMENTS


Richard H. Pratt is the Principal Investigator. Dr. Katherine F. Turnbull of the Texas Transportation Institute assisted as co-Principal Investigator during initial Project B-12 phases, leading up to the Phase I Interim Report and the Phase II Draft Interim Handbook. With the addition of Project B-12B research, John E. (Jay) Evans, IV, then of Jay Evans Consulting LLC, was appointed co-Principal Investigator. Lead Handbook chapter authors and co-authors, in addition to Mr. Pratt, are Mr. Evans (initially with Parsons Brinckerhoff and now with Cambridge Systematics); Dr. Turnbull; J. Richard Kuzmyak, initially of Cambridge Systematics and now of J. Richard Kuzmyak, L.L.C.; Frank Spielberg of VHB; Brian E. McCollom of McCollom Management Consulting, Inc.; Herbert S. Levinson, Transportation Consultant; Erin Vaca of Cambridge Systematics, Inc.; and Dr. G. Bruce Douglas of PB. Contributing authors include Dr. Kiran U. Bhatt, K.T. Analytics, Inc.; Shawn M. Turner, Texas Transportation Institute; Dr. Rachel Weinberger, Cambridge Systematics (now with the University of Pennsylvania); Andrew Stryker, PB; Dr. C. Y. Jeng, Gallop Corporation; and Daniel Nabor, VHB.

Other research agency team members contributing to the preparatory research, synthesis of information, and development of this Handbook have been Stephen Farnsworth, Laura Higgins, and Rachel Donovan of the Texas Transportation Institute; Nick Vlahos, Vicki Ruiter, and Karen Higgins of Cambridge Systematics, Inc.; Greg Benz, Bill Davidson, G.B. Arrington, and Lydia Wong of PB, along with the late travel demand modeler/planner extraordinaire Gordon W. Schultz; Kris Jagarapu of VHB; Sarah Dowling of Jay Evans Consulting LLC; and Laura C. (Peggy) Pratt of Richard H. Pratt, Consultant, Inc. Dr. C. Y. Jeng of Gallop Corporation has provided pre-publication numerical quality control review throughout. By special arrangement, Dr. Daniel B. Rathbone of The Urban Transportation Monitor searched past issues. Assistance in word processing, graphics, and other essential support has been provided by Bonnie Duke and Pam Rowe of the Texas Transportation Institute; Karen Applegate, Laura Reseigh, Stephen Bozik, and Jeff Waclawski of PB; others too numerous to name but fully appreciated; and lastly the warmly remembered late Susan Spielberg of SG Associates (now part of VHB).

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Continued recognition is due to the participants in the development of the First and Second Editions, key elements of which are retained. Co-authors to Mr. Pratt were Neil J. Pedersen and Joseph J. Mather for the First Edition, and John N. Copple for the Second Edition. Crucial support and guidance for both editions was provided by the Federal Highway Administration’s Technical Representative (COTR), Louise E. Skinner.

In the TCRP Report 95 edition, J. Richard Kuzmyak is the lead author for this volume: Chapter 19, “Employer and Institutional TDM Strategies.” Contributing authors for Chapter 19 are John (Jay) Evans, IV, and Richard H. Pratt.

Participation by the profession at large has been absolutely essential to the development of the Handbook and this chapter, which has received the special attention of TRB Transportation Demand Management Committee ABE50 past chairs/chair and selected members. Past Chairs Eric Schreffler and Philip L. Winters, and Chair Lori Diggins—aided by committee members Tom Rye, Peter Valk, and members of the MassRIDES Outreach team, including Kay Carson, Jennifer Doyle, and Donna Smallwood—reviewed an early version, providing extensive comments, guidance, and information leads. Sara Hendricks, Ed Hillsman, and Judy Clark stepped in to provide additional reviews of the formal review draft. The contribution of each and all is truly valued.

Finally, sincere thanks are due to the many other practitioners and researchers who were contacted for information and unstintingly supplied both that and all manner of statistics, data compilations, and reports. Though not feasible to list here, many appear in the “References” section entries of this and other chapters.
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OVERVIEW AND SUMMARY

Transportation Demand Management (TDM) refers to a body of actions that seek “to manage the demand for travel by drive-alone private car, rather than catering for that demand, or managing the road system . . .” (Ison and Rye, 2008). Managing the road system comes under the category of Transportation Systems Management (TSM). TDM is in the family of actions referred to as demand-side strategies (Association for Commuter Transportation et al., 2004).

TDM program goals include achieving traffic and vehicle miles of travel (VMT) reduction and all of the associated transportation, environmental, conservation, and sustainability benefits, generally without large infrastructure investments. Actions may be directed at increasing vehicle occupancy, shifting travel mode or time of travel, or reducing the need for travel. Programs can include supportive actions, special transportation services, financial incentives, or alternative work arrangements. TDM programs can also involve parking management and regular transit service enhancements; however, these topics are for the most part discussed in other chapters within this TCRP Report 95 “Traveler Response to Transportation System Changes” Handbook (see below).

TDM can involve many stakeholders, including landowners, developers, employers and institutions, employees, business associations, and local, regional, and state levels of government. This chapter provides a synthesis on the potential for employer- or institution-based TDM strategies, in particular, to influence travel behavior.

This “Overview and Summary” section presents:

- “Objectives of TDM Strategies,” highlighting the various goals and purposes of employer and institutional TDM strategies.

- “Types of TDM Strategies,” categorizing and describing the predominant employer and institutional TDM program elements for purposes of chapter organization.

- “Analytical Considerations,” covering methods used in quantifying response to employer and institutional TDM strategies, limitations of available research, and cautions that thus apply to its use.

- “Traveler Response Summary,” providing an encapsulation of the key travel demand findings related to employer and institutional TDM strategies. It is recommended that all lead-in “Overview and Summary” subsections be read as background for both the “Traveler Response Summary” and the chapter as a whole.
Following the “Overview and Summary” are sections on:

- “Response by Type of TDM Strategy,” reviewing travel demand findings related to a variety of individual TDM program elements.
- “Underlying Traveler Response Factors,” providing perspective on the behavioral mechanisms at work in achieving results with employer- and institutional-based TDM.
- “Related Information and Impacts,” addressing non-travel-specific implications of TDM strategy implementation such as air quality impacts.
- “Case Studies,” presenting five examples of employer and institutional TDM strategy applications with varying degrees of public involvement.

Because this chapter is focused on employer and institutional TDM strategies, it does not directly address public-agency-based TDM programs, most especially programs with which an employer or institution would have little direct involvement. Travel demand effects of most of such program types are covered in other chapters of this “Traveler Response” Handbook, as follows:

- High occupancy vehicle (HOV) lanes and other provisions for expediting movement of HOVs (strategies typically classed as TDM and/or TSM) are covered in Chapter 2, “HOV Facilities.”
- Road value pricing, including central area congestion pricing, is the subject of Chapter 14, “Road Value Pricing,” with a High Occupancy Toll (HOT) lane update within Chapter 2 under “Traveler Response by Type of HOV Application”—“Response to HOV Facility Exempt Vehicle and Value Pricing Programs.”
- Operational-level transit service enhancements are addressed in Chapter 9, “Transit Scheduling and Frequency”; Chapter 10, “Bus Routing and Coverage”; and—to the extent express bus can be considered an operational-level strategy—in Chapter 4, “Busways, BRT and Express Bus.”
- “Vanpools and Buspools” is the sole subject of Chapter 5.
- Transit promotion and pricing, including travel pass partnership programs, are topics of Chapter 11, “Transit Information and Promotion,” and Chapter 12, “Transit Pricing and Fares.”
- Parking strategies, especially important to TDM, are covered in two chapters—Chapter 13, “Parking Pricing and Fees,” and Chapter 18, “Parking Management and Supply.”
- Land use and non-motorized travel considerations are addressed in Chapter 15, “Land Use and Site Design”; Chapter 16, “Pedestrian and Bicycle Facilities”; and Chapter 17, “Transit Oriented Development.”

Beyond what is contained within the chapters of TCRP Report 95, resources that cover the broader scope of TDM are identified in the “Additional Resources” section. Also, the regional effect of employer and institutional TDM strategies is felt to be of sufficient importance that a “Site- Versus System-Level Impacts” discussion is included in this chapter’s “Related Information and Impacts” section, supported by a case study on overall TDM program effects.

Within the realm of employer and institutional TDM strategies, Chapter 19 is unique in the extent to which individual components—individual TDM measures—are covered in other chapters, specif-
ically the chapters identified above. In general, where individual TDM measures are the subject of other chapters or chapter subsections, the material assigned to this “Employer and Institutional TDM Strategies” chapter is only that which pertains to how a measure relates to overall TDM programs and works in conjunction with other measures within TDM program packages. However, for most TDM measures, the more recent twenty-first century findings are presented only here in Chapter 19, which serves as a limited update for TDM-related Handbook chapters published earlier.

**Objectives of TDM Strategies**

TDM strategies are used as an important component in the mix of improvements and policies needed to address congestion and provide more options than driving alone. They include incentives and disincentives which are designed to encourage automobile drivers to travel in less congested times or to find an alternative mode which does not lead to the same peak-hour congestion. Among the objectives of TDM actions are: congestion mitigation, improved air quality, reduced energy consumption, reduced carbon emissions, land development support, and employee benefits.

Actions to mitigate congestion may include as objectives increasing vehicle occupancy and reducing vehicle miles of travel. Such actions tend to have benefits in reducing emissions and energy usage. Actions oriented to spreading peak-period travel may target overcrowding of both transit and highway facilities.

Some TDM strategies are used with the objective of supporting more development or density than might otherwise be possible because of either regulations or physical constraints. TDM actions can improve the access to or utilization of particular sites. Parking needs or requirements may also be reduced, potentially freeing up space for additional development.

Finally, some TDM actions may have as their objective to ease travel burdens for employees or customers, or to address employer worksite issues, such as benefits, recruitment, retention, productivity, or absenteeism.

**Types of TDM Strategies**

TDM can stand for transportation demand management or travel demand management. The terms are interchangeable. It is a process that can encompass a variety of measures intended to influence travel choices. TDM is used to manage heavy traffic demand and parking requirements, and to enhance the effectiveness of transit services. Employer and institutional TDM actions within the scope of this chapter can be classified into four major categories: employer or institutional support actions, provision of transportation “services,” financial incentives or disincentives, and alternative work arrangements. Each is described in more detail in the subsections that follow.

**Employer or Institutional Support Actions**

This broad category of actions includes measures taken by employers or institutions to support the use of alternatives to single occupancy vehicles during peak hours by employees and others. These measures, which serve to raise awareness, provide information, remove impediments, and encourage use of travel alternatives, generally do not involve any financial inducement or physical service offerings. Examples include: transportation coordinators; on-site transit information and/or pass sales; rideshare matching services; preferential parking for carpools or vanpools; provision of bike lockers, showers, and/or changing facilities; and guaranteed ride home.
Many TDM employers also offer flexible work hours, in order to allow employees to accommodate transit or ridesharing scheduling constraints. While this is an important support action, it is discussed in more detail later in conjunction with alternative work arrangements. Employers in a large employment center may also belong to a transportation management association (TMA), which avails them and their employees of a wider array of travel opportunities and incentives. Support actions include:

**Transportation Coordinators.** Transportation coordinators are professionals located at a transportation management association or at an employment site who provide personalized trip planning and assistance to commuters. The presence of an on-site coordinator can make it easier to obtain information about alternatives to single occupancy vehicle commutes.

**Transportation Management Association (TMA).** TMAs are an association of public and private entities concerned with traffic congestion and transportation issues in a specific geographic area. TMAs allow businesses to pool their resources in executing commuter support strategies. The TMA may also act in an advocacy role with local government on behalf of its membership.

**On-Site Transit Information and Pass Sales.** Providing transit information on-site can lower the barriers that may prevent people from trying transit. Convenient purchase of transit passes may also facilitate trying out transit use. In addition, on-site sales may support introduction of site-specific transit pass discounts.

**Rideshare Matching Services.** Rideshare matching services put compatible commuters in touch with one another to enable carpooling. Employers can facilitate formation of ridesharing arrangements by employees in a number of ways, ranging from simple in-house employee match listings to computerized matching programs. These services may be unique to the given employer or can pool matching candidates from a larger area ranging from multiple employers in a building or complex to large regional matching systems.

**Guaranteed Ride Home.** Guaranteed ride home programs provide backup transportation to employees who rideshare or use transit if they need to return home suddenly for an emergency, or if they must work late and therefore cannot connect with the mode they used to travel to the site on that day. Generally, these programs provide vouchers for the person to travel home by taxi, although some employers permit use of company vehicles as well. Guaranteed ride home may be provided by the individual employer or through a broader local or regional program. While a guaranteed ride home may be seldom used, it is felt to be important in reducing reliance on a personal vehicle at the workplace and thus lessening the need to drive alone.

**Preferential Parking.** Employers may set aside reserved parking spaces as an incentive to carpool or vanpool. This is a non-monetary benefit that can be an important incentive if parking is tight, or if the parking lot is large and the reserved spaces are near the building entrance. Reserved spaces may also be sheltered versus outdoors, lessening the impact of severe weather.

**Bicycle Storage, Lockers, and Changing Facilities.** Changing facilities and showers and secure bicycle parking are key features for an employer or institution interested in encouraging bicycle use. Such facilities may be combined with an exercise facility and may encourage healthy habits. Some employers provide a transportation allowance that may be used by bicycle commuters. Chapter 16, “Pedestrian and Bicycle Facilities,” discusses these in more detail, but this chapter discusses employer and institutional support for bicycles in the context of TDM programs.
**Provision of Transportation Services**

A small number of employers choose to become directly involved in providing attractive transportation alternatives to their employees. They do this either by contracting for special services, operating their own services, or taking a lead role in the purchasing, leasing, or maintenance of transportation vehicles. Most often this occurs because the work site is poorly located in relation to public transit access. On other occasions, the employer feels a need or desire to become active in employee transportation, or has a preference for a particular type of mode or service.

**Shuttle Bus Services.** Some employers choose to operate shuttle bus services to provide easy connections with nearby rapid transit services or other important facilities. Shuttle services may be an individual employer effort or a collective effort of a few sites. In some instances, shuttles are also used for local circulation during the midday, lessening the need to bring a personal vehicle to the job site.

**Contract Transit Service.** In some cases, employers will contract with a private bus operator or with a public transit agency to either operate special transit routes or to supplement service to their particular site. Urban hospitals or medical centers with limited parking for staff and visitors frequently make arrangements for additional bus service, often through financial assurances that a given level of ridership will occur.

**Vanpool Formation Assistance/Cost Sharing.** Since a vanpool carries between 7 and 12 passengers, large employers may find that vanpools provide an effective commute alternative for their employees, particularly when a large percentage live a substantial distance from the site and when transit service to the site is limited. Employers can support vanpooling through a variety of ways, from purchase or leasing of vehicles, to underwriting insurance or maintenance costs, or even providing and maintaining the vehicles themselves. Fare subsidies are a particular type of vanpool assistance measure, and these are discussed under “Financial Incentives or Disincentives” below. While this chapter discusses the role of vanpools in travel demand management programs, Chapter 5, “Vanpools and Buspools,” provides detailed information on vanpools as a travel alternative.

**Use of Company Vehicles.** Employers who maintain fleet vehicles (which may include employee vanpools) will sometimes offer those vehicles for midday business travel, and sometimes for personal errands or emergencies. Some employers allow use of company vehicles for commuting by a registered carpool. (The phrase “company vehicles” is often used within this chapter as shorthand for these types of activities.)

**Bicycle Loan Programs.** While bicycling may or may not be suitable in current workplace locations as an alternative mode for commuting, making bicycles available for employees on site can help reduce the need to use a car for certain midday trips. Particularly on large suburban campuses, easy access to a bicycle can aid in trips to other functions on the site or nearby commercial/retail opportunities. Bicycles can also facilitate access to transit from the employment site.

**Financial Incentives or Disincentives**

Financial incentives or disincentives are actions of tangible monetary value which either encourage employees/commuters to make use of a particular alternative, or discourage them from some other course of action. These actions may have an obvious monetary value, such as a subsidy or parking fee. Alternatively, they may be of such a nature that a monetary value can be imputed, an example being the earning of points toward a tangible reward. There are many variations on how “money” can be used to influence behavior.
Transit Subsidies. Employers can reduce the cost of taking transit by offering prepaid or discounted transit passes to employees who agree to commute by transit. This benefit can vary from a modest share of the actual cost to full absorption of the cost, and instances have been observed where employees have been subsidized more than the actual fare being charged. Federal tax law allows employees to receive a transit subsidy of up to $230 per month without incurring tax liability for that benefit, while some states offer the employer a tax credit for paying such subsidies. Governments or transit agencies can supplement these subsidies through their own special programs that reward large customers or employers who provide substantial subsidies.

Vanpool Subsidies. Employers may subsidize the cost of vanpooling in a variety of ways. Federal tax law now extends the tax-free subsidy provision to vanpool as well as transit user fees. Employers can also offer start-up (empty seat) subsidies to support a vanpool during its formative stage (keeping the cost down for initial riders), short-term promotional fare subsidies, or driver subsidies. Vanpools can also be subsidized through a variety of indirect methods, the monetary value of which can be quantified. Employers can help procure or arrange financing for the vehicle, they can provide fuel or maintenance, and they can pay for or underwrite insurance.

In-Kind Incentives. Instead of cash, direct support for alternative transportation may be provided in other ways. Free or discounted products or services may be provided in lieu of cash. Relating the in-kind incentives to the transportation mode can provide synergism. For example, carpoolers and vanpoolers might receive gasoline or oil changes, transit riders might receive transit passes, walkers might receive shoes, and bicyclists might receive bike accessories or mechanical services.

Parking Supply and Pricing. Perhaps the biggest lever available to employers and institutions interested in reducing single occupancy vehicle use for access to their facility is the imposition of parking supply constraints or parking pricing. Because parking is itself such a powerful determinant of travel behavior, it has been given separate coverage in Chapter 13, “Parking Pricing and Fees,” and Chapter 18, “Parking Management and Supply.” An effort has been made not to duplicate that coverage in this chapter. The reader should be aware that many employer and institutional TDM programs include a parking component.

Alternative Work Arrangements

Flexible Work Hours. Flexible work hours are programs allowing employees a degree of freedom in choosing their starting and quitting times. Employees must be at work during core periods (typically 9:30 to 11:30 AM and 1:30 to 3:30 PM) and must observe earliest allowed starting time and latest allowed quitting time limitations. Employers may restrict how much daily flexibility workers have in scheduling their work day.

Staggered Work Hours. Staggered work hours are a fixed scheduling of work that normally spreads the employee starting and quitting times over a 1- to 3-hour period, with individual groups of employees designated to report and leave at 15 to 30 minute intervals. Staggered work hours are generally employed in large facilities, especially manufacturing, where work schedules are otherwise regular.
**Compressed Work Week.** CWW allows employees to work a greater-than-standard number of hours each day so as to reduce the total number of days worked, and hence, the number of times it is necessary to commute to the work site. A popular arrangement is the 9/80 schedule in which employees work 9 hours per day versus the standard 8 hours, and then get the 10th day off. Generally, employees arrange with the employer which day of the week will be their day off, typically choosing a Monday or Friday in order to extend their weekend.

**Telecommuting.** Telecommuting (or “Telework”) is an arrangement whereby an employee is permitted to work at a remote location one or more days a week rather than commute to the work site. The availability of telecommunications technology which allows the worker to remain in “virtual” contact with the work site via a networked home or other remote computer is the basis for the naming of this strategy. However, not all employees who telecommute are necessarily working on a computer, and hence the real characteristic of the strategy is that the employee is allowed to work offsite. The offsite location is generally the home or sometimes at a remote “telework center” which has the necessary equipment. As with CWW or staggered work hours, employees who telecommute generally do so on a fixed schedule that they negotiate with their employer.

**Analytical Considerations**

Attempting to quantify the impact of TDM strategies on traveler behavior brings several critical analytical considerations to light.

- It is almost never the case that a given TDM strategy is implemented (or evaluated) in isolation, as a unique action. Rather, strategies are normally implemented in combinations, or “packages,” such that ascertaining the effectiveness of an individual action is statistically very challenging.

- Added to the statistical challenge is the fact that the available data for conducting these analyses are seriously limited. If travel data have been collected, they are almost always for a post-implementation period and do not offer a comparative “before” measure. The data collection methods themselves are also often suspect, as is the aggregate format (total mode split or “average vehicle ridership”) in which they are typically presented.

- Accounting for setting and context is very important. The effects of some strategies may be much more significant in an environment where there is good transit service, where parking is limited and priced, or where other activities are reachable from the work site without a personal vehicle.

- Finally, the details on program strategies themselves are often incomplete or inconsistent. It is often the case that neither the magnitude of incentives/services nor the time a strategy has been in place is reported. Moreover, it is usually not recorded whether individual strategies were poorly implemented or well run.

As is evident from the list in the preceding subsection, there are a large number of TDM strategies. Given the many ways in which they can be bundled and applied, attempting to present estimates of travel impact for individual strategies is simply not always possible with the data and analyses from existing research studies and databases.

Many TDM studies are both topical and qualitative, focusing on a particular type of programmatic strategy or approach, but offering little numerical information as to impacts. These studies tend to
be focused more on reporting “who” has used a particular strategy or approach, “how” they imple-
mented it, and the circumstances underlying “why” that approach was taken. In many cases, the
impetus is a legal or regulatory requirement, and the issue is in assessing the reasonableness or
overall effectiveness of the requirement.

It might be expected that significant TDM impact information would be available from the vari-
ous state- or regionally-enacted employer trip reduction programs introduced in the late 1980s/
early 1990s, largely in response to concerns about worsening air quality in major metropolitan areas.
California was the vanguard in these efforts, with passage of Regulation XV in 1987. This action
legally required employers in the Los Angeles region with 100 or more employees to introduce mea-
ures to discourage driving and to reduce employee vehicle trips by 15 percent. This state initiative
presaged a similar national initiative written into the 1990 Clean Air Act Amendments, requiring
metropolitan areas in “severe” non-attainment of National Ambient Air Quality Standards (NAAQS)
for ozone to implement similarly-structured Employee Commute Options (ECO) programs.

The California program, and many of those patterned after it (e.g., Washington State’s Commute
Trip Reduction Law and Portland, Oregon’s Regional Transportation Options program) formal-
ized employer participation by requiring travel surveys of employees and the development of a
plan detailing the trip reduction goal, the current gap, and the specific set of TDM strategies that
would be used to reach the goal. These travel data and employer TDM plans were computerized
and stored in massive databases to be used for subsequent tracking of performance and evaluation
of effectiveness. Employers would be evaluated on a biennial basis, necessitating a new employer
survey and a revised plan with additional strategies as necessary to achieve their respective trip
reduction target.

While these data archives would appear to offer great opportunity to obtain measurements of
exactly the type of strategy-impact relationships which are the subject of this chapter, a number of
factors cause these data to be of limited use:

- The travel survey data collected by employers were reduced to aggregate measures before data
release. Five-day-week average mode shares for the employer were computed. Also computed
was the Average Vehicle Ridership (AVR), an amalgam of employee commute trips by all
modes and means into an effective commutes-per-vehicle rate (covered employees reporting
to work divided by the vehicle round trips thus produced, per average day, over a 5-day week).
To the extent that some employees telecommuted or participated in a CWW schedule, that too
was embedded into the AVR for an average day.¹

- The processed data lack any record of the characteristics of individual trips, and there is no
tracking of individuals between surveys. The analyst must try to explain changes in the aggre-
gate travel measures—between consecutive plans—with nothing more than information about
the composition of the TDM program. The processed data provide no clue as to individual

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¹ The inverse of the AVR is average vehicle trips per employee, one of two common vehicle trip rate expres-
sions found in the TDM literature, though not always implying a rigorous 5-day average. The other common
vehicle trip rate expression is average vehicle trips per 100 employees. Both are used within this chapter. The
former is always less than one, e.g., 0.85, while the latter is nearly always a two-digit number, e.g., 85. Both
are expressed in terms of complete round trips, in contrast to the usual transportation demand analysis prac-
tice of counting individual one-way trips or trip ends. Either trip rate expression (and also AVR) may be used
to compute vehicle trip reduction (VTR), a dimensionless rate, so long as consistency is maintained.
worker socio-demographics, trip origins/destinations, trip length, quality of travel alternatives, or changes over time in travel alternatives available.

- There is considerable uncertainty in determining exactly what strategies (or incentives) were being applied in a given employer program, based on the information supplied in the required Trip Reduction Plans. Details were often found to be missing in terms of specific strategies, when they were invoked, to whom they were available, or what monetary value they represented. For example, it might be recorded that a transit subsidy was provided, but with no information on the dollar value of that subsidy.

- The reliability of the data, as entered into the massive databases involved, has often been found wanting. In some areas, such as in Washington State and Portland, Oregon, the massive amounts of information collected tended to overwhelm budgeted data processing capabilities, resulting in large amounts of these data waiting to be processed or purged of questionable data records.

Numerous entities have attempted to take on the challenge of analyzing these data, but with limited success (Giuliano, 1992; Comsis, 1993b; CUTR, 2004). Simply put, the precision of the data was found to be too coarse to permit use of the necessary multivariate statistical tools. Two exceptions are noted here, largely because of an important departure from the standard analytic approach:

- The first is a study sponsored by the California Air Resources Board (CARB) which, recognizing the limitations of the Regulation XV database, commissioned an original survey of 45 employers in Los Angeles and Sacramento. This enabled the researchers to control the quality of the response data on employee travel and specific strategies in operation, and to analyze travel response at an individual traveler level, rather than an aggregate outcome for the employer. Unfortunately, the research did not have access to pre-program baseline data for the surveyed employees, which seriously limited its ability to analyze behavioral changes in response to the given employer program (Comsis, 1993a). Nevertheless, the findings from this study are somewhat unique and are reported later in the “Related Information and Impacts” section.

- The second is a more recent effort by the University of South Florida’s Center for Urban Transportation Research (CUTR), done under its National Center for Transit Research, which has attempted to develop a Worksite Trip Reduction Model using data from the California (Regulation XV), Washington State Commute Trip Reduction (CTR), and Tucson, Arizona, employer databases. While CUTR experienced the same types of data problems as identified by Comsis in its 1993 study for CARB, it opted to use a different statistical approach, one incorporating “neural networks,” to extract relationships (CUTR, 2004). This research is also summarized in the “Related Information and Impacts” section. (The model itself has subsequently been updated, as covered in Footnotes 14 and 20 of the “Related Information and Impacts” and “Additional Resources” sections, respectively.)

The primary focus of this chapter on quantifying the link between TDM strategies and travel behavior ultimately led to a small number of studies that specifically focused on that aspect of TDM programs without attempting to rely exclusively on the large databases critiqued above. The three studies most extensively utilized are as follows:

While somewhat dated, these studies nevertheless provide the most comprehensive set of employer and institutional TDM project examples available in which a travel change has been calculated. The calculation is based either on before and after data, or on comparison with an objective control site or measure against which to gauge a travel behavior difference.

The primary travel change measure utilized is the vehicle trip reduction for the site. Vehicle trip reduction (VTR), a term commonly used in both analytical studies of TDM and travel mitigation legislation, is the percentage of vehicles removed (actual, presumed, or estimated) from a site’s commute traffic load. More specifically, it is the incremental reduction achieved in the vehicle trip rate, expressed as a percentage of the starting-point trip rate. Planned and apparently successful trip reductions are reported as positive VTRs. A negative VTR indicates that the travel change appears to have been an increase in the vehicle trip rate. A VTR may be associated with TDM, land-use and site-design modifications, or related actions, although TDM per se is the subject of this chapter.

VTR may be computed from mode shift data if one knows the before-and-after carpool occupancy rates and the amount of trip suppression attained from CWW and telecommuting strategies.

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2 TCRP Project B-4, “Cost-Effectiveness of TDM Strategies,” is an important TDM research project whose detailed findings were never formally published. This project was centered on a national survey of 50 employers (49 officially accepted) covering the details of their TDM programs. The sample was designed to include employers of all sizes, basic industry groups including institutions, locations within or outside urban areas, presence or lack of a regulatory requirement, and various types of strategies within programs. Extensive analyses were done with the survey data, including the effect of both program strategies and environment on vehicle trip reduction, reasons for engaging in TDM, sources of information for program design, changes made over time and compelling circumstances for the change, and costs and benefits. The initial analysis was documented in the identified “working memo” and technical appendices, but the review panel opted to frame the final report in a less technical, more executive format. The authors of Chapter 19 have had access to this unpublished technical information, and the TCRP Report 95 team received support for using these Project B-4 data and findings in developing this third edition Handbook.

3 Slightly different methods were used by the three studies to establish a baseline against which to gauge the given program’s presumed vehicle trip reduction (VTR). The Rutherford et al. (1994) case studies compared the given project with area-wide mode split averages. TCRP Project B-4 selected as its datum the area modal split from the 1990 Census Transportation Planning Package (CTPP). The earliest study—Comsis and ITE (1993)—used a variety of comparative methods depending on data availability. These included before-and-after survey information, comparison against a local peer site of similar character but without a formal TDM program, or transportation mode split taken from regional model estimates for the subarea. Occasionally one of these methods gives an individual trip reduction value that is open to question (key instances are highlighted in chapter footnotes). Overall, however, the approaches used are a reasonable response to difficult data constraints. For simplicity, travel differences relative to the baseline are referred to in this chapter as vehicle trip reduction (VTR) although in fact most are inferred by comparison against the selected baseline.
Successful vehicle trip reduction does not necessarily infer less traffic than before. VTR is a dimensionless rate, referring to the reduction in vehicle trips from what they would have been without the TDM or other travel mitigation strategy.

There are a combined 80 different project examples provided by the three primary studies listed above. A fourth study (Comsis et al., 1996) provided two of the examples. These examples cover a wide range of situations in terms of employer type and size, setting, and composition of TDM program. Using this collection of cases as an analysis platform, the approach taken in this chapter is along the lines of a descriptive analysis. Namely, for this reasonably large and diverse sample of employer and institutional TDM projects—for which there is fairly reliable and complete data—an analysis has been structured that partitions the examples into cases that do versus cases that do not have a particular TDM element or other characteristic. The evaluation then attempts to infer the relative importance of particular categories of TDM strategies (e.g., support versus incentives), and even to some degree of particular strategies (e.g., a transit subsidy versus an HOV parking discount), through pair-wise comparisons from the sample. Unweighted project averages within categories are used in these comparisons.

This approach is used to examine each of the four basic TDM strategy groupings: employer support, transportation services, financial incentives, and alternative work arrangements. This 82-program sample becomes the basis or starting point for the analysis in each of the program areas. To the extent that there is sufficient clarity about an individual TDM strategy—either from the 82 examples or, more often, a supplemental study out of the literature that focuses on that strategy—additional detail about the nature and impact of that strategy is provided.

There are four major caveats in the primary approach of this analysis, which uses the sample of 82 programs as a basis. First and foremost, in no way should these 82 examples be construed as a random sample of TDM programs. While there are a number of examples that are fairly average in their impact, many of the examples were originally selected because they were distinct in some way—often because they were regarded as success stories. Hence, the performance of this group of programs should not be looked upon as being “typical.” As a group, they are probably considerably above average in effectiveness relative to what one would expect to find in a large random sample of programs.

Second, even though there can be reasonable confidence about the quality of the data for this sample, the “pairwise” approach used in evaluation is a very simplistic means for trying to quantify the impact of individual strategies. The only way that one can begin to discern the relative impact of any given strategy is through a multivariate statistical approach, such as regression. Unfortunately, the data in this sample are too coarse and too aggregate to enable such a statistical approach, so one is resigned to trying to learn as much as possible from the data available, acknowledging the many shortcomings. Later in the report, in the “Related Information and Impacts” section, the results of two research studies that have attempted to apply more advanced statistical methods to this task are presented, though both were ultimately limited by the same data issues outlined here.

Third, except where before and after data is available and exogenous influences are known, causality is only inferred—not demonstrated. It is presumed that observed travel differences are largely caused by the TDM measures in place, but there is no analytical proof. In discussion, the terms “implied” or “inferred” are occasionally inserted as a reminder that the effect is presumed, not proven. Indeed, a majority of the VTR outcomes presented are not direct observations but rather estimates/inferences based on comparison with control sites or areas.
Fourth, there is a particular limitation specific to those alternative work arrangements actions designed to reduce the absolute number of commute trips involved. The two actions affected are telecommuting and CWW. The nature of the travel data collection affecting all 82-program samples was such that numbers of trips eliminated outright by telecommuting one or more days a week or by reducing the number of workdays by compressing work weeks cannot be ascertained. Thus outcome analysis based on the 82-program sample can only address effects of associated mode shifts, exclusive of trip elimination effects. Other available evidence must be drawn upon to obtain a full picture of telecommuting and CWW effectiveness.

Finally, a reminder as to the role of Chapter 1, “Introduction,” is in order. Chapter 1 not only outlines development of the Handbook, it also provides important technical guidance in its “Use of the Handbook” section. One example of the helpful material included is the tabulation, in Appendix B, of U.S. Consumer Price Index factors for conversions to constant dollars. These may be applied to give up-to-date context to price and cost data in cited studies from various time periods.

**Traveler Response Summary**

Examples of effective TDM programs—defined as having a measurable trip reduction—may be found in all types of environments. Nevertheless, those employers or institutions located near good transit service have been found to have better-performing programs than those not close to good public transit. In the mostly exemplary 82-program sample of employers, the sites with high transit availability had an average program-level vehicle trip reduction (VTR) of 26 percent, compared with 12 percent where transit availability was low.

**Employer Support Actions**

Employer support actions are by far the most commonly-applied TDM strategies, providing a necessary—but not alone sufficient—ingredient for TDM program success. They cover providing better information on travel alternatives to employees, offering assistance in seeking out and using those alternatives, and marketing and promotional activity to persuade experimentation and use. Common measures in this group include commuter information services, employee transportation coordinators, rideshare matching, transportation fairs, on-site transit pass sales, and guaranteed ride home. One of their important benefits is an increase of employee awareness about TDM-related alternatives to driving. Employee awareness of individual incentive and assistance programs in support of alternatives has been found to range from 77 percent down to 15 percent aware.

The average empirically based estimate of site-specific vehicle trip reduction impacts for full-scale employer support programs alone is on the order of 4 to 5 percent VTR. Such estimates tend to be drawn from programs that are exemplary more often than not. Employer support programs actually have the most consistently significant impact where transit accessibility is low, making non-transit alternatives critical. Support programs are most appropriate and productive when implemented in conjunction with tangible actions such as provision of transportation services, management of parking supply and price, financial incentives, or combinations thereof. What is also clear is that simply adding “more” employee support measures to an existing solid but basic support-only program will have limited additional trip reduction benefit, but will generally raise the cost of the employer’s program effort.

**Guaranteed Ride Home**

Guaranteed Ride Home (GRH) is a unique form of employer support action. It is effectively a standby transportation service—insurance that an employee who chooses an alternative to driving
alone to work has a low- or no-cost recourse when faced with an unanticipated need to get home at a time when his/her alternative mode is unavailable or inadequate. GRH effectiveness remains somewhat of an enigma, in that empirical quantitative data on its travel impacts are scarce and not sufficiently informative. The handful of empirically-based and modeled estimates of GRH impact ranges from nil to upwards of 5 percent VTR. (The employer support actions average impact estimate provided immediately above is inclusive of GRH effects.) In any case, a good logical argument can be constructed for the role of GRH as an effective TDM catalyst, and with appropriate limits, it is relatively inexpensive to provide.

**Employer Transportation Services**

Employer transportation services include employer assistance with vanpool creation and program management, transit assistance either in the form of running separate shuttles or contracting with the transit operator to intensify service, or allowing use of company vehicles for ridesharing or midday business trips. In the 82-program sample of employers, those TDM programs which provided transportation services were considerably more effective as a group in reducing vehicle trips (22 percent program VTR) than those that did not (14 percent), an 8 percentage point advantage.4

The benefit of transportation services is enhanced in the presence of modal subsidies (monetary incentives linked to use of the preferred alternative modes) and is damped without modal subsidies. The synergy between transportation services and modal subsidies is both obvious and strong. Programs in the 82-program sample with services but without modal subsidies averaged slightly over 9 percent VTR, while programs with both achieved just under 27 percent VTR, almost three times as much. In a well-studied exceptional case with time-series data available—a Tennessee Valley Authority program of the 1970s—the VTR for a multimodal transportation services program (aided by a gasoline shortage) was 25 percent, increasing to 51 percent with the addition of modal subsidies, a doubling of effectiveness.

**Incentives and Disincentives**

Among inducements to use alternative modes, incentives and disincentives encompass a variety of TDM strategies that constitute “incentives.” These may in turn be separated categorically into non-monetary incentives and monetary incentives. Non-monetary incentives include such strategies as preferential parking, awards, or other special treatment, while monetary incentives are those that have a tangible dollar value to the employee. Even this distinction still blurs somewhat in strategies where the financial benefit to the employee is somewhat diffuse, such as prizes and raffles or time off with pay. The most tangible financial incentives are either modal subsidies or travel allowances, where the association between the incentive and the behavior is visible and direct. Of course, the incentive must logically be relevant to the travel alternatives available at the site. Many employers offer their employees a transit subsidy simply because of its tax-exempt advantage, although in many cases transit is not a viable commute alternative.

In the 82-program sample, those employers who featured transit subsidies in their TDM programs had an average VTR of 21 percent, versus 14 percent for those who did not. Carpool subsidies, per se,

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4 All VTR findings reported from the 82-program sample examination include the effects of not only the TDM strategy being discussed (with or without employer transportation services in this case), but also all other TDM actions that may have been in place within the particular programs in question (in this instance, the 34 programs with employer transportation services on the one hand and the 48 programs without services on the other).
were not found to be common, but employers who offered them as part of their programs averaged a 23 percent trip reduction versus 17 percent for those who did not. HOV parking discounts were a much more prevalent form of subsidizing carpooling, and those programs averaged 26 percent trip reduction versus 14 percent for those who did not. Travel allowances, which include parking cash-out, were still an early concept when the 82-program sample data were assembled in 1990–1993 and are not well represented in the data set. A 1997 review of eight California parking cash-out programs found an average decline in vehicle trips of 17 percent.

In the realm of “disincentives” to driving, the management of employer parking can play an important role. Through controlling parking availability, price, or both, parking management has a major effect on TDM program success in reducing vehicle travel. The impact is similar in magnitude to the supportive effect of good transit availability, and the two are most commonly found together. Those employer TDM programs in the 82-program sample that were accompanied by restricted parking had average VTRs of 25 percent. If the parking was also priced with parking fees, the average VTR increased to 28 percent, and if discounts were also offered to carpools or vanpools, the average VTR was 30 percent.

The combination of parking fees and employer transportation services produces a particularly strong synergistic effect, with the average of such combinations within the 82-program sample exhibiting an implied 37 percent VTR. The University of Washington U-PASS program combines parking pricing, transportation services, and modal subsidies, and has obtained a 31 percent VTR as measured with time-series data over a span of 16 years. Clearly, if it is more difficult or costly to drive, TDM alternatives become more attractive.

**Alternative Work Arrangements**

Alternative work arrangements constitute the final major category of TDM strategies. They include flexible work hours, staggered work hours, compressed work weeks (CWW), and telecommuting. An important finding has been that the only work hours strategy with a measurably positive effect on choice of alternative commute modes is flexible work hours. In many cases use of flexible work hours has been restricted to employees using alternative modes, which may help explain the synergy. In the 82-program sample, employer programs that included flexible work hours averaged a VTR of 20 percent compared to 13 percent for other programs, a difference that may or may not be wholly attributable to the work hours strategy.

CWW and telecommuting are the only TDM strategies intended to lead to outright elimination of commute trips by whatever travel mode. CWW programs achieve this with more hours per work day and correspondingly fewer work days per week or two-week period. A comprehensive 1980s experiment in Denver involving 9,000 federal employees found the longer work day flattened the peak, reducing the peak 1/2 hour from 56 to 42 percent of all arrivals; had no adverse effect on ridesharing or transit use; and reduced vehicle miles of travel (VMT) by a net 15 percent among participating employees. Employee participation in the program was 65 percent.

Telecommuting has yet to live up to its anticipated theoretical promise as a TDM measure. Surveys indicate that employees who telecommute from home avoid a physical commute about 1.8 days a week on average. A Washington State analysis of the special case of telework centers found 83 percent drive-alone mode shares for the daily telework center commute compared to 56 percent for these telecommuters on days they went to the main work site, detracting from telework center efficacy. A 1998 synthesis-type study of telecommuting overall estimated, starting with empirical observations, that a regional program would reduce employee VMT by 1 percent or less—and perhaps not at all—depending on residential relocation decision assumptions. Newer evidence does
not contradict the vehicle trip reduction basis for this estimate, though a slow, steady growth of telecommuting has been seen.

The trip timing decisions employees make when given the option of flexible work hours have been found in most cases to be as effective as mandatory staggered work hours in spreading out work arrival and departure times, although the 1980s Bishop Ranch and Pleasanton suburban programs in California stand as exceptions. A large-scale urban program could smooth traffic peaks enough, in the 1970s, to reduce maximum 15-minute passenger and vehicular loads by 15 to 35 percent at terminal facilities such as rapid transit stations and major parking lots. The effects dissipate, becoming diluted by 50 percent or more, on radial facilities serving the involved employment core. It is not known to what extent the gradual adoption of flexible work hours in recent years may have reduced the remaining potential for peak spreading by shifting the baseline starting point for concentrated alternative work arrangements programs.

**Site-Specific and System-Level Impacts**

Site-specific impacts are the focus of this chapter, but it is important to understand the relationship with area-wide, regional, and system-level impacts of employer TDM programs. As one moves from the site level toward the broader area-wide or regional transportation facility level, dissipation of site-specific impacts occurs. Effectiveness is leveled out among differing participating employers and institutions, averaging out big and small employers and high- and low-effectiveness programs. Participating employer commuting is mixed in with commuting to and from non-participating employers. Mixing also occurs with passenger and vehicular flows associated with non-work activities either at the site or at other nearby land uses. Further leveling-out of impacts occurs as locally generated trips become mixed on specific facilities with other intra-regional travel and even intercity travel in the case of major highways.

A limited number of estimates have been made of actual and potential regional and system-level impacts of employer and institutional TDM strategies. In the Minneapolis-St. Paul airport area, for example, it was estimated that TDM with limited mandatory involvement and strong parking management combined with mixed-use development would offer an 8 to 27 percent VTR at participating sites, a 6 percent average workplace VTR, and a 2 percent peak-traffic reduction on adjacent I-494. Another examination of potential regional impact calculated that only 13 percent of daily VMT would be affected by a mandatory TDM program, and went on to estimate that a 25 percent increase in average vehicle ridership (AVR) at involved employment sites would produce a 2 to 3 percent reduction in regional vehicle trips and a 3 to 4 percent decrease in regional VMT. An evaluation of actual 2003 Commute Trip Reduction (CTR) mandatory TDM program effects along an 8.6 mile centrally located section of I-5 in Seattle estimated that the average VTR at 189 involved employers was between 11 and 14 percent. Traffic simulation was then used to project that absent the TDM programs, peak-period I-5 ramp volumes would increase by about 4 percent, peak-period traffic congestion would be up from 23 to 44 percent, and corridor peak-period vehicular emissions would rise on the order of 11 percent.

**RESPONSE BY TYPE OF TDM STRATEGY**

This section examines the response of travelers to implementation of various employer and institutional transportation demand management (TDM) strategies. To the extent possible, what is known as to the effect of individual strategies on such key travel measures as vehicle trip generation/
trip reduction, vehicle miles of travel, mode split changes, vehicle occupancy, or time of day/frequency—where relevant—is reported. Historically, TDM response findings have been difficult to derive in this detail, since strategies are frequently implemented in often unique groupings or packages, are not monitored in a manner that facilitates travel impact research, and may be changed or offered to different groups of employees.

As noted earlier in the “Analytical Considerations” subsection, the approach that has been used by the Handbook authors to explore the relationships between particular types of TDM strategies and traveler behavior depends heavily on the detailed examination of a sample of 82 employer and institutional TDM programs (the 82-program sample). These project examples have been drawn primarily from three separate research studies, selected for comparable detail on program description and measurement of travel impact. A listing of these individual programs, along with the employer characteristics, TDM strategies encompassed, and computed travel impact, is provided as Appendix Table 19-A.

Travel impacts in this analysis are gauged by the inferred change in average vehicle trip rate. The vehicle trip rate is the number of vehicle trips made by the employees commuting to a given work site in relation to the total person trips to the site, expressed in Appendix Table 19-A in the form of average daily vehicle trips per employee. (See Footnote 1 in the “Analytical Considerations” discussion above for alternative vehicle trip rate units of measurement.)

By comparing the vehicle trip rate of the employer with the TDM program relative to the vehicle trip rate measured either before implementation or as some other control rate representing background conditions, one may interpret the change or difference in trip rate as a vehicle trip reduction (VTR) attributable to the TDM program. Control rates employed by the source studies include a similar employer in the adjacent area, the average performance for a sample of employers in similar physical settings, or the average vehicle trip rate for the local area derived from modal split information in the Census Transportation Planning Package (CTPP) for the nearest comparable time period.

Even though the sample of projects used for this assessment is viewed as the most robust data resource available in terms of program detail and impact measurement, the types of analyses and conclusions it allows are still quite limited. There are also important caveats to keep in mind when making use of findings drawn from it. These were enumerated at the conclusion of the “Analytical Considerations” subsection within the “Overview and Summary.”

The basic analysis consists of comparing VTR for a group of employers who have a particular TDM element with those who do not. For this comparison to be statistically valid at demonstrating the actual effect of the given element, it would be necessary to assume that everything else about the two groups being compared is the same, apart from this element. Clearly, this is a big assumption given the diversity of the examples highlighted in Appendix Table 19-A. In very large samples (as in epidemiological studies), the randomness with which these other characteristics occur can be assumed to produce fairly comparable samples, and hence determining whether the difference between the means is real can be addressed with statistical reliability tests. In the case at hand, however, a relatively large sample of TDM programs is still small statistically in terms of all of the sources of internal and external variance, particularly given the small number of observations in some analysis cells.

As a result, the relationships presented here should be regarded as primarily descriptive, although in some instances the differences are so great that one may begin to suggest that the particular element surely must be influencing the outcome. The nature of this analysis is to begin to show what types of actions appear to be the most influential, and what underlying factors may complement or detract from the inferred effect.
The key employer characteristics of the 82-program sample are as follows (size of sample sub-set shown in parentheses):

- **Employment Type:**
  - Professional/Office (25)
  - Commercial/Service (8)
  - Manufacturing/Industrial (14)
  - Government (10)
  - Utility (8)
  - Medical Institution (6)
  - University (4)
  - Miscellaneous Research or Non-Profit Institution (7)

- **Number of Employees:**
  - 10,000 or more (8)
  - 5,000 to 9,999 (7)
  - 1,000 to 4,999 (26)
  - 500 to 999 (5)
  - 100 to 499 (34)
  - less than 100 (2)

- **Location:**
  - Central Business District (CBD) (14)
  - CBD Fringe (9)
  - Suburban CBD (14)
  - Suburb (10)
  - Office Park (13)
  - Campus (12)
  - Exurban/Rural (10)

- **Transit Availability:**
  - High (24)
  - Medium (18)
  - Low (40)

- **Parking Conditions:**
  - Restricted Parking (34 with, 48 without)
  - Parking Fees (30 with, 52 without)

Inferences from the 82-program sample are presented together with results of synthesizing available TDM travel demand impact studies and research. In most instances the one is supportive of the other, but in some cases disparate findings illustrate inability to draw definitive conclusions and corresponding need for further research.

**Response to Support Actions**

Support actions are arguably the most basic initial strategies an employer can implement when creating an employee TDM program. Frequently, low utilization of alternative modes for commuting or of alternative work arrangements such as telecommuting or CWW is a result of low awareness and poor information. Several studies have shown that even in an employment setting where
the employer is offering a wide array of transportation options and benefits, a substantial percentage of employees are unaware or under-informed regarding the nature and availability of these options. This aspect of awareness is covered in more detail in the “Individual Behavioral and Awareness Considerations”—“Awareness and Comprehension of Options” discussion within the “Underlying Traveler Response Factors” section. A primary function of TDM support actions is to increase knowledge and awareness, not only of reasons why changing commute habits is important, but—most importantly—what means exist to make that change and what advantages may come to the employee for changing.

However, as important as support actions are for directing attention to an employer TDM program, many programs rely too heavily—or even exclusively—on support actions while ignoring measures shown to produce more substantive behavioral change. Support actions are perhaps best viewed as a catalyst—important in stimulating the reaction, but generally with a minimum role in the reaction itself. Regardless, many employers or institutions have tried to use a rigorous program of marketing and promotion to raise employee consciousness levels, hoping to change the “culture” in accepting alternative choices.

Support Action Insights from the 82-Program Sample

Because there are so many TDM strategies that fall in the category of support actions, and with countless combinations and renditions of those strategies, a typology has been used to examine the relative effectiveness of different levels of employer support. The 82-program sample has been categorized into levels of high, medium, and low support, based on the range of strategies employed and the level of intensity with which they are applied.

In general, a low-support program is one in which the employer shows little or no active effort in promoting alternative commuting habits to employees. For example, such employers may allow employees to participate in rideshare matching or allow the transit agency to drop off literature, but will not themselves get involved in the process. In a medium-support program, by the definition used here, the employer makes a conscious effort to get involved. There seems to be good spirit behind providing information about commute options and programs (inside and outside the organization), an employee transportation coordinator is appointed (even if only part time), and there is an openness to assisting with ridesharing (matching), transit (pass sales), and promoting the use of these programs. In a high-support program, the employer appears to be applying just about every strategy possible, even though in some cases the applicability or objective may not be clear.

Table 19-1 provides an employer trip reduction performance comparison of programs that incorporate high, medium, and low levels of support actions. This is the first of a number of tables of this genre. In these tables, vehicle trip reduction strategies are cross-classified, either with each other or with ambient conditions such as transit availability. Drawing from the 82-program sample, the VTRs of programs that match each of the strategy/strategy or strategy/condition combinations defined by the table’s columns and rows are averaged using unweighted computations. These program average VTRs are the percentage values displayed in each cell of the table defined by the column and row strategies/conditions.

Just below each VTR, in parentheses, is the number of programs out of the 82-program sample that have met the combination criteria and have been used in calculating the average. In the tables these counts are identified as sample size. It is crucial to remember that the VTR convention is to show vehicle trip reductions (or the degree to which vehicle trips are less than in baseline sites) as positive numbers, reflecting that vehicle trip reduction is the TDM objective. The occasional negative
VTR implies that the average in question reflects vehicle trip rates actually greater than the average baseline values with which they were originally compared.

As an example, take the “28.4%” value near the upper left-hand corner of the table. It is in the high employer support level column and the high transit availability row. Below it is the sample size of “(10).” This indicates that out of the 82-program sample, 10 programs have been found to be characterized both by a high level of employer support actions in their TDM programs and location in areas of high transit availability. The simple average VTR of these 10 programs has been calculated to be 28.4 percent. The fact that it is positive suggests success in trip reduction in connection with the high-transit-availability location of the 10 sites, the high level of support actions applied, and also (importantly), whatever other TDM actions these particular 10 programs may have also included. The VTR value may be compared with others in the table to begin to infer the effect of different combinations of TDM actions and situations.

In the “All” row, Table 19-1 first compares VTR performance with reference to the level of employer support actions included in the programs. The table then connects the support program levels with other important characteristics of the sites or of the TDM programs. Looking only from the perspective of level of support, the data suggest that employers or institutions offering high levels of support in their programs, with a 19.0 percent average VTR, performed better than medium-level support (15.9 percent VTR) and low-level support (15.0 percent VTR) programs.
<table>
<thead>
<tr>
<th>Other Conditions</th>
<th>VTR by Level of Overall Employer Support (Sample Size)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>All</td>
<td>19.0%</td>
</tr>
<tr>
<td></td>
<td>(32)</td>
</tr>
<tr>
<td>Transit Availability</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>28.4%</td>
</tr>
<tr>
<td></td>
<td>(10)</td>
</tr>
<tr>
<td>Medium</td>
<td>10.1%</td>
</tr>
<tr>
<td></td>
<td>(5)</td>
</tr>
<tr>
<td>Low</td>
<td>15.9%</td>
</tr>
<tr>
<td></td>
<td>(17)</td>
</tr>
<tr>
<td>Restricted Parking</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>29.9%</td>
</tr>
<tr>
<td></td>
<td>(12)</td>
</tr>
<tr>
<td>No</td>
<td>12.5%</td>
</tr>
<tr>
<td></td>
<td>(20)</td>
</tr>
<tr>
<td>Parking Fees</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>24.4%</td>
</tr>
<tr>
<td></td>
<td>(14)</td>
</tr>
<tr>
<td>No</td>
<td>12.5%</td>
</tr>
<tr>
<td></td>
<td>(18)</td>
</tr>
<tr>
<td>Transportation Services</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>26.5%</td>
</tr>
<tr>
<td></td>
<td>(15)</td>
</tr>
<tr>
<td>No</td>
<td>12.4%</td>
</tr>
<tr>
<td></td>
<td>(17)</td>
</tr>
<tr>
<td>Modal Subsidies</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>20.5%</td>
</tr>
<tr>
<td></td>
<td>(26)</td>
</tr>
<tr>
<td>No</td>
<td>12.7%</td>
</tr>
<tr>
<td></td>
<td>(6)</td>
</tr>
<tr>
<td>Telecommuting</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>16.6%</td>
</tr>
<tr>
<td></td>
<td>(10)</td>
</tr>
<tr>
<td>No</td>
<td>20.1%</td>
</tr>
<tr>
<td></td>
<td>(22)</td>
</tr>
<tr>
<td>Compressed Work Week</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19.7%</td>
</tr>
<tr>
<td></td>
<td>(15)</td>
</tr>
<tr>
<td>No</td>
<td>18.4%</td>
</tr>
<tr>
<td></td>
<td>(17)</td>
</tr>
</tbody>
</table>

**Sources:** Derived (see Appendix Table 19-A) from Comsis (1994), Comsis and ITE (1993), Rutherford et al. (1994), and Comsis et al. (1996).
What is not reflected in this simple comparison, however, is the extent to which the performance of high-level programs is influenced by packaging with other high-impact strategies, such as parking fees or modal subsidies. This question is further explored in the following discussion, in parallel with Table 19-1. It will be shown that support actions have less effect than either ambient area transit service levels or programs involving parking management/pricing, transportation service provisions, or modal subsidies.

**Transit Availability.** Sites with high transit availability show a rather small difference between high- and low-support programs (28.4 percent versus 24.3 percent VTR), but there is a marked difference between sites with high and low transit availability, regardless of the support program level. The difference between high and low transit availability sites with high support is 28.4 percent versus 15.9 percent VTR, while the same comparison for medium-support sites is 28.2 percent versus 13.6 percent, and for low support it is 24.3 percent versus 8.6 percent. Interestingly, though, the implementation of higher-level support programs when transit service is limited seems to have more of a benefit—while the difference between low- and high-support programs when transit availability is high is only 4.1 percentage points (24.3 percent versus 28.4 percent). The difference is 7.9 percentage points (3.2 percent versus 10.1 percent) for medium transit availability and 7.3 percentage points (8.6 percent versus 15.9 percent) where transit availability is low.

**Incentives and Disincentives.** A similar result may be seen in relation to support actions in programs with incentive and disincentive characteristics such as restricted parking, priced parking (parking fees), or where the employer provided transportation services or modal subsidies. In each of these cases, the difference in VTR between employers who had any of these TDM program elements and those who did not is significantly greater than the corresponding difference associated with different support levels. Clearly, higher support levels are associated with higher rates of trip reduction in most of these cases (all cases if the comparison is restricted to high- versus low-support levels), but the effects are small relative to the impacts of the other types of strategies in the comparison.

**Alternative Work Arrangements.** Higher levels of support programs seem to enhance trip reduction in combination with both telecommuting and CWW programs, as they do in cases without telecommuting or CWW, though the modest positive effect on trip reduction is not entirely consistent between individual support levels. Note that, as previously cautioned, data from the 82-program sample are not capable of reflecting the full range of telecommuting and CWW impacts. A full discussion of how these alternative work arrangements perform as strategies is provided in the subsection on “Response to Alternative Work Arrangements.” It should be consulted before attempting interpretation of the “Yes” versus “No” telecommuting and CWW comparisons in Table 19-1.

**Additional Evidence of Individual Support Action Effects**

**Information, Marketing, and Promotion.** As suggested earlier, for a TDM program to succeed, several conditions must be present. In the case of persuading employees to switch modes or adopt an alternative work schedule, they must: (1) be convinced of the inherent value of changing their behavior; (2) have access to the type of information that allows them to understand their options, which also means being made aware that their employer offers particular options; and (3) be motivated to test and ultimately continue using the recommended options. This is rightly seen as the role of marketing and promotion.

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5 “Percentage points” refers to an absolute difference in percentages, rather than a relative difference.
An example of the possible effects of active marketing, promotion, and information campaigns on commute behavior is offered by a “Transportation Days” experiment in the Cross Westchester Expressway Corridor of New York State in the early 1990s. Rapid employment growth in the corridor in the late 1980s was resulting in severe traffic congestion, causing the New York State Energy Office to award a grant to the Westchester County Department of Transportation to develop and implement transportation management programs to save energy, and reduce congestion and air pollution. The resulting public-private effort included targeted transit service improvements coupled with marketing of alternatives and information on their availability and use. The information was presented throughout 1992 at 79 different employer locations in the corridor, representing about 12,000 of the corridor’s estimated 100,000 employees.

Before-and-after employee surveys showed that about 17 percent of the targeted employees attended the promotional events. Of these, about 32 percent changed mode in the subsequent year, although the changes were not uniformly from drive-alone to alternative modes. However, among promotional event attendees, single occupancy vehicle (SOV) use fell from 68.6 percent to 63.7 percent—an almost 5 percentage point reduction—while among those who did not attend, SOV use increased from 68.9 percent to 70.8 percent, an increase of almost 2 percentage points. What is unclear from these results is whether the people who attended the promotion were different in some way, such as more in need of a transportation alternative, and how stable these choices were over time, given that the follow-up survey was conducted within 1 year of the promotion (SG Associates and Howard/ Stein-Hudson Associates, 1993; Spielberg et al., 1993). This program is covered in more detail later in the “Case Studies” section (see “ ‘Transportation Days’ Marketing and Outreach Programs—Cross Westchester Expressway Corridor”).

In a 1993 study for the California Air Resources Board (CARB), it was found that a surprising percentage of employees were unaware that their employer offered a particular type of TDM strategy. While 1/2 to 2/3 of employees were aware of employer-offered measures such as preferential parking (77 percent), rideshare matching (70 percent), company vanpool vehicles (67 percent), and rideshare prizes (64 percent), much smaller numbers were aware that their employer conducted transportation fairs (15 percent), or offered bus pass discounts (17 percent), on-site pass sales (41 percent), or guaranteed ride home (36 percent). These findings were a revelation to CARB and to the participating employers, and argued strongly for more aggressive information and marketing efforts as part of the programs (Comsis, 1993a). For tabulation and further discussion of these awareness level findings see “Individual Behavioral and Awareness Considerations”—“Awareness and Comprehension of Options” within the “Underlying Traveler Response Factors” section.

Employee Transportation Coordinators (ETCs) are a popular strategy for performing this information and promotional function. Most of the example programs in the 82-program sample incorporate ETCs, either on a part-time or full-time basis. The time investment required for an ETC is a function of the size of the employer, the complexity of the given program and local travel alternatives, and the pressure felt by the employer to have its program succeed. In addition to interacting with employees, ETCs are also the point of contact with outside programs and agencies, such as regional ridematching, transit, or a Transportation Management Association.

CUTR’s National Center for Transit Research performed a study to try to determine the importance of an ETC in the success of an employer TDM program, while at the same time accounting for differences in management support and factors like transit availability. Based on a review of 13 work sites in the Puget Sound area, the study reached an interesting, almost dichotomous conclusion: ETCs are necessary for a successful work site trip reduction program if the work site is not located in an area with access to high quality public transportation, but are not necessary if the work site is located in an area with good public transportation and the employment base consists of lower-
income staff who must choose transportation cost savings over time savings and convenience. The study further concluded that, in a successful program, top management backs up these factors through support such as the provision of meaningful incentives (Hendricks and Joshi, 2004).

**Guaranteed Ride Home.** A strategy appearing to address an important concern of employees considering use of an alternative commute mode to reach a work site is Guaranteed Ride Home (GRH). Numerous surveys have suggested that having the assurance of a back-up mode that can be used in the event of a personal emergency or unplanned schedule change can be the “deal clincher” in getting an employee to switch from driving alone. The issue from an evaluation perspective is determining just how important a “supporting” strategy like GRH is in the overall trip-making decision process, and what portion of vehicle trip reductions can be directly attributed to this strategy.

An examination of 11 GRH programs throughout the United States, representing many different program types, scales, and settings, found—in general—strong intuitive support for GRH among the program managers. The evaluation was, however, unable to statistically support or reject the contention that GRH services actually encourage ridesharing. This situation was attributed to a frequent lack of adequate before-and-after data and the fact that GRH was usually implemented concurrently with other incentive programs, making it difficult to attribute changes in alternative mode use exclusively to the GRH service (Polena and Glazer, 1991).

In its 2001 State of the Commute Survey, the Metropolitan Washington Council of Governments (MWCOG) found that 31 percent of commuters who decided to use a non-drive-alone mode felt that GRH was very important to their decision, while 33 percent said it was somewhat important and 36 percent said that it was not at all important. Asked another way, 20 percent said that they would be 100 percent likely to use an alternative mode even if GRH were not available, 48 percent said they would be very likely, 23 percent said they would be somewhat likely, and 8 percent said they would be not at all likely (MWCOG, 2002).

A 1994 review of a GRH program demonstration conducted in the Baltimore/Washington International Airport Business District reached a similar set of conclusions. These responses suggest that despite a highly favorable view of GRH, evaluation of its importance in actually determining a shift in mode must consider that only a small percentage of employees making a shift (8 percent) would be unlikely to make the change without GRH.

Under the 12-month Airport Business District experiment, a registered program participant would notify his/her supervisor of the emergency or overtime requirement and directly call one of the participating service providers (a taxi company and a rental car company). The service, which was available 24 hours a day, was provided within 30 minutes, with the user permitted to make en route stops related to the emergency. The fare was passed directly on to the administrating agency (BWI Partnership). The number of participants grew steadily from 241 to 732 over the course of the program, amounting to roughly 25 percent of eligible employees. In all, 114 participants (15 percent of all participants) used the GRH program for a total of 287 trips. The majority of users made only one GRH trip, with the average number of trips per user being 2.5. Forty-five percent of the GRH trips were for unexpected overtime, while the remainder were for personal or family emergencies.

The evaluation of the program concluded that there was no reliable evidence that the GRH program directly increased alternative mode use in the study area, although it may have helped retain existing alternative mode users. Analysis of commute behavior before and after the demonstration indicated that overall it remained virtually unchanged. Surveys revealed a decrease of less than 1 percent in SOV use and a 1 percent increase in High Occupancy Vehicle (HOV) and transit use over the course of the project. Some 58 percent of those respondents who changed their mode during
this time period said that the GRH program was not an important factor in their choice (Jewell and Schwenk, 1994).

An evaluation of the impact of trip reduction requirements for the City of Sacramento suggests a different result. Looking at annual employer and employee travel survey data compiled by the city, covering 58 employers and roughly 26,000 employees, vehicle trip rates were compared for the 38 employers who offered GRH with the rates of the 20 employers who did not. An increase in carpool mode share by an average of 4.6 percent was found at the employers offering GRH as compared to only 1.6 percent at those where it was not offered. Similarly, an increase in vanpool share of 1.7 percent was found in the presence of GRH versus a decline of 0.2 percent otherwise, along with an increase in transit share of 1.2 percent when GRH was offered versus a no-GRH decline of 0.1 percent. These findings correspond to an average VTR of 7.3 percent in the programs where GRH was offered versus only 1.7 percent in those where it was not, suggesting a net VTR effect of 5.6 percentage points for GRH (Schreffler, 1997). Of course, as with the Handbook authors’ own pairwise analysis of the 82-program sample, other characteristics of program or setting that may have influenced this result are not known.

Support Action Combinations. A National Center for Transit Research study aimed at developing a “Worksite Trip Reduction Model and Manual” provides an overview of the types of employer support strategies that are most commonly employed, and roughly what role they have in TDM program effectiveness. Using data from major publicly mandated employer trip reduction programs in Los Angeles, Tucson, and Washington State, the researchers first identified the 50 most common types of program combinations that were offered by employers. They then calculated the average VTR associated with each combination of strategies. The most common support measures observed were marketing, rideshare matching, guaranteed ride home, and facilities and amenities such as bike racks, showers, and changing areas (CUTR, 2004). What was evident in comparing the different programs with regard to their composition and VTR is that while the support strategies occurred in virtually all of the program packages, the programs with the higher impacts were clearly those which also implemented financial and other incentives. This provides further support for the premise that support strategies are a necessary, but not sufficient, ingredient for a successful TDM program.

Consulting the 82-program sample once more, judgment has been used to identify those programs which were exclusively or substantially high-employer-support programs, with none or few other meaningful strategies offered. There were 15 programs that fit this definition. The programs are identified in Appendix Table 19-A as Childress Buick, K-Mart Valencia, Mercy Home Care, Hillsborough County, Rosarita Foods, Shure Bros., California Franchise Tax Board, McClellan AFB, Dean Witter, Kinko’s Service Corp., Payroll One, Varian, UCLA, University of Central Florida, and AT&T Pleasanton. The average VTR for this set of programs is 4.1 percent, substantially below the average of 16.9 percent for the entire 82-program sample.

An analysis of information previously compiled by the legislatively-mandated employer trip reduction program of Maricopa County, Arizona, was prepared in 1993 for the Chicago Area Transportation Study (CATS) as an aid to developing guidelines for Employee Commute Options (ECO) program implementation in Chicago. The Arizona program had required all employers with 100 or more employees to develop a set of strategies aimed at reducing vehicle trips by 5 percent annually. The analysis looked at data on TDM measures, employer characteristics, and travel behavior changes taken from annual surveys covering the first 3 years of program operation—from inception through year 3—for 556 work sites.

Maricopa County had identified approximately 55 distinct TDM measures, and those which had been actually implemented were consolidated in the CATS analysis into 16 strategy categories. The
first 10 were classified as “marketing and support” measures. Table 19-2 shows the change in Average Passenger Occupancy (APO)\(^6\) for programs that—according to this classification system—only employed support and marketing strategies. (It will be noted that several of these strategies were not classified as employee support programs for purposes of this chapter’s discussions.) Where a particular strategy (e.g., Bike Incentives) was one of the strategies in a package, that program is included in the tabulation under that strategy.

A percentage increase in APO may be roughly compared to a percentage increase in VTR. APO increases were found to range from 3.4 percent to 9.0 percent depending on the included strategies, with an average 4.6 percent for the group as a whole (Teal, 1993). This Maricopa County/CATS analysis suggests that 4.6 percent may be taken as a reasonable estimate of the vehicle trip reduction potential for TDM programs that incorporate only “marketing and support” strategies, an estimate very close to the 4.1 percent average VTR for the 15 support-strategy-only programs identified in the 82-program sample.

Table 19-2 Association Between “Marketing and Support” Strategies and Average Passenger Occupancy (APO) Changes in Maricopa County, Arizona

<table>
<thead>
<tr>
<th>Included “Marketing and Support” Strategy</th>
<th>APO Increase (Pct.)</th>
<th>No. of Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike Incentives</td>
<td>5.4%</td>
<td>25</td>
</tr>
<tr>
<td>Bike/Walk Facilities</td>
<td>5.0</td>
<td>77</td>
</tr>
<tr>
<td>Preferential Parking</td>
<td>5.5</td>
<td>61</td>
</tr>
<tr>
<td>Carpool Matching</td>
<td>4.9</td>
<td>47</td>
</tr>
<tr>
<td>Carpool Incentives</td>
<td>4.3</td>
<td>23</td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>5.8</td>
<td>74</td>
</tr>
<tr>
<td>Prizes, Rewards</td>
<td>5.5</td>
<td>75</td>
</tr>
<tr>
<td>Flexible Schedules for Alternative Mode Use</td>
<td>9.0</td>
<td>5</td>
</tr>
<tr>
<td>Transit Support Incentives</td>
<td>3.4</td>
<td>21</td>
</tr>
<tr>
<td>Information Measures</td>
<td>4.7</td>
<td>239</td>
</tr>
<tr>
<td><strong>All (Programs with “Marketing and Support” Strategies Only)</strong></td>
<td><strong>4.6%</strong></td>
<td><strong>240</strong></td>
</tr>
</tbody>
</table>

Note: The typical program had more than one “Marketing and Support” strategy, thus the last column does not add to the total number of programs.


Still further corroborative evidence is provided by an analysis conducted by the Washington State Commute Trip Reduction (CTR) program. With very high statistical correlation, it was estimated that early employer TDM programs in both city and suburban locations achieved an average drive-alone mode share reduction close to 5 percentage points in the first 2 years after program implementation.

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\(^6\) Average Passenger Occupancy (APO) is the weekly total number of employee person trips divided by the weekly total of employee vehicle trips (commute trips only). A percentage change in APO may be roughly compared to a percentage change in vehicle trip rate. APO is essentially the same as AVR, except that legal definitions of AVR may introduce slight differences, such as specification of covered commute hours instead of having the computation cover full 24-hour periods.
Although records of individual program actions implemented were not assembled, the sense is that they were dominantly focused on providing information, making employees aware of their options, and offering and publicizing a guaranteed ride home (Hillsman, 2009).

An interesting supplemental analysis from the Maricopa County/CATS assessment looked at the potential cumulative benefit from multiple marketing and support measures. Many employers were found to have implemented multiple measures of this category. Table 19-3 shows the percent change in APO in relation to the total number of measures, and also the number of those measures that were “non-information” in nature (Teal, 1993).

The tabulation suggests a very modest APO improvement when the number of measures increases from 6 to 8 (APO from 5.0 percent to 5.7 percent), and again from 8 to 10 measures (APO from 5.7 percent to 6.6 percent). However, since the number of measures that are non-information is also increasing to the same extent as total measures, one is left to wonder if the very modest effect is coming solely from non-information measures. The other side of this coin is the potential inference that the primary marketing and support program effect is that associated with the information measures. Perhaps the major point to be made is that simply adding more marketing and support measures to a core marketing/support program does not appreciably enhance its bottom-line effectiveness, though in many cases it will likely add to program costs.

<table>
<thead>
<tr>
<th>Total Measures</th>
<th>Non-Information Measures</th>
<th>APO Change</th>
<th>Number of Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 or more</td>
<td>2 or more</td>
<td>5.0%</td>
<td>93</td>
</tr>
<tr>
<td>6 or more</td>
<td>3 or more</td>
<td>5.0%</td>
<td>88</td>
</tr>
<tr>
<td>8 or more</td>
<td>5 or more</td>
<td>5.7%</td>
<td>54</td>
</tr>
<tr>
<td>10 or more</td>
<td>7 or more</td>
<td>6.6%</td>
<td>16</td>
</tr>
</tbody>
</table>


**Response to Employer Transportation Services**

It is relatively uncommon for employers or institutions in the United States to become involved in the physical transportation of their employees, and more likely that they will simply encourage them to use alternatives that are available in the marketplace. In some circumstances, however, no meaningful travel alternatives are available, such as at a remote business campus where transit does not directly serve the site. In such cases, some employers have taken the initiative to provide tangible transportation services for their employees. They may do this by:

- Arranging for bus service to the site under contract or other agreement with a public or private transit provider, or paying to augment the level or quality of a pre-existing service.
- Arranging for shuttle service to connect with a rail transit station beyond walking distance.
- Assisting in the startup, operation, maintenance, or cost sharing of a vanpool program.
• Making company fleet vehicles available for use by employees for ridesharing or site-based uses, such as travel to business meetings, errand running, or emergency trips home.

It may be argued that other types of strategies also serve as transportation services in which the employer is directly involved, such as assisting with rideshare matching, providing bike facilities and showers and/or preferential parking for carpools, or offering a guaranteed ride home. However, because these strategies generally entail less direct, physical involvement of the employer, they have been included among support actions in this chapter’s typology, reflecting how they are generally regarded among TDM practitioners.

Not all employers/institutions that provide transportation services are characterized by remote/campus locations. Some become involved simply because transit service to their site or from particular employee concentrations is too limited. Some become involved in vanpool programs, as a special example, even when they are located in an urbanized setting near transit, simply because they feel it best suits their company ethic or policies, or because they judge more employees can be served effectively through such a program.

**Employer Transportation Services Insights from the 82-Program Sample**

Table 19-4 examines the employers in the 82-program sample that had transportation services as part of their TDM program. As with the support actions assessment, the table is developed from information displayed in Appendix Table 19-A. It shows the average VTR associated with particular groups of employers and the number of employer examples in each category.

For convenience, the employer transportation efforts are divided into four groups: those who provided transit assistance, those who provided vanpool assistance, those who provided both transit and vanpool assistance, and those who provided company vehicles for employee use. The last two columns summarize and compare the programs of all employers providing services with those who did not. Finally, trip reduction impacts are presented in relation to such elements as transit availability, restricted parking, parking fees, level of support program, modal subsidies, and the alternative work arrangements of telecommuting and CWW. This is done to gauge the importance of transportation services in relation to other program strategies or site conditions and of any synergistic effects of combining these actions/conditions.

One thing Table 19-4 indicates is that 34 of the employers in the 82-program sample, or 41 percent, offered one or more types of transportation service. Of these, four programs exclusively provided transit service assistance, 11 exclusively offered vanpool assistance, 11 provided both transit and vanpool assistance, and those who provided company vehicles for employee use. The last two columns summarize and compare the programs of all employers providing services with those who did not. Finally, trip reduction impacts are presented in relation to such elements as transit availability, restricted parking, parking fees, level of support program, modal subsidies, and the alternative work arrangements of telecommuting and CWW. This is done to gauge the importance of transportation services in relation to other program strategies or site conditions and of any synergistic effects of combining these actions/conditions.

In general, the programs where employers offered transportation services have better performance than those that did not. Looking at the summary row in Table 19-4 marked “All,” it may be noted that the average VTR of the 34 employers who provided transportation services is 21.6 percent, in comparison to 13.6 percent for the 48 employers who did not provide services. Among the different types of transportation services provided, programs offering company vehicles for uses supportive of not driving to work alone rank highest, with an average VTR of 24.6 percent. These are followed by vanpool assistance at 21.3 percent, and transit and transit–plus-vanpool at 18.9 percent and 18.8 percent, respectively.
Looking at the combination of these transportation service programs with other employer TDM elements or site conditions yields the following insights:

**Transit Availability.** Not surprisingly, the largest number of instances where employers offered transportation services is where transit availability was low. Seventeen of the 34 employers providing services fell in this category, and virtually all of them attempted to compensate for the absence of transit by providing vanpool assistance, either by itself (six employers, averaging 18.6 percent VTR), or in combination with transit (seven employers, averaging 16.1 percent VTR). The best-performing programs in this low transit availability category are the six that provided use of company vehicles, averaging 21.8 percent VTR. As a whole, the programs in this low transit availability category only account for an average VTR of 15.5 percent—below the average of 16.9 percent for the overall sample of 82 sites, and only 4.4 percentage points better than the average of 11.1 percent for the 22 programs in this category that offer no services.
### Table 19-4  VTR Percentages Related to Employer Transportation Services Provided

<table>
<thead>
<tr>
<th>Other Conditions</th>
<th>Transit</th>
<th>Vanpool</th>
<th>Transit &amp; Vanpool</th>
<th>Company Vehicles</th>
<th>All with Services</th>
<th>No Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>18.9%</td>
<td>21.3%</td>
<td>18.8%</td>
<td>24.6%</td>
<td>21.6%</td>
<td>13.6%</td>
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<tr>
<td>(4)</td>
<td>(11)</td>
<td>(11)</td>
<td>(11)*</td>
<td>(34)</td>
<td>(36)</td>
<td>(48)</td>
</tr>
<tr>
<td>Transit Availability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>35.3%</td>
<td>24.4%</td>
<td>27.2%</td>
<td>33.5%</td>
<td>28.8%</td>
<td>23.6%</td>
</tr>
<tr>
<td>(2)</td>
<td>(4)</td>
<td>(3)</td>
<td>(2)</td>
<td>(11)</td>
<td>(11)</td>
<td>(13)</td>
</tr>
<tr>
<td>Medium</td>
<td>14.1%</td>
<td>25.6%</td>
<td>12.6%</td>
<td>15.0%</td>
<td>21.0%</td>
<td>8.0%</td>
</tr>
<tr>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(3)</td>
<td>(6)</td>
<td>(6)</td>
<td>(13)</td>
</tr>
<tr>
<td>Low</td>
<td>&lt;0</td>
<td>18.6%</td>
<td>16.1%</td>
<td>21.8%</td>
<td>15.5%</td>
<td>11.1%</td>
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<td>(1)</td>
<td>(6)</td>
<td>(7)</td>
<td>(6)*</td>
<td>(17)</td>
<td>(17)</td>
<td>(22)</td>
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<tr>
<td>Restricted Parking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Yes</td>
<td>35.3%</td>
<td>28.4%</td>
<td>23.1%</td>
<td>20.7%</td>
<td>27.9%</td>
<td>20.3%</td>
</tr>
<tr>
<td>(2)</td>
<td>(6)</td>
<td>(5)</td>
<td>(5)*</td>
<td>(17)</td>
<td>(17)</td>
<td>(19)</td>
</tr>
<tr>
<td>No</td>
<td>2.6%</td>
<td>12.8%</td>
<td>15.2%</td>
<td>17.2%</td>
<td>15.4%</td>
<td>9.3%</td>
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<td>(2)</td>
<td>(5)</td>
<td>(6)</td>
<td>(6)*</td>
<td>(17)</td>
<td>(17)</td>
<td>(29)</td>
</tr>
<tr>
<td>Parking Fees</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Yes</td>
<td>35.3%</td>
<td>34.1%</td>
<td>23.6%</td>
<td>36.6%</td>
<td>31.4%</td>
<td>18.2%</td>
</tr>
<tr>
<td>(2)</td>
<td>(5)</td>
<td>(4)</td>
<td>(5)*</td>
<td>(15)</td>
<td>(15)</td>
<td>(16)</td>
</tr>
<tr>
<td>No</td>
<td>2.6%</td>
<td>10.7%</td>
<td>16.1%</td>
<td>14.6%</td>
<td>13.9%</td>
<td>11.3%</td>
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<tr>
<td>(2)</td>
<td>(6)</td>
<td>(7)</td>
<td>(6)*</td>
<td>(19)</td>
<td>(19)</td>
<td>(32)</td>
</tr>
<tr>
<td>Level of Support</td>
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</tr>
<tr>
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<td>n/a</td>
<td>21.7%</td>
<td>25.6%</td>
<td>33.5%</td>
<td>26.5%</td>
<td>12.4%</td>
</tr>
<tr>
<td>(0)</td>
<td>(6)</td>
<td>(5)</td>
<td>(6)*</td>
<td>(15)</td>
<td>(15)</td>
<td>(17)</td>
</tr>
<tr>
<td>Medium</td>
<td>15.8%</td>
<td>12.8%</td>
<td>12.9%</td>
<td>14.0%</td>
<td>15.5%</td>
<td>16.2%</td>
</tr>
<tr>
<td>(3)</td>
<td>(2)</td>
<td>(5)</td>
<td>(5)*</td>
<td>(14)</td>
<td>(14)</td>
<td>(19)</td>
</tr>
<tr>
<td>Low</td>
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<td>26.3%</td>
<td>14.1%</td>
<td>n/a</td>
<td>24.2%</td>
<td>11.2%</td>
</tr>
<tr>
<td>(1)</td>
<td>(3)</td>
<td>(1)</td>
<td>(0)</td>
<td>(5)</td>
<td>(5)</td>
<td>(12)</td>
</tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>28.2%</td>
<td>25.4%</td>
<td>25.4%</td>
<td>30.8%</td>
<td>26.7%</td>
<td>14.7%</td>
</tr>
<tr>
<td>(3)</td>
<td>(9)</td>
<td>(7)</td>
<td>(8)*</td>
<td>(24)</td>
<td>(24)</td>
<td>(40)</td>
</tr>
<tr>
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<td>13.4%</td>
<td>7.3%</td>
<td>8.3%</td>
<td>9.4%</td>
<td>6.0%</td>
</tr>
<tr>
<td>(1)</td>
<td>(3)</td>
<td>(4)</td>
<td>(3)*</td>
<td>(10)</td>
<td>(10)</td>
<td>(8)</td>
</tr>
<tr>
<td>Telecommuting</td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>28.2%</td>
<td>9.6%</td>
<td>14.5%</td>
<td>21.9%</td>
<td>18.3%</td>
<td>14.6%</td>
</tr>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)*</td>
<td>(9)</td>
<td>(9)</td>
<td>(8)</td>
</tr>
<tr>
<td>No</td>
<td>15.8%</td>
<td>23.9%</td>
<td>20.4%</td>
<td>26.2%</td>
<td>22.9%</td>
<td>13.4%</td>
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<tr>
<td>(3)</td>
<td>(9)</td>
<td>(8)</td>
<td>(7)*</td>
<td>(25)</td>
<td>(25)</td>
<td>(40)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>20.5%</td>
<td>22.2%</td>
<td>15.4%</td>
<td>24.2%</td>
<td>23.0%</td>
<td>16.2%</td>
</tr>
<tr>
<td>(3)</td>
<td>(3)</td>
<td>(2)</td>
<td>(7)*</td>
<td>(12)</td>
<td>(12)</td>
<td>(16)</td>
</tr>
<tr>
<td>No</td>
<td>14.1%</td>
<td>21.0%</td>
<td>19.5%</td>
<td>25.4%</td>
<td>23.2%</td>
<td>12.0%</td>
</tr>
<tr>
<td>(1)</td>
<td>(8)</td>
<td>(9)</td>
<td>(4)*</td>
<td>(22)</td>
<td>(22)</td>
<td>(32)</td>
</tr>
</tbody>
</table>

**Note:** Asterisked samples (*) include cases combined with other transportation services.

**Sources:** Derived from the Table 19-A sources (see Appendix A).
A surprisingly large number of employers (11) located in areas with high existing transit service availability are found to have engaged in providing transportation services. Examining the cases in this group, reasons seem to include:

1. The employer is very large, with a widely-scattered regional employment base, and either existing transit service doesn’t extend far enough or cannot spread wide enough to serve employees.

2. The employer has felt, despite the generally good transit service, that it needed more capacity or more route coverage than the public transit agency is able to provide.

3. The employer has felt a particular kinship with some service, such as vanpools, for reasons unique to the organization.

Programs in this high transit availability category have an average VTR of 28.8 percent, which is quite high but still only 5.2 percentage points greater than those programs that had high transit availability but did not offer additional transportation services.

**Restricted Parking.** Sites where parking supply was restricted have higher overall VTR rates, and programs that provided transportation services in conjunction with restricted parking also perform better than those that do not. Sites with restricted parking that provided transportation services average a 27.9 percent VTR, which is 7.6 percentage points higher than comparable sites with restricted parking but no transportation services (20.3 percent VTR). Where parking was not restricted, programs offering transportation services outperform those without services by a similar margin, 6.1 percentage points, or 15.4 percent versus 9.3 percent. The overall effect of restricted parking as a condition corresponds with a greater difference in VTR than the difference related to transportation services. Having restricted parking averages about twice the impact of providing services. Nevertheless, there is clear evidence that providing services makes a significant difference.

**Parking Fees.** The influence of parking pricing is similar to that of restricted parking, only more so. The difference in VTR at sites with parking fees between programs that provided transportation services and those that did not is 31.4 percent versus 18.2 percent, or 13.2 percentage points. Meanwhile, for comparable programs where parking was not priced, those that provided transportation services average 13.9 percent VTR versus 11.3 percent for those without services, or only a 2.6 percentage point difference. Similarly, the difference between programs with transportation services that had parking fees versus those where parking was not priced is 17.5 percentage points, whereas programs that did not provide services have only a difference of 6.9 percentage points between situations were parking was priced versus not priced. Hence, not only do services make an important difference, the effect is accentuated when combined with parking fees.

**Employer Support.** Examining the relationships between transportation services and employer support programs yields somewhat inconclusive findings. Programs with transportation services at both high and low levels of employer support appear to perform quite well, both overall and in relation to programs at the same support level but without transportation services. Programs with services and high support average 26.5 percent VTR, or 14.1 percentage points higher than those without services (12.4 percent). Similarly, programs with low support but offering services average 24.2 percent VTR compared to 11.2 percent for those without services, a difference of 13 percentage points. This suggests that transportation services are very important in this relationship, and that the level of employer support seems to be relatively unimportant to the outcome if services are offered. This conclusion must be tempered, however, by the small sample size of 5 observations in the services/low support category and the curious result for programs with medium support. With medium support there is no major or logical difference between programs that offered
transportation services and those that did not, and both cases are below the average 16.9 percent VTR for the sample. One thing that can be said is that the data in this table provide weak justification at best for expanded levels of employer support.

**Modal Subsidies.** The combining of modal subsidies with transportation services produces a set of outcomes that are similar to those with parking pricing. Transportation services programs which were paired with modal subsidies produce an average VTR of 26.7 percent, compared to only 9.4 percent for those without modal subsidies, a difference of 17.3 percentage points. This compares to a difference of only 8.7 percentage points between situations where modal subsidies were or were not provided within programs not including transportation services (14.7 percent versus 6.0 percent VTR). Also noteworthy is that programs that provided modal subsidies exhibit a much bigger difference in VTR performance with versus without transportation services—26.7 percent against 14.7 percent, or a 12.0 percentage point difference—than when no subsidies were offered, namely 9.4 percent with transportation services versus 6.0 percent without, or only a 3.4 percentage point difference. The synergy between transportation services and modal subsidies is both obvious and strong.

**Telecommuting.** An inference that can be drawn from the VTR comparisons in Table 19-4 is that work hours strategies like telecommuting may conflict with the modal shift objectives of transportation services. Where telecommuting was offered along with transportation services, the result is a VTR which—when computed on the basis of mode shifts alone—is 4.6 percentage points lower than when telecommuting is not provided. It may be that when employees are released from the expectation of traveling to the worksite each day, it becomes harder to conform to the schedule discipline of using an alternative mode, particularly ridesharing.

Despite that possible effect, the presence of a telecommuting program may still reduce overall vehicle trip making through its elimination of physical commute trips in an amount equal to the average number of days per week that the telecommuting individuals do not go to their employment site. TDM regulatory programs typically provide credit for these reductions in their trip generation formulas, which account for total trips by mode over a 5-day cycle. Unfortunately, data from the 82-program sample drawn upon here is insufficient to calculate a trip generation reduction for telecommuting, since neither the percentage of employees who telecommuted nor the number of days per week they did so is known.\(^7\)

The only positive observation that can be made given data limitations is that even with the possibly adverse mode choice effects of telecommuting, programs that offered transportation services appear to perform better than those without services. It is also important to point out that overall evidence on the mode choice effects of telecommuting is mixed, as suggested by the examples provided under “Response to Alternative Work Arrangements”—“Additional Research Evidence on Alternative Work Arrangements”—“Telecommuting.”

**Compressed Work Weeks.** A slightly less ambiguous result is produced in combination with CWW, another alternative work hours strategy, even though the same 82-program sample data limitations apply. Programs offering transportation services perform just about the same in terms of mode shifts with or without the presence of CWW (about 23 percent VTR computed on the basis of mode shifts alone). This would suggest that, in the presence of transportation services, the gain

\(^7\) For additional discussion of this limitation in the 82-program sample, and its implications, see the final paragraph of the “Analytical Considerations” subsection in the “Overview and Summary.”
in trip reduction that comes from fewer work days is not cancelled out by mode shifts. As with telecommuting, CWW programs that offered transportation services have higher VTRs than those not providing services. It does not appear, however, that transportation services and CWW have a synergistic relationship.

**Additional Evidence of Transportation Services Effects**

**Employer-Assisted Transit Service.** Two types of employer intervention with transit service are observed. One is supplementing existing fixed-route bus service with additional service or routes, and the other is operation of shuttle services to either connect with regional rail transit service or to provide midday circulation.

Table 19-5 lists a number of employers from the 82-program sample that achieved fairly substantial vehicle trip reductions in conjunction with providing one or more transportation services. Of course, there are many other aspects of these particular exemplary programs that may have led to their performance, such as parking conditions, financial incentives, and employer support, and these characteristics are also summarized in the table. This presentation is provided to offer some insight as to what elements may contribute to the success of these service-oriented programs.

The “Type of Services” column of Table 19-5, as the heading suggests, indicates the type of transportation service offered by each particular employer or institution at the time the information was compiled. The first two examples, Puget Sound Blood Center and Swedish Hospital, are neighboring medical establishments in Seattle’s First Hill area. This area, which lies on the fringe of the CBD, has above-average transit service. However, these employers took steps to coordinate with each other and the transit operator, Metro, to bring more service to the area. Parking in the area is limited, which affects access not only by employees but also by patients and visitors. The increased transit service was matched by employee transit subsidies and other financial incentives as part of the arrangement with Metro to ensure ridership. The results were vehicle trip rates of 42.4 percent and 28.2 percent, respectively, below the average for the surrounding area, indicating very effective vehicle trip reductions.

P. L. Porter and Pacific Bell had programs that focused mainly on vanpooling, but also provided transit or van shuttle service to distant rail transit stations. Even though they are in remote locations with free parking, the combination of the transportation services with subsidies resulted in vehicle trip rates of 0.67 and 0.73, which are 23 percent and 21.5 percent lower, respectively, than their adjacent areas.
Table 19-5  Exemplary Employer Transportation Services Programs

<table>
<thead>
<tr>
<th>Employer</th>
<th>Type</th>
<th>Size</th>
<th>Setting</th>
<th>Transit Availability</th>
<th>Support Level</th>
<th>Type of Servicesa</th>
<th>Parkingb</th>
<th>Financial Incenticesc</th>
<th>VTRd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puget Sound Blood Center</td>
<td>Medical</td>
<td>200</td>
<td>CBD Fringe</td>
<td>High</td>
<td>Medium</td>
<td>TR, P, D</td>
<td>T, O</td>
<td>42.4%</td>
<td></td>
</tr>
<tr>
<td>Swedish Hospital</td>
<td>Medical</td>
<td>2,250</td>
<td>CBD Fringe</td>
<td>High</td>
<td>Low</td>
<td>TR, P, D</td>
<td>T, A</td>
<td>28.2%</td>
<td></td>
</tr>
<tr>
<td>Univ. of Washington</td>
<td>University</td>
<td>17,400</td>
<td>CBD Fringe</td>
<td>High</td>
<td>High</td>
<td>TR, VP</td>
<td>R, P, D</td>
<td>62.0%</td>
<td></td>
</tr>
<tr>
<td>Sears (Hoffman Estates)</td>
<td>Comm./Svc.</td>
<td>5,400</td>
<td>Exurban</td>
<td>Low</td>
<td>High</td>
<td>TR, VP</td>
<td>T</td>
<td>42.4%</td>
<td></td>
</tr>
<tr>
<td>P.L. Porter</td>
<td>Ind./Manuf.</td>
<td>230</td>
<td>Campus</td>
<td>Low</td>
<td>Medium</td>
<td>TR, VP</td>
<td>T, V</td>
<td>23.0%</td>
<td></td>
</tr>
<tr>
<td>Pacific Bell (San Ramon)</td>
<td>Utility</td>
<td>6,900</td>
<td>Exurban</td>
<td>Low</td>
<td>High</td>
<td>TR, VP</td>
<td>R</td>
<td>21.5%</td>
<td></td>
</tr>
<tr>
<td>So. California Gas</td>
<td>Utility</td>
<td>1,800</td>
<td>Exurban</td>
<td>Low</td>
<td>High</td>
<td>VP, CV</td>
<td>R, P, D</td>
<td>47.4%</td>
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</tr>
<tr>
<td>Travelers Insurance</td>
<td>Prof./Office</td>
<td>10,000</td>
<td>CBD</td>
<td>High</td>
<td>Low</td>
<td>VP</td>
<td>R, P, D</td>
<td>42.4%</td>
<td></td>
</tr>
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<td>Atlantic Richfield</td>
<td>Prof./Office</td>
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<td>CBD</td>
<td>High</td>
<td>High</td>
<td>VP</td>
<td>R, P, D</td>
<td>34.5%</td>
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</tr>
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<td>Bonneville Power</td>
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<td>CBD Fringe</td>
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<td>Medium</td>
<td>VP</td>
<td>R, P, D</td>
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<td>Exurban</td>
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<td>Low</td>
<td>VP</td>
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</tr>
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<td>Johnson &amp; Higgins</td>
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<td>CBD</td>
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<td>High</td>
<td>CV</td>
<td>R, P</td>
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<td>150</td>
<td>Suburban</td>
<td>Low</td>
<td>High</td>
<td>CV</td>
<td>T, A, O</td>
<td>43.5%</td>
<td></td>
</tr>
<tr>
<td>CH2M Hill (Bellevue)</td>
<td>Prof./Office</td>
<td>400</td>
<td>Sub CBD</td>
<td>Medium</td>
<td>Medium</td>
<td>CV</td>
<td>R, P, D</td>
<td>38.9%</td>
<td></td>
</tr>
<tr>
<td>Bellevue City Hall</td>
<td>Gov’t.</td>
<td>650</td>
<td>Office Park</td>
<td>Medium</td>
<td>Medium</td>
<td>CV</td>
<td>R, P, D</td>
<td>30.0%</td>
<td></td>
</tr>
<tr>
<td>Wm. H. Mercer</td>
<td>Prof./Office</td>
<td>120</td>
<td>CBD</td>
<td>High</td>
<td>High</td>
<td>CV</td>
<td>P, D</td>
<td>22.7%</td>
<td></td>
</tr>
</tbody>
</table>

Notes:  

a  Codes:  TR = Transit, VP = Vanpool, CV = Company Vehicles.

b  Codes:  R = Restricted, P = Priced, D = HOV Discounts.

c  Codes:  T= Transit Subsidy, V = Vanpool Subsidy, C = Carpool Subsidy, A = Travel Allowance, O = Other Monetary.

d  VTR = vehicle trip reduction, defined as the percentage by which the vehicle trip rate (vehicle round trips per 100 employees commuting) for the program is less than the vehicle trip rate for the control population.

e  See accompanying text and also case study “University of Washington’s U-PASS Program — Seattle, Washington” Footnote 21.

Sources: Derived (see Appendix Table 19-A) from Comsis (1994), Comsis and ITE (1993), Rutherford et al. (1994), and Comsis et al. (1996).
Sears, upon relocation of its headquarters operations to Hoffman Estates in the outskirts of Chicago, arranged for contract transit service for its employees, many of whom realized long commutes. Subsidy was paid through the employees to the transit provider. In conjunction with its vanpool program, Sears achieved a vehicle trip rate of only 0.53, 42.4 percent lower than the average for the surrounding area. The Sears example is somewhat of a special case, given the relocation involved, though a similar situation applies to the Pacific Bell example as well. (Further background on the Sears Hoffman Estates program is found in the case study, “Pace Vanpool and Subscription Bus Programs in Suburban Chicago,” in Chapter 5, “Vanpools and Buspools.”)

The University of Washington, involving students as well as faculty and staff, also presents a special case. Located on a campus that is somewhat removed from downtown Seattle, it made arrangements with transit operator Metro to provide up to 6,000 hours of additional service to the campus per year. To support this commitment of service, the University has carefully managed its parking supply and prices, and in addition has offered attractive subsidies to students and staff through Metro’s U-PASS program. The result is a vehicle trip rate on the order of 0.27 to 0.29 per person for the campus. This rate has been calculated as being 62 percent lower than the surrounding area (Comsis, 1994), or 31 percent lower than the before-program University rate. The University of Washington program is covered further in the case study, “University of Washington’s U-PASS Program—Seattle, Washington” (see “Case Studies” section including Footnote 21).

**Shuttles and Circulators.** Although they are not purely employer-provided transit services, there are many examples where cooperative efforts have been made to institute shuttle services to either close a gap in existing service, formalize a connection with regional transit, or improve internal circulation and thus reduce auto dependency. Table 19-6 lists ten such services that were staged as demonstration projects under the Los Angeles County Metropolitan Transportation Authority’s regional TDM program.

This group of examples is selected for presentation because of special evaluation data that were obtained for the projects, permitting assessment of the services’ impact on diverting SOV trips and subsequent claimed vehicle trip reduction. The table also shows annual cost for the service and the resulting cost per VTR as a measure of effectiveness. (No information on the physical magnitude of the services is available.) Daily ridership on these services ranged from 11 to 239 riders and costs ranged from $5.15 to $75.60 per VTR. Perhaps what is most interesting about these services is the degree of prior SOV use for the commute, ranging from a low of 33 percent prior SOV mode share among users up to 75 percent or more. One-half of all the cases are in the over-75-percent category. Data are insufficient to ascertain how frequently the former SOV users actually used the shuttle, or the extent to which the feeder service or the internal circulation element is most critical to the modal shift (Comsis and Pansing, 1997).

**Employer-Assisted Vanpool Service.** There are numerous ways that employers can get involved in providing a vanpool option for their employees. Perhaps the simplest is offering a subsidy, although the evidence from the 82-program sample is that, by itself, that approach is not particularly effective (as discussed in the “Response to Incentives and Disincentives” subsection below). What does seem to have more impact is when employers get materially involved in the facilitation and administration of a vanpool program, relieving employees of major logistical burdens.
Table 19-6  Effectiveness of Transit Shuttle Services Tested as Demonstration Projects in the Los Angeles Area

<table>
<thead>
<tr>
<th>Service/Description</th>
<th>Daily Shuttle Use</th>
<th>Prior SOV Use&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Annual VTR&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Annual VMTR&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Annual Cost</th>
<th>Cost per VTR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All-Day Shuttles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Children’s Court Shuttle</strong>: Employee and visitor shuttle between rail station and court complex</td>
<td>239</td>
<td>33%</td>
<td>16,760</td>
<td>835,380</td>
<td>$333,524</td>
<td>$19.90</td>
</tr>
<tr>
<td><strong>PVTA Metrolink Shuttle</strong>: Subscription service for commuters to Pomona/Claremont stations preferential parking</td>
<td>21</td>
<td>76%</td>
<td>3,840</td>
<td>23,040</td>
<td>$48,691</td>
<td>$12.68</td>
</tr>
<tr>
<td><strong>Mid-Day Shuttles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Santa Clarita Shuttles and Shelters</strong>: City-implemented mid-day circulator between industrial park and town center</td>
<td>11</td>
<td>77%</td>
<td>1,984</td>
<td>15,872</td>
<td>$56,822</td>
<td>$28.64</td>
</tr>
<tr>
<td><strong>West Hollywood Sunset Shuttle</strong>: TMA-supported shuttle service along Sunset Blvd.</td>
<td>70</td>
<td>51%</td>
<td>6,250</td>
<td>9,950</td>
<td>$275,625</td>
<td>$44.10</td>
</tr>
<tr>
<td><strong>Peak Period Shuttles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hollywood Connection</strong>: Feeder service for employees linking with bus and Metrolink</td>
<td>90</td>
<td>76%</td>
<td>66</td>
<td>1,970</td>
<td>$84,542</td>
<td>$5.15</td>
</tr>
<tr>
<td><strong>Burbank Media District Shuttle</strong>: TMA-provided service between Burbank Media District and Metrolink</td>
<td>165</td>
<td>78%</td>
<td>30,888</td>
<td>617,760</td>
<td>$193,050</td>
<td>$6.25</td>
</tr>
<tr>
<td><strong>12th Council District Taxi Voucher</strong>: Free taxi feeder between Metro and employment sites</td>
<td>73</td>
<td>55%</td>
<td>19,200</td>
<td>364,800</td>
<td>$138,040</td>
<td>$7.19</td>
</tr>
<tr>
<td><strong>Lincoln Corridor Shuttle</strong>: Commuter service between Pacific Palisades and El Segundo</td>
<td>40</td>
<td>66%</td>
<td>6,256</td>
<td>67,220</td>
<td>$259,249</td>
<td>$41.44</td>
</tr>
<tr>
<td><strong>Burbank Flat Fare Taxi</strong>: Home-work taxi service for Media District employees</td>
<td>34</td>
<td>78%</td>
<td>6,256</td>
<td>19,094</td>
<td>$88,155</td>
<td>$13.85</td>
</tr>
<tr>
<td><strong>Westside RUSH</strong>: 5 TMA-sponsored shuttles to fill gaps in existing service</td>
<td>84</td>
<td>46%</td>
<td>9,246</td>
<td>36,523</td>
<td>$698,998</td>
<td>$75.60</td>
</tr>
</tbody>
</table>

Notes:  
<sup>a</sup> Percentage of users reporting their prior commute mode as single occupant vehicle (SOV).  
<sup>b</sup> Vehicle Trips Reduced (round trips).  
<sup>c</sup> Vehicle Miles of Travel Reduced.

Source: Comsis and Pansing (1997).
Effective vanpool involvement includes taking the lead in procuring vehicles, either through lease or purchase; underwriting a service arrangement with a vanpool provider; offering use of company vans for use by vanpool units; providing or cost sharing in van maintenance, fueling, or insurance; and, perhaps most importantly, being a strong advocate for the program. The strong vanpool system performers in Table 19-5 are all marked by solid corporate/institutional backing of the vanpool program. Organizational leadership views the program as an important benefit for employees, a demonstration of their loyalty, and not coincidentally, a means for acquiring and retaining employees, particularly when the site is remotely located and travel there is viewed as a burden.

In the case of Sears and Pacific Bell, the vanpool program was an important element facilitating relocation of large operations from an urban site to a remote exurban area. The sense is that the vanpool and related programs were key to the viability of the move. At the other extreme are employers like Atlantic Richfield Company in downtown Los Angeles or Travelers Insurance in downtown Hartford that opted for vanpool programs in spite of locations near good public transit service. They may have concluded that including a vanpool alternative was the only way to fully serve all of their employees.

It should be noted that not all successful vanpool programs are limited to large employers. The programs of P. L. Porter (230 employees), Bonneville Power (100 employees), and Rockbestos (400 employees) are examples of modest size employers that have been very effective with a well-executed vanpool effort. Nor are vanpool programs necessarily limited to commute populations with long trip lengths, although longer trips are usually the primary market.

The vanpool chapter in the 1993 Federal Highway Administration report on Implementing Effective Travel Demand Management Measures describes an interesting program at the Aerospace Corporation in Los Angeles where vanpools were used to serve a variety of employee travel markets. As of 1990, 15 percent of Aerospace’s employees were using vanpools (another 19 percent used carpools), thanks to attractive pricing and treatment. The company enabled lower fares by 12-year amortization of vehicles, and maintenance was performed by the company. Preferential parking was a meaningful perk given the large size of the workforce (6,000 employees). But perhaps most interesting is that 13 of the 60 vanpools had average trip lengths in the 10 to 20 mile range, which is fairly short for vanpools. Vanpooling was motivated by the company’s extensive support as well as the fact that many of the employees lived in clusters across the region, enabling easy assembly of travel groups (Comsis and ITE, 1993). TCRP Report 95, Chapter 5, “Vanpools and Buspools,” provides additional information on this service.

Use of Company Vehicles. An increasing number of employers are offering company fleet vehicles to employees as an inducement to use alternative modes for commuting. In most instances the company vehicles are made available for midday business trips. This was the case with Johnson & Higgins, City of Simi Valley, CH2M Hill, Southern California Gas, and Wm. H. Mercer, in Table 19-5. The City of Bellevue, Washington, at the time offered a slightly different twist—allowing employee groups of three or more to use the vehicles for commuting (a practice since discontinued). Each of these listed sites achieved a notable vehicle trip reduction, although it would appear that parking conditions, transit availability, and financial incentives also played a significant role in each program’s performance. Nevertheless, providing for the employee’s travel needs once at the work site, particularly in pedestrian-unfriendly areas like office parks or suburban strip developments, can alleviate a major impediment to the decision to forego having one’s car at the workplace.

Car Sharing. An alternative to offering use of company or fleet vehicles involves utilizing quickly executed short-term vehicle rentals from a private vendor, known as car-sharing. Registered users
reserve a car online or by phone, walk to a conveniently located available vehicle, and access it with an electronic key card. The user is subsequently billed for all transactions. An introduction to car sharing is provided in Chapter 14, “Road Value Pricing,” under “Response by Type of Strategy”—“Response to Vehicle Use Pricing Systems.”

The concept has been popular for some time outside the United States as a residential-based service, particularly in urban areas where car ownership is difficult. Increasingly, however, employers are finding value in car-sharing to help address employee transportation issues, including not only mobility for midday business travel, but as a means to reduce parking demand and traffic associated with employee vehicle use. TCRP Report 108, “Car-Sharing: Where and How It Succeeds,” presents examples of employers in the Seattle, Washington, CBD and CBD fringe area who have successfully incorporated car-sharing strategies into their TDM programs (Nelson\Nygaard and Westat, 2005):

- The Seattle Times has used car-sharing to reduce parking demand following sale of several of its surface parking lots. Of employees surveyed in advance of the program, 15 percent stated that access to a car during the day would help them not to drive to work.

- Swedish Medical Center has employed car-sharing as a commute trip reduction strategy and as a way to provide transportation between its six campuses. Staff calculated that car-sharing was cheaper than either a shuttle or paying parking and mileage expenses. Swedish allows all employees access to car-sharing for business purposes, and also allows personal use by those who have not obtained a parking permit.

- The Defender Association used car-sharing to eliminate one-half of its 20 parking spaces, thereby qualifying it for a Metro transit incentive, FlexPass. This allowed it to absorb the cost of continuing to provide transit passes to its employees while also applying savings to costs of the FlexCar car-sharing service (Nelson\Nygaard and Westat, 2005).

Transportation Management Associations (TMAs) may have the potential to become brokers in the use of car-sharing services by providing memberships for employers and integrating those programs with transit and other TDM strategies. Portland’s Lloyd District TMA built on its “PASSport” employer transit pass to fund the PASSport+ program, which allows unlimited use of FlexCar vehicles in the TMA district during business hours for PASSport holders who sign up for car-sharing (Urban Transportation Monitor, 2002).

Back-to-back car-sharing demonstration projects conducted in the San Francisco Bay area between 2001 and 2003, branded CarLink, provide more travel behavior change information and additional support for the potential of this strategy. In CarLink I (January–November 1999), 54 individuals from San Francisco, Oakland, and the East Bay enrolled in a program involving 12 compact rental cars. The vehicles were based in premium parking spaces at the Dublin-Pleasanton BART station and, except for accommodating 10 home-based “traditional” commuters, were set up to serve travel needs of employees at the Lawrence Livermore National Laboratory. Three separate user groups were involved: home-based users commuting to the BART station, work-based commuters reverse-commuting to Lawrence Livermore via the BART station, and shared vehicle day users at the worksite. Each group paid a distinct fee according to duration of car use, with fees including fuel, insurance and maintenance costs. Travel behavior analysis for CarLink I showed an increase in rail transit (BART) mode share of 23 percent, a reduction in drive-alone mode share of 44 percent, and a decrease in average daily vehicle miles of travel (VMT) of 18 miles (Shaheen and Rodier, 2005).
CarLink II was a more expansive test, involving 19 cars and 107 participants, and running for 12 months (July 2001–June 2002). The experiment was located in Palo Alto in conjunction with Caltrain commuter rail service and the employment base of Stanford Research Park (150 research and technology companies and 23,000 employees). Workplace involvement was, however, limited to 6 employers. Again, three distinct categories of users shared the CarLink vehicles:

1. Home-based users, who lived in or near Palo Alto, and for a fee of $300 a month were able to drive a CarLink vehicle to the Caltrain California Avenue station each weekday morning before taking a train to work and then home again at night, while also having access to the vehicles on evenings and weekends.

2. Work-based commuters, who were employees at Stanford Research Park and, for a fee of $50/month, used the vehicles parked at the California Avenue station to shuttle between Caltrain and the worksite.

3. Work-based day users, employees of the participating employers at Stanford Research Park, who were able to use the vehicles for personal and business trips during the day under a subscription package to employers of $300/month per vehicle.

Table 19-7 shows what appear to be rather impressive results from the CarLink II experiment. Using before-and-after surveys along with 3-day travel diaries, the researchers determined a fairly significant decline in driving alone as a commute mode. SOV use for all or part of the home-to-work commute dropped from 37.5 percent to 12.5 percent for the home-based users, and from 64.1 percent to 41.2 percent for the work-based commuters and day users. Correspondingly, use of Caltrain—obviously as the primary commute mode—increased from 56.3 percent to 100 percent for the home-based group and from 35.9 percent to 56.9 percent for the work-based group. At the same time, however, rates of carpooling and bicycling dropped for both groups, and use of bus/shuttle declined for the work-based group, reflecting the greater convenience of CarLink. Also, many participants still used personal vehicles to access transit on their non-CarLink terminus.

The VMT results for CarLink II showed that VMT for round-trip commuters was reduced by 23 miles per day as members shifted to Caltrain. The VMT reduction was entirely produced, however, by the work-based commuters/employees, as detailed in Table 19-7. Meanwhile, travel times increased by an average of 31.5 minutes per day, while commuter stress reportedly decreased. Almost 6 percent of program participants sold or stored a personal vehicle, while none leased or purchased a personal vehicle (Shaheen and Rodier, 2005).
An important factor that cannot be tested in a limited-scale pilot program such as this is the market penetration a full-scale program could achieve. The market for the home-based users and the work-based commuters in a transit-linked program like CarLink II would be limited by the extent of the transit service residential and employment commutersheds involved and the proportions and quantities of daily commutes actually oriented to the transit line. The market would also be limited by the degree of employer interest, an aspect of TDM effectiveness examined in the “Voluntary Versus Regulatory Employer Motivation” subsection of the “Underlying Traveler Response Factors” section. Finally, it should be noted that all reports encountered of workplace-based car-sharing successes come from areas where transit service is quite strong.

Transportation Brokerage. For lack of a better term, there are occasions when either an area-wide organization or a large employer takes on the role of transportation broker, in which it attempts to provide for the transportation needs of commuters in an environment where alternatives to driving are very limited. Historical examples of employers adopting this approach include the 3M Corporation in the Twin Cities and CONOCO in Houston (Pratt and Copple, 1981; Enoch and Zhang, 2008).

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### Table 19-7  Before and After Commute Mode Shares and VMT for CarLink II Participants

<table>
<thead>
<tr>
<th>Modes</th>
<th>Mode Shares and VMT Before</th>
<th>Mode Shares and VMT After</th>
<th>Change in Mode Share (Percentage Points) and Change in VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HB(^a) WB(^b) All</td>
<td>HB</td>
<td>WB</td>
</tr>
<tr>
<td>Drive Alone</td>
<td>37.5% 64.1% 60.2%</td>
<td>12.5% 41.2% 37.3%</td>
<td>-25.0%</td>
</tr>
<tr>
<td>Carpool</td>
<td>12.5 10.9 11.1</td>
<td>0.0 11.8 10.2</td>
<td>-12.5</td>
</tr>
<tr>
<td>Bus/Shuttle</td>
<td>25.1 22.8 23.2</td>
<td>37.5 13.7 15.3</td>
<td>12.4</td>
</tr>
<tr>
<td>Caltrain</td>
<td>56.3 35.9 39.6</td>
<td>100.0 56.9 62.7</td>
<td>43.7</td>
</tr>
<tr>
<td>Bike</td>
<td>12.5 5.4 6.5</td>
<td>0.0 3.9 3.4</td>
<td>-12.5</td>
</tr>
<tr>
<td>Walk</td>
<td>43.8 22.8 25.9</td>
<td>50.0 52.9 52.5</td>
<td>6.2</td>
</tr>
<tr>
<td>Other</td>
<td>6.3 2.2 3.7</td>
<td>12.5 11.8 11.9</td>
<td>6.2</td>
</tr>
<tr>
<td>CarLink</td>
<td>0.0 0.0 0.0</td>
<td>100.0 56.9 62.7</td>
<td>100.0</td>
</tr>
<tr>
<td>VMT(^c)</td>
<td>10.4 34.4 30.8</td>
<td>11.6 7.2 7.8</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Notes: Unlike most presentations of mode share data, this tabulation treats each component mode of a multi-mode trip separately. Thus a trip from work to home via CarLink, Caltrain, and walking is entered into the tabulation as one CarLink trip, one Caltrain trip, and one walk trip. Since many participants already took more than one mode to commute, the total percentages of mode use sum to more than 100 percent both before and after CarLink.

- \(^a\) HB = Homebased Users.
- \(^b\) WB = Workbased Commuters and Day Users.
- \(^c\) Total Drive Alone, Carpool, and CarLink VMT.

A classic example is that of the Tennessee Valley Authority (TVA) in Knoxville, where extensive involvement by the TVA in the 1970s led to large increases in ridesharing among employees. The TVA program was oriented almost exclusively toward its approximately 3,000 central headquarters employees in downtown Knoxville. The program grew from one express bus in late 1973 to 10 buses carrying 330 people and six vanpools carrying 69 people 1 year later. Support actions included worksite advertising, a (pre-internet) telephone information service, carpool matching, and vehicle leasing assistance. Not insignificantly, a national fuel crisis occurred that year, with gasoline price increases that obviously raised interest in alternatives to driving. The program continued, however, long after the initial shock. Bus and vanpool subsidies were added, as were preferential, inexpensive carpool parking spaces. By the end of 1976, 23 express buses, 18 vanpools, and 436 carpools were carrying 950, 2,400, and 1,400 employees, respectively, while site employment had grown by 400. The dramatic mode shifts and parking demand reductions that occurred are shown in Table 19-8 below for pre-program, program without monetary incentives, and program with monetary incentives (Wegmann, Chatterjee, and Stokey, 1979):

Table 19-8 Impacts on Mode Share of the TVA Transportation Brokerage Program

<table>
<thead>
<tr>
<th>Mode and Other Information</th>
<th>Before Program</th>
<th>First Stage Gasoline Crisis Effect</th>
<th>Stage 1: Before Monetary Incentive</th>
<th>Second Stage Gasoline Crisis Effect</th>
<th>Stage 2: After Monetary Incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Alone</td>
<td>65% Yes</td>
<td>42% No</td>
<td>18%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpool</td>
<td>30 Yes</td>
<td>40 No</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanpool</td>
<td>0 Yes</td>
<td>2 No</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Express Bus</td>
<td>0 Yes</td>
<td>11 No</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular Bus</td>
<td>3 Yes</td>
<td>3 No</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2 Yes</td>
<td>2 No</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>2,950 —</td>
<td>3,000 —</td>
<td>3,400 —</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking Demand</td>
<td>2,200 —</td>
<td>1,940 —</td>
<td>1,070 —</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


The success of the TVA project spawned a citywide “brokerage” program in January 1976. By June 1977, 47 vanpools were carrying 450 commuters to 12 employers. Over 18,000 people had requested and received carpool match lists. A random sample indicated that 13 percent of the lists were used to make initial contacts with the intent of ridesharing. However, only 3.3 percent of those using the lists (approximately 80 persons) actually entered into ridesharing agreements. Degree of response was said to relate to the level of employer interest at each firm contacted (U.S. Department of Energy, 1979).

Response to Incentives and Disincentives

The theoretical basis for the role of incentives and disincentives in encouraging use of alternative modes is examined in the “Individual Behavioral and Awareness Considerations” subsection of the “Underlying Traveler Response Factors” section. In summary, to make alternative modes
more attractive, it is frequently necessary to provide incentives to reduce the competitive advantage driving often provides in terms of door-to-door time savings and convenience. These incentives may act to reduce either the travel time or the travel cost associated with using the alternative, such that the comparative disadvantage vis-à-vis auto use is reduced or reversed. Both travel time and cost incentives are relevant in the choice of commute mode. Ways to improve the comparative travel time of alternative modes include:

- Reducing over-the-road travel time by providing HOV lanes on highways or streets, or providing exclusive access via HOV ramps or turning provisions.

- Reducing wait or walk time in the case of transit, by shortening headways between transit vehicles, reducing the number or duration of transfers, or enhancing route coverage.

- Providing exclusive, close-in parking at the work site for carpool or vanpool users, thus offering a walk time advantage over those driving alone.

With exception of the third strategy, preferential parking, which was discussed earlier as a support strategy, these travel time strategies are not the subject of this chapter. Over-the-road travel time savings and reductions in transit wait or access time are public-side strategies (neither employer-provided nor TDM per se), and are discussed in detail in Chapters 2 and 3, “HOV Facilities” and “Park-and-Ride/Pool”; Chapters 4 through 8, which as a group cover “Transit Facilities and Services”; and Chapters 9 through 11, which address “Public Transit Operations.”

The economic incentives covered in this chapter and this section are financial incentives. In other words, they involve actions that either transfer money to decrease the cost of using alternative modes, increase the cost of driving alone (disincentives), or otherwise provide a benefit which has monetary value to those who would use alternative modes. These include:

- Alternative mode subsidies (incentives).

- Parking fees or surcharges (disincentives).

- HOV parking discounts for carpools or vanpools (incentives).

- Travel allowances (also includes parking “cash-out”), which allow the recipient to make the best travel choice given a discretionary budget, perhaps in lieu of free parking (normally functioning as incentives).

- Various gifts, drawings, prizes, or privileges that have a tangible monetary value (incentives).

In this discussion, “incentives” will generally be used as shorthand for both incentives and disincentives.

Incentives Insights from the 82-Program Sample

Table 19-9 cross-classifies incentives used by the employers in the 82-program sample and presents the VTRs associated with each cross-classification and with each incentive category overall (the “All With Incentive” row). The sample data in the cross-tabulation frame a picture of the frequency with which particular incentives were used within the sample, alone or in combination. The VTR percentages illuminate their relative associations with apparent employee vehicle trip reductions.
Note that restricted parking is included in this table, not because it is considered a financial incentive, but for the purpose of conditioning its importance in relation to other incentives.

**Individual Incentives.** Focusing first on the bottom two rows of Table 19-9, it is possible to review the separate occurrence rate and impact differential for each incentive. Clearly the biggest differential among the incentives shown is with parking pricing: The 31 programs that employed parking fees have an average VTR of 24.6 percent, which is double the 12.3 percent VTR for those sites with free parking.

Of similar magnitude, in comparison with unpriced parking, is the effect of providing parking discounts for HOVs as part of parking pricing. Obviously, parking must first be priced in order for the discounts to be relevant, hence 22 of the 31 programs with parking fees also offered discounts for HOVs. These 22 programs exhibit an average VTR of 25.7 percent, which is 1.1 percentage points above the VTR for all 31 sites with parking fees and 13.4 percentage points greater than for the 51 sites with no parking pricing or discounts at all.

Transit fare subsidies were the most commonly offered incentive, seen in over one-half of the examples. Programs with transit subsidies have the third largest impact in terms of VTR, with such programs exhibiting an average VTR of 20.6 percent, 7.5 percentage points higher than the 13.1 percent VTR in those programs not offering transit fare subsidies.

The VTRs associated with vanpool subsidies in Table 19-9 suggest a curious inverse relationship, wherein programs that offered subsidies show up as less effective than those that did not (15.3 percent VTR versus 17.2 percent VTR). A deeper analysis of this finding—beyond that available in the table—reveals that of the 12 programs providing vanpool subsidies, six operated a vanpool program as a transportation service and six did not. The six with a vanpool service have an average implied VTR of 20.9 percent. The other six, which had a vanpool subsidy but not a vanpool service, average a VTR of only 9.8 percent. Hence, the effectiveness of the vanpool subsidy is more than doubled when combined with a formal vanpool service.

Also relevant are the results for 16 employers who provided a vanpool transportation service but did not offer a separate and distinct vanpool subsidy. These sites had an average VTR of 19.8 percent, almost as high as programs that reported both a vanpool service and a vanpool subsidy. This dissection of the data suggests that vanpool service provision may be much more important than a separate subsidy. It may also be that the employer vanpool service programs contained one or more implicit subsidies. In any case, it is the inclusion of relatively more programs without vanpool operations in the Table 19-9 aggregation of employers offering vanpool subsidies that drags down the average VTR, not any inherent flaw in subsidization of HOV use.
<table>
<thead>
<tr>
<th>Other Incentive</th>
<th>Parking Fees</th>
<th>HOV Discounts</th>
<th>Transit Subsidy</th>
<th>Vanpool Subsidy</th>
<th>Carpool Subsidy</th>
<th>Bike/Walk Subsidy</th>
<th>Travel Allowance</th>
<th>Other Monetary</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted Parking</td>
<td>27.6% (26)</td>
<td>29.8% (18)</td>
<td>27.8% (23)</td>
<td>36.2% (3)</td>
<td>26.6% (3)</td>
<td>30.4% (1)</td>
<td>22.8% (12)</td>
<td>29.9% (2)</td>
<td>24.6% (35)</td>
</tr>
<tr>
<td>Parking Fees</td>
<td>25.8% (21)</td>
<td>27.6% (21)</td>
<td>36.2% (3)</td>
<td>24.7% (2)</td>
<td>n/a (0)</td>
<td>23.8% (12)</td>
<td>29.0% (2)</td>
<td>24.6% (31)</td>
<td></td>
</tr>
<tr>
<td>HOV Parking Discounts</td>
<td>26.9% (16)</td>
<td>36.2% (3)</td>
<td>38.9% (1)</td>
<td>n/a (0)</td>
<td>28.9% (8)</td>
<td>29.0% (2)</td>
<td>25.7% (22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transit Subsidy</td>
<td>14.4% (10)</td>
<td>20.5% (3)</td>
<td>12.1% (2)</td>
<td>26.2% (8)</td>
<td>22.5% (6)</td>
<td>20.6% (42)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanpool Subsidy</td>
<td>12.1% (1)</td>
<td>12.1% (1)</td>
<td>23.4% (3)</td>
<td>9.7% (2)</td>
<td>15.3% (12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpool Subsidy</td>
<td></td>
<td>21.3% (2)</td>
<td>24.7% (2)</td>
<td>n/a (0)</td>
<td>23.0% (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bike/Walk Subsidy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12.1% (1)</td>
<td>18.2% (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel Allowance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26.2% (4)</td>
<td>19.3% (24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Monetary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23.1% (11)</td>
</tr>
</tbody>
</table>

Note: Restricted parking is not a monetary incentive per se, but is included for comparison.

Sources: Derived (see Appendix Table 19-A) from Comsis (1994), Comsis and ITE (1993), Rutherford et al. (1994), and Comsis et al. (1996).
Table 19-9 shows that carpool and bike/walk subsidies were fairly uncommon, found at only four and three sites, respectively, although they are associated with above-average rates of VTR in the particular cases involved. The travel allowance and other monetary incentives are associated with above-average rates of VTR, while the comparable employers without those incentives have below-average VTRs. In these examples, the travel allowance only accounts for a 3.3 percentage point difference compared to programs not offering it, while the other monetary category accounts for a 7.0 percentage point difference.

Incentive Combinations. The top portion of Table 19-9 illustrates VTR performance for incentive combinations found in the 82-program sample. There are many cases where the combined occurrence of an incentive pairing is sufficiently uncommon that it shows a small sample size (three or less), and hence its average VTR performance must be treated with special caution. What seem to be the most frequent incentive combinations and their effective impacts follow:

- Parking fees (priced parking) together with restricted parking averages 27.6 percent VTR, while restricted parking overall and priced parking overall both average 24.6 percent.

- Parking fees with HOV parking discounts averages 25.8 percent VTR, slightly greater than parking pricing overall (24.6 percent).

- Programs including a transit fare subsidy (20.6 percent average VTR) have a lower VTR average when combined with subsidies for competing modes, such as vanpool subsidies (14.4 percent) and bike/walk subsidies (12.1 percent). There is no clear explanation for this except possibly the small sample sizes (two to three programs) when in combination with carpool and bike/walk subsidies. In any case, the VTR is virtually undiminished when combined with carpool subsidy (20.5 percent), and is enhanced when combined with the travel allowance (26.2 percent) and other monetary incentives (22.5 percent).

- The travel allowance does better than its average program VTR of 19.3 percent in all combinations with other incentives, including transit (26.2 percent), vanpool (23.4 percent), and carpool subsidies (24.7 percent), and also works better with parking fees (23.8 percent) or restricted parking (22.8 percent).

- Other monetary incentives (23.1 percent) appear to be enhanced when teamed with restricted parking (29.9 percent), parking fees (29.0 percent), HOV parking discounts (29.0 percent) and travel allowance (26.2 percent), but show less impact when teamed with transit (22.5 percent), vanpool (9.7 percent), or bike/walk subsidies (12.1 percent).

One is tempted to wonder if the relatively poor VTR showing for several modal subsidy combinations is a reflection of lack of program focus. There is, unfortunately, no data to either support or reject such speculation. Small program sample sizes in the case of several combinations together with the inherent variability among program circumstances remain more obvious potential explanations.

Effects Without Restricted or Priced Parking. It is generally acknowledged that parking conditions at a work site have a major underlining effect on the success of TDM programs. Where parking supply is limited or restricted (Chapter 18, “Parking Management and Supply”) or where it is not free (Chapter 13, “Parking Pricing and Fees”), the desire of employees to find and use alternatives is demonstrably more urgent. To test this effect in the analysis of incentive measures, Table 19-10 summarizes the performance of those 27 programs that offered incentives but had no restrictions on parking. As a group, these 27 programs have an average VTR of 14.3 percent, which is less than the overall average for the 82-program sample of 16.9 percent. In addition, in a direct cell-by-cell com-
parison of Table 19-10 with Table 19-9, the combinations without restricted or priced parking exhibit a lower VTR in each case with data available where the included examples are not identical.

On the other hand, the 14.3 percent overall average VTR for the 27 programs without restricted/priced parking is greater than the average VTR of 7.0 percent for the 14 programs that had unrestricted parking and also did not offer subsidies. The four employers in the 82-program sample who had restricted/priced parking but did not offer subsidies have an average VTR of only 11.5 percent. The 37 employers who had both restricted/priced parking and offered subsidies have an average 23.3 percent VTR.

Table 19-10 Vehicle Trip Reduction Percentages Related to Monetary Incentives in the Case of Programs Without Restricted or Priced Parking

<table>
<thead>
<tr>
<th>Other Incentive</th>
<th>Transit Subsidy</th>
<th>Vanpool Subsidy</th>
<th>Carpool Subsidy</th>
<th>Bike/Walk Subsidy</th>
<th>Travel Allowance</th>
<th>Other Monetary</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(8)</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(5)</td>
<td>(21)</td>
<td></td>
</tr>
<tr>
<td>Vanpool Subsidy</td>
<td>12.1%</td>
<td>8.7%</td>
<td>12.1%</td>
<td>12.1%</td>
<td>18.5%</td>
<td>13.5%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(1)</td>
<td>(1)</td>
<td>(2)</td>
<td>(9)</td>
<td></td>
</tr>
<tr>
<td>Carpool Subsidy</td>
<td></td>
<td>21.3%</td>
<td>n/a</td>
<td>n/a</td>
<td>12.1%</td>
<td>18.2%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2)</td>
<td>(0)</td>
<td>(0)</td>
<td>(1)</td>
<td>(3)</td>
<td></td>
</tr>
<tr>
<td>Bike/Walk Subsidy</td>
<td></td>
<td></td>
<td>n/a</td>
<td>12.1%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0)</td>
<td>(0)</td>
<td>(1)</td>
<td>(3)</td>
<td></td>
</tr>
<tr>
<td>Travel Allowance</td>
<td></td>
<td></td>
<td></td>
<td>26.2%</td>
<td></td>
<td>14.8%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(4)</td>
<td></td>
<td>(12)</td>
<td></td>
</tr>
<tr>
<td>Other Monetary</td>
<td>21.7%</td>
<td></td>
<td></td>
<td>18.2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(9)</td>
<td></td>
<td></td>
<td>(3)</td>
<td></td>
<td>(9)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Overall average VTR is 14.3 percent for these 27 programs without restricted or priced parking. See text for other aggregations.

Sources: Derived (see Appendix Table 19-A) from Comsis (1994), Comsis and ITE (1993), Rutherford et al. (1994), and Comsis et al. (1996).

Incentives in Conjunction with Other Site Conditions or TDM Strategies

Table 19-11 provides an assessment of how the various incentive strategies influence or are aided by other site conditions or TDM strategies. Once again, the 82-program sample is drawn upon.
Table 19-11  Vehicle Trip Reduction Percentages Related to Monetary Incentives and Other Site Programs or Conditions

<table>
<thead>
<tr>
<th>Other Conditions</th>
<th>Parking Pricing</th>
<th>HOV Discounts</th>
<th>Transit Subsidy</th>
<th>Vanpool Subsidy</th>
<th>Carpool Subsidy</th>
<th>Bike/Walk Subsidy</th>
<th>Travel Allowance</th>
<th>Other Monetary</th>
</tr>
</thead>
<tbody>
<tr>
<td>With</td>
<td>With</td>
<td>With</td>
<td>With</td>
<td>With</td>
<td>With</td>
<td>With</td>
<td>With</td>
<td>With</td>
</tr>
<tr>
<td>(31)</td>
<td>(22)</td>
<td>(60)</td>
<td>(42)</td>
<td>(40)</td>
<td>(12)</td>
<td>(70)</td>
<td>(4)</td>
<td>(3)</td>
</tr>
<tr>
<td>All</td>
<td>24.6%</td>
<td>12.3%</td>
<td>25.7%</td>
<td>13.8%</td>
<td>15.3%</td>
<td>17.2%</td>
<td>23.0%</td>
<td>16.6%</td>
</tr>
<tr>
<td>16.9%</td>
<td>19.3%</td>
<td>16.0%</td>
<td>23.1%</td>
<td>16.1%</td>
<td>16.9%</td>
<td>(31)</td>
<td>(51)</td>
<td>(22)</td>
</tr>
</tbody>
</table>

Transit Availability

| High | 27.0% | 18.9% | 26.4% | 25.1% | 27.4% | 22.5% | 26.2% | 25.9% | n/a | 26.0% | n/a | 26.0% | 20.3% | 26.8% | 38.2% | 24.9% | 26.0% |
| (21) | (3)   | (16)  | (8)   | (17)  | (7)   | (3)   | (21)  | (0)  | (0) | (24)  | (0) | (0)  | (19)  | (22)  | (24)  |

| Medium | 13.7% | 8.0% | 19.0% | 9.6% | 11.2% | 13.6% | 10.5% | 13.5% | 20.5% | 10.5% | 12.1% | 12.1% | 19.6% | 7.7% | 15.0% | 11.5% | 12.1% |

| Low    | 47.4% | 12.9% | 47.7% | 12.9% | 20.3% | 10.5% | 10.5% | 14.4% | 30.4% | 13.3% | 30.4% | 13.3% | 17.6% | 12.1% | 22.0% | 12.3% | 13.8% |
| (2)   | (38)  | (1)   | (38)  | (38)  | (13)  | (26)  | (6)   | (33)  | (1)  | (38)  | (1)  | (38)  | (12)  | (58)  | (11)  |

Level of Support

| High | 24.4% | 12.5% | 23.7% | 16.6% | 22.8% | 15.7% | 14.9% | 19.6% | n/a | 19.0% | n/a | 19.0% | 20.7% | 18.1% | 17.3% | 19.5% | 19.0% |

| Medium | 27.3% | 12.9% | 31.9% | 13.1% | 20.4% | 11.7% | 11.5% | 17.1% | 27.1% | 14.8% | 18.2% | 15.7% | 20.9% | 14.3% | 33.1% | 13.6% | 15.9% |

| Low    | 22.8% | 9.6% | 24.0% | 10.2% | 17.8% | 10.0% | 44.2% | 13.2% | 10.5% | 15.3% | n/a | 15.0% | 13.6% | 15.6% | n/a | 15.0% | 15.0% |

Transportation Services

| Transit | 35.3% | 2.6% | 35.3% | 2.6% | 35.3% | 2.6% | n/a | 18.9% | n/a | 18.9% | n/a | 18.9% | 21.1% | 16.7% | 42.4% | 11.1% | 18.9% |
| (2)   | (2)   | (2)   | (2)   | (2)   | (2)   | (0)   | (4)   | (0)  | (4)  | (0)  | (4)  | (2)   | (1)   | (3)   |

| Vanpool | 34.1% | 10.7% | 34.1% | 10.7% | 25.0% | 17.0% | 23.1% | 20.3% | n/a | 21.3% | n/a | 21.3% | 30.7% | 17.8% | 13.8% | 22.1% | 21.3% |
| (5)   | (6)   | (5)   | (6)   | (6)   | (5)   | (4)   | (7)   | (0)  | (11) | (0)  | (11) | (3)   | (8)   | (10)  | (11)  |

| Both    | 23.6% | 16.1% | 38.0% | 14.5% | 30.2% | 9.3% | 16.0% | 19.3% | 42.4% | 16.4% | n/a | 18.8% | 3.4% | 20.0% | n/a | 18.8% |
| (4)   | (7)   | (2)   | (9)   | (5)   | (6)   | (2)   | (9)   | (1)  | (10) | (0)  | (11) | (2)   | (9)   | (0)   | (11)  |

| Co. Veh’s. | 36.6% | 14.6% | 34.8% | 18.9% | 34.4% | 7.6% | 16.4% | 27.5% | 38.9% | 23.2% | n/a | 26.2% | 40.0% | 15.9% | 20.7% | 23.8% | 24.6% |
| (5)   | (6)   | (4)   | (7)   | (4)   | (7)   | (4)   | (3)   | (7)   | (1)  | (7)  | (0)  | (4)   | (7)   | (2)   | (9)   | (11)  |

| No Serv’s. | 18.2% | 11.3% | 15.6% | 13.1% | 13.1% | 14.2% | 5.8% | 14.3% | 17.7% | 13.4% | 18.2% | 13.3% | 13.5% | 13.7% | 19.2% | 12.5% | 13.6% |
| (16)  | (32)  | (10)  | (38)  | (24)  | (24)  | (4)   | (4)   | (4)   | (3)   | (45)  | (3)   | (45)  | (14)  | (34)  | (40)  |

Sources: Derived (see Appendix Table 19-A) from Comsis (1994), Comsis and ITE (1993), Rutherford et al. (1994), and Comsis et al. (1996).
Level of Transit Availability. Across the board, programs located in proximity to good transit service outperform those with medium to poor service. The 24 programs of all types favored with high transit availability have an average VTR of 26.0 percent, compared to only 12.1 percent for those with medium availability and 13.8 percent for those with low availability. Given a comparative advantage of high transit availability, particular incentives then either enhance or lessen VTR—or have negligible additional effect—based on their compatibility with transit use.

For example, parking pricing further encourages transit use. Programs with high transit availability and parking fees have an average VTR of 27.0 percent versus only 18.9 percent without priced parking. At the same time, offering parking discounts for HOVs is hardly an incentive to use transit, and accordingly there is only a small difference in VTR with or without the incentive (26.4 percent versus 25.1 percent). The same is true for vanpool subsidies, where the difference is 26.2 percent VTR with, versus 25.9 percent without.

In high transit availability cases transit subsidies are, logically, associated with a higher VTR (27.4 percent) than programs with no transit subsidies (22.5 percent). In the case of other monetary incentives, for whatever reason, the difference is even larger (38.2 percent with such incentives versus 24.9 percent without). No programs in the sample were observed to provide carpool or bike/walk subsidies in areas with high transit availability.

Programs in areas with medium or low transit availability also show positive impact on VTR from application of incentives like parking pricing, transit subsidies, and other monetary measures. Parking discounts for HOVs show a positive effect on VTR in the medium and low availability cases, illustrating the greater importance of HOV benefits where the transit alternative is less attractive. The travel allowance cases produce a somewhat curious result in that they show positive impacts on VTR for medium and low availability cases, but a negative effect where transit availability is high. Generally, the travel allowance provides for maximum user choice, and where transit service is at a maximum, one would expect that transit would be a preferred alternative.

Level of Employer Support. At all levels of employer support—from high to low—there is generally a demonstrably positive effect on VTR performance by providing incentives. This is certainly the case with regard to parking pricing, HOV parking discounts, and transit subsidies, and is true in most cases for carpool and bike/walk subsidies, travel allowances, and other monetary incentives. In the case of parking pricing, the effect on VTR seems to be almost independent of level of support, with low support programs registering a 22.8 percent VTR compared to 24.4 percent for high support programs, and both substantially higher than the equivalent programs without parking pricing (9.6 percent and 12.5 percent, respectively). HOV parking discounts and transit subsidies have a similar effect of increasing trip reduction almost independent of level of support, even though level of support shows a measurable VTR difference between high and low programs. Travel allowances seem to work better in combination with high or medium support levels and more poorly with low support levels. Oddly enough, in the 82-program sample, other monetary measures are associated with higher VTRs in the instance of medium support levels than they are in combination with high support levels.

Transportation Services. Once again, several of the financial incentives have a demonstrable, positive effect on the VTR performance of employer programs, in this case with respect to programs that provide transportation services. Parking pricing, HOV parking discounts, and transit subsidies again show evidence of a major additional VTR impact when combined with the respective transportation service. A number of combinations involve particularly low program sample sizes, however, requiring extra caution vis-à-vis individual VTR percentages.
Employer-enabled transit service, when combined with parking pricing, shows an average VTR of 35.3 percent compared to only 2.6 percent when parking is not priced. The differential is 34.1 percent with pricing versus 10.7 percent without when vanpool programs are the service provided, 23.6 percent versus 16.1 percent for combined transit and vanpool programs, and 36.6 percent versus 14.6 percent for service programs offering use of company vehicles. These VTR performance attainments exceeding 20 to 30 percent when parking pricing is applied contrast substantially not only with those programs that do not price parking, but also with programs that do not provide services, where VTR averages only 18.2 percent when parking is priced. These findings suggest an important combined benefit for mixing these two types of strategies. The same situation is evident for HOV parking discounts in combination with services and for transit subsidies with services. The various combinations appear to yield a much larger impact than either the monetary strategy or the transportation services strategy acting independently.

**Additional Evidence of Transportation Incentive Effects**

**Parking Supply and Pricing.** As revealed in the preceding analysis, the supply and price of parking serving a worksite have the single largest effect on the performance of employer-based TDM programs. Not only does limited parking or the existence of parking fees discourage solo driving outright, but such conditions also tend to increase the appeal of travel alternatives and other TDM strategies. Providing corroboration, a study of six San Francisco Medical Institutions found that the monthly charge for employee on-site parking was the single most influential factor in determining employee drive-alone rates. The monthly parking charge at each institution was also found to be highly correlated to the severity of off-site parking restrictions and the abundance of transit service (the second and third most important factors after parking pricing). An increase of $8 per month in employee parking charges was found to be necessary to decrease employee SOV mode split rates by one percentage point (Dowling, Feltham, and Wycko, 1991).

Because parking has such a powerful role, it is the exclusive subject of Chapter 13, “Parking Pricing and Fees,” and Chapter 18, “Parking Management and Supply.” These chapters offer substantially more information on the key role played by parking in employer and institutional TDM programs. In particular, see Table 13-22, “Relationship Between Parking Pricing and/or Subsidies and Vehicle Trip Rates at Employment Sites,” and associated narrative, in conjunction with parking pricing. Likewise, see especially Table 18-8, “Parking and Transportation Characteristics at Six San Francisco Medical Institutions,” in relation to parking supply.

Beyond the lessons of Chapters 13 and 18, further insight on the impact of parking and other financial incentives may also be derived from the 82-program sample, drawing upon the information on the composition of individual programs in Appendix Table 19-A. A subgroup of 56 sites, which incorporated some combination of financial incentives into their programs, has been extracted and tabulated in Table 19-12.
Table 19-12  Transportation Incentive Programs from the 82-Program Sample

<table>
<thead>
<tr>
<th>Employer</th>
<th>Restricted Parking</th>
<th>Parking Fees</th>
<th>HOV Discounts</th>
<th>Parking Cash Out</th>
<th>Travel Allowance</th>
<th>Transit Subsidy</th>
<th>Other Subsidy</th>
<th>Other Incentives</th>
<th>VTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aetna – Hartford CT</td>
<td>Yes</td>
<td></td>
<td></td>
<td>TR subsidy</td>
<td>$21/mo.</td>
<td>VP Program</td>
<td>50%</td>
<td>VP Rideshare</td>
<td>0%</td>
</tr>
<tr>
<td>Allergan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100% VP</td>
<td></td>
<td>Days Off, Raffles</td>
<td>13.8%</td>
</tr>
<tr>
<td>Atlantic Richfield Company – Los Angeles</td>
<td>Yes</td>
<td>$87/mo.</td>
<td>50% CP2</td>
<td>Free HOV3+</td>
<td>$15/mo.</td>
<td></td>
<td></td>
<td>Subsidized VP Program</td>
<td></td>
</tr>
<tr>
<td>Arlington Heights, IL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$500/yr.</td>
<td>$500/yr.</td>
<td>Time Off</td>
<td>34.5%</td>
</tr>
<tr>
<td>AT&amp;T – Silver Spring</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>12.1%</td>
</tr>
<tr>
<td>Bellevue, WA, City Hall</td>
<td>Yes</td>
<td>$30/mo.</td>
<td>Yes</td>
<td></td>
<td>Yes</td>
<td>VP $25/mo.</td>
<td></td>
<td>CP/TR $15</td>
<td>24.0%</td>
</tr>
<tr>
<td>Bonneville Power Adm.</td>
<td>Yes</td>
<td>$25-40/mo.</td>
<td></td>
<td></td>
<td>$21/mo.</td>
<td></td>
<td></td>
<td></td>
<td>30.0%</td>
</tr>
<tr>
<td>Boulder, CO, Hospital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td>14.1%</td>
</tr>
<tr>
<td>Broadway Plaza 1</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>5.6%</td>
</tr>
<tr>
<td>Broadway Plaza 2</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15.4%</td>
</tr>
<tr>
<td>Brown &amp; Bain</td>
<td>$25-50/mo.</td>
<td>25%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.7%</td>
</tr>
<tr>
<td>CA Franchise Tax Board</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$15/mo.</td>
<td>$25/mo. VP</td>
<td></td>
<td></td>
<td>5.6%</td>
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<tr>
<td>Cedars Sinai Hospital</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>$40/mo.</td>
<td></td>
<td></td>
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<td>12.6%</td>
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<td>CH2M Hill - Bellevue</td>
<td>Yes</td>
<td>$56/mo.</td>
<td>Yes</td>
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<td>$40/mo.</td>
<td>$15/mo.</td>
<td>$15/mo.</td>
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<td>Chubb Insurance</td>
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<td>$1/day</td>
<td>25%</td>
<td>25%</td>
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<td></td>
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<tr>
<td>City of Simi Valley, CA</td>
<td></td>
<td>$2-3/day</td>
<td>0.75/day</td>
<td>Bike Equip.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>43.5%</td>
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<td>City Place Mall</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26.7%</td>
</tr>
<tr>
<td>City/County of Denver</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>19.8%</td>
</tr>
<tr>
<td>Commuter Transp. Svcs.</td>
<td></td>
<td>$50/mo.</td>
<td>$40/mo.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17.5%</td>
</tr>
<tr>
<td>Comsis Corp.</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td>$60/mo.</td>
<td>County</td>
<td>County</td>
<td></td>
<td>10.5%</td>
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</tbody>
</table>

(continued on next page)
<table>
<thead>
<tr>
<th>Employer</th>
<th>Restricted Parking</th>
<th>Parking Fees</th>
<th>HOV Discounts</th>
<th>Parking Cash Out</th>
<th>Travel Allowance</th>
<th>Transit Subsidy</th>
<th>Other Subsidy</th>
<th>Other Incentives</th>
<th>VTR</th>
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<td>Cornell University</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
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<td>Yes</td>
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<td>13.3%</td>
</tr>
<tr>
<td>GEICO</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>14.1%</td>
</tr>
<tr>
<td>Gotcha Sportswear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time Off</td>
<td>34.1%</td>
</tr>
<tr>
<td>G-Street Fabrics</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td>11.8%</td>
</tr>
<tr>
<td>Hartford Steam Boiler</td>
<td>Yes</td>
<td>$110/mo.</td>
<td>CP2 $75</td>
<td>CP3 $40</td>
<td>CP4+ $10</td>
<td>$10-30/mo.</td>
<td>$10-30/mo.</td>
<td>Vanpool</td>
<td>36.4%</td>
</tr>
<tr>
<td>Heller Financial</td>
<td></td>
<td>$55/mo.</td>
<td>HOV3 Free</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time Off</td>
<td>15.6%</td>
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<tr>
<td>Hillsborough Co., FL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50%</td>
<td>3.4%</td>
</tr>
<tr>
<td>IT Corp. – Irvine, CA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
<td>$50/mo. Ped.</td>
<td>Annual Drawing</td>
<td>12.1%</td>
</tr>
<tr>
<td>Johnson &amp; Higgins</td>
<td>Yes</td>
<td>$180/mo.</td>
<td></td>
<td></td>
<td>$10/mo.</td>
<td></td>
<td></td>
<td></td>
<td>44.2%</td>
</tr>
<tr>
<td>Kirkland, WA, City Hall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$125/mo.</td>
<td></td>
<td></td>
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<td>16.3%</td>
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<tr>
<td>Lawrence Livermore</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$20/mo.</td>
<td></td>
<td></td>
<td></td>
<td>17.4%</td>
</tr>
<tr>
<td>Nat. Optical Observat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
<td>39.8%</td>
</tr>
<tr>
<td>Nike – Beaverton, OR</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50%</td>
<td>$1/day</td>
<td></td>
<td>5.7%</td>
</tr>
<tr>
<td>NOAA</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>36.0%</td>
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<tr>
<td>Nuclear Reg. Comm.</td>
<td>Yes</td>
<td>$60/mo.</td>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>30.6%</td>
</tr>
<tr>
<td>P. L. Porter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$15/mo.</td>
<td></td>
<td></td>
<td></td>
<td>23.0%</td>
</tr>
<tr>
<td>Pacific Pipeline</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>$24/mo.</td>
<td></td>
<td></td>
<td></td>
<td>15.1%</td>
</tr>
<tr>
<td>Pasadena City Hall</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td>18.5%</td>
</tr>
<tr>
<td>Puget Sound Blood Center</td>
<td>Yes</td>
<td>Yes</td>
<td>$25/mo.</td>
<td>discount</td>
<td>50%</td>
<td></td>
<td>1 day/mo.</td>
<td>Free park</td>
<td>42.4%</td>
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<td>Rick Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$25/mo.</td>
<td>$25/mo.</td>
<td></td>
<td></td>
<td>9.4%</td>
</tr>
<tr>
<td>Rockbestos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vanpool</td>
<td></td>
<td></td>
<td>29.0%</td>
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Table 19-12  (Continued)

<table>
<thead>
<tr>
<th>Employer</th>
<th>Restricted Parking</th>
<th>Parking Fees</th>
<th>HOV Discounts</th>
<th>Parking Cash Out</th>
<th>Travel Allowance</th>
<th>Transit Subsidy</th>
<th>Other Subsidy</th>
<th>Other Incentives</th>
<th>VTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Diego Trust</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>$60/mo.</td>
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<td></td>
<td></td>
<td>22.7%</td>
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<tr>
<td>Shur-Lok Corp.</td>
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<td>$21/mo</td>
<td></td>
<td></td>
<td>$10-20/mo.</td>
<td>CP</td>
<td></td>
<td></td>
<td>12.1%</td>
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<tr>
<td></td>
<td></td>
<td>$10-20/mo.</td>
<td></td>
<td></td>
<td>$25/wk. VP</td>
<td>Bike/Walk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>So. California Gas</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>$50/mo.</td>
<td>$60/mo.</td>
<td></td>
<td>Paid to not park</td>
<td>47.4%</td>
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<tr>
<td>State Farm Insurance</td>
<td>Yes</td>
<td>$44/mo.</td>
<td>$22/mo.</td>
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<td></td>
<td>$60/mo.</td>
<td></td>
<td>30.4%</td>
<td></td>
</tr>
<tr>
<td>Swedish Hospital</td>
<td>Yes</td>
<td>$62/mo.</td>
<td>$10/pool +</td>
<td>$15/add'tl.</td>
<td>$20/mo.</td>
<td>$15/mo.</td>
<td></td>
<td>18.8%</td>
<td></td>
</tr>
<tr>
<td>TransAmerica</td>
<td>Yes</td>
<td>$15 CP2</td>
<td>Free CP3+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travelers - Hartford</td>
<td>Yes</td>
<td>$25/mo.</td>
<td>$15 CP2</td>
<td>Free CP3+</td>
<td>$15/mo.</td>
<td>$20/mo. VP</td>
<td></td>
<td>44.2%</td>
<td></td>
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<tr>
<td>Univ. of Washington</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td>62.0%</td>
</tr>
<tr>
<td>US West – Bellevue</td>
<td>Yes</td>
<td>$60/mo.</td>
<td>$45 CP2</td>
<td>Free CP3+</td>
<td>Yes</td>
<td></td>
<td>Bike Equip.</td>
<td>31.3%</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1/day for</td>
<td>Rebates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varian</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Awards</td>
<td>17.4%</td>
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<tr>
<td>Ventura Co., CA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1/day for</td>
<td></td>
<td>13.3%</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>not driving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W. H. Mercer</td>
<td></td>
<td>$130/mo.</td>
<td>$91/mo.</td>
<td></td>
<td>100%</td>
<td>100%</td>
<td>Ferry</td>
<td>22.7%</td>
<td></td>
</tr>
<tr>
<td>Walker Richer &amp; Quinn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
<td>60% VP or</td>
<td>Ferry</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Warner Center Hilton</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$15/mo.</td>
<td>$15/mo.</td>
<td></td>
<td>43.7%</td>
<td></td>
</tr>
</tbody>
</table>

Notes:  CP = Car Pool, VP = Van Pool, TR = Transit.

Source: Appendix Table 19-A.
The data in this table not only provide a guide as to which sites have used particular incentives, but also help illustrate how varied the combination of incentive strategies is in practice. This variability, plus lack of uniformity in the way the various incentives are defined or measured, demonstrates why it has been difficult to isolate the contribution of individual incentive strategies.

In relation to parking, previous analysis indicated that those 39 sites with restricted and/or priced parking achieved an average VTR of 24.1 percent, versus 12.2 percent for those without parking controls. One way in which the incentive effect of parking pricing can be increased is by teaming it with strategies that further magnify the cost advantages of shifting travel modes. Two such strategies that have close linkages with parking pricing are parking discounts for HOVs and parking cash-out.

**HOV Parking Discounts.** HOV parking discounts offer employees who rideshare an additional cost advantage through reduced parking rates. Frequently these discount rates are scaled to the number of occupants, with HOVs of 3 or more often parking for free or at nominal cost. Sites in Table 19-12 that employed HOV parking discounts include: Atlantic Richfield Company—Los Angeles (34.5 percent VTR), Bellevue City Hall (30.0 percent), Broadway Plaza 1 (5.6 percent), Broadway Plaza 2 (15.4 percent), CH2M Hill (38.9 percent), City and County of Denver (19.8 percent), Hartford Steam Boiler (36.4 percent), Heller Financial (15.6 percent), Pasadena City Hall (18.5 percent), Puget Sound Blood Center (42.4 percent), San Diego Trust and Savings (22.7 percent), Southern California Gas (47.4 percent), Swedish Hospital (28.2 percent), TransAmerica (18.8 percent), Travelers Insurance (44.2 percent), the University of Washington (62.0 percent), US West (31.3 percent), and Wm. H. Mercer (22.7 percent). This combination of balancing fee-based disincentives with positive incentives has a clear impact on the success with which these programs reduce vehicle trips. Table 19-12 provides detail on the combination of strategies and circumstances which are at play in each of the examples and there is additional information in Appendix Table 19-A.

**Parking Cash-out.** Another strategy that works in tandem with parking pricing is parking cash-out, in which employees are given the option of exchanging the privilege of a free parking space for the cash equivalent, which they may then use flexibly to defray the cost of other transportation options including transit, walking, or biking. Such cash-out programs work best when employers are paying separately for parking, or where there is a parking shortage. The 82-program sample does not have many examples of parking cash-out as it is a relatively new TDM strategy. Only the City of Pleasanton, California, and Cedars Sinai Hospital officially cited cash-out programs. Aetna Insurance provided a $21 monthly transit subsidy in exchange for the employee’s parking space, and State Farm Insurance in Orange County, California, took the unusual approach of paying employees not to park by offering cashable scrip linked to travel mode.

There are various studies of parking cash-out covered in Tables 13-12 through 13-14 of Chapter 13, “Parking Pricing and Fees.” A 1997 study of eight parking cash-out programs in California found that total vehicle trips declined by 17 percent on average after a parking cash-out option was introduced at various urban and suburban work sites. This outcome was achieved by a reduction in drive-alone share from 76 to 53 percent, coupled with an increase in carpooling from 14 to 23 percent, transit from 6 to 9 percent, and bike/walk from 3 percent to 4 percent (Shoup, 1997).

**Alternative Mode Subsidies.** While parking has a powerful effect on vehicle trip making, its principal drawback is that it is very unpopular to implement proactively as a strategy. For employers located in areas with already restricted parking, pricing is more likely to be accepted as a fact of life for commuters. The one major difficulty would be in removing an existing parking subsidy when commuters have become accustomed to it. In contrast, in suburban areas where parking is generally not constrained, it is difficult to institute pricing without fearing a competitive dis-
advantage and loss of employees. Subsidies represent an important alternative way to use travel cost as a TDM strategy, since they encourage a desired behavior rather than discourage an undesired behavior. Of course, used in tandem, their effect is complementary, and the subsidy may allow the employer to also implement controls on parking. Parking fees, in turn, can provide the revenue source to fund the subsidies.

Federal and state tax incentive changes have made alternative mode subsidies more attractive for both employers and employees. Since 1984, Section 132(f) of the Internal Revenue Service (IRS) Code has authorized special treatment for commuter benefits. Initially, the law permitted employers to provide employees with a tax-free transit subsidy of up to $15/month. Meanwhile, employer-provided parking benefits had always been and remained fully tax exempt. Over time, the scope and amount of the alternative mode tax benefits have been steadily expanded. A major change occurred in conjunction with the Energy Policy Act of 1992 that raised the monthly employee tax-free transit subsidy limit to $60, included vanpools as an eligible mode, put a first-time ceiling on employer-provided parking of $155/month, and provided for inflation indexing. By early February of 2009, the non-taxable monthly transit/vanpool subsidy limit was $120, as compared to $230 per month for parking.

Transit/vanpool and auto commute mode federal tax treatment was equalized for the first time with the signing on February 17, 2009, of The Emergency Economic Recovery Act. This law raised to $230 per month the pre-tax income that employees in employer-sponsored commuter benefit programs can apply to payment for use of these alternative modes (TransitCenter, 2009). The tax deduction equalization does not extend to non-motorized transport, but there now exists a similarly applied $20 per month tax allowance for bicycling expenses (Los Angeles County Metropolitan Transportation Authority, 2009). Note that the timing of these new equalization and bicycling provisions is such that no program results reported in this chapter reflect these latest tax benefit enhancements.8

A number of states have also implemented tax incentive programs to encourage employers to provide transit or vanpool benefits to employees. These programs generally work to enhance cost savings for businesses. Examples range from a $25 annual tax credit for each employee receiving a commuter benefit in Georgia to $30 per employee per month for specified alternative mode benefits in Maryland (U.S. Environmental Protection Agency, 2005).

Transit Vouchers/Passes/Discounts. The easiest way to convey this employer subsidy is through transit vouchers or passes. Many metropolitan transit agencies actively administer transit pass programs designed to facilitate employers’ efforts to provide subsidies to employees. A popular medium used in places like Philadelphia and New York City is TransitChek, in which an agreement between the employer and the transit agency provides employees with vouchers that can be used to buy tokens, tickets or passes from public or private transit operators (Comsis et al., 1996). Both Portland’s TriMet and Seattle’s King County Metro offer a similar set of instruments to entice employers and institutions to cost share in employees’ or students’ alternative mode costs.

Both the Portland and Seattle transit agencies market passes to private employers and universities by offering introductory discounts, although the primary discounting for the user is provided by

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8 During publication preparations for this chapter it was announced that direct federal grants (as contrasted to tax deductions) are being made through the new Energy Efficiency and Conservation Block Grant Program to government entities for, among other things, use in incentive programs to reduce commuting with single-occupancy vehicles (Institute of Transportation Engineers, 2009).

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the employer/institution. Both agencies also offer a special instrument and program to employers who are required under state regulations to reduce vehicle trips. Metro credits its proactive pass programs with increasing regional use of non-SOV modes—principally transit, but also vanpool, carpool, and non-motorized—from 4.7 million to 6.7 million annual trips between 1997 and 1999. With its FlexPass program, Metro targeted 433 King County employers affected by the Commute Trip Reduction law. As of 2000, 120 employers were participating in the program, representing 80,000 employees, who took over 7 million transit trips in 2000. Over 2,300 vanpool riders also received an employer subsidy via their FlexPass in 2000 (Hansen and Slachowitz, 2001).

Some examples of subsidized transit pass efforts and the reported outcomes include the following (Comsis et al., 1996, or as indicated):

- **First Hill (Seattle):** A program serving employers in this area led to doubling of riders in a 12-month period. Of new riders, 60 percent formerly drove alone.

- **Denver/Boulder:** A total of 132 companies generated 9,648 new riders from introduction of an ECO Pass Program.

- **Charlotte Uptown Council:** A program of transit passes combined with other TDM measures gave employees at eight companies a choice between subsidized transit passes or parking. Transit ridership increased by 800 riders between 1989 and 1991.

- **Cornell University:** Discount passes to commuters living outside Tompkins County, combined with parking pricing, reduced vehicles parked on campus by 26 percent.

- **University of Washington:** The U-PASS discount program combined with more intensive bus service and higher parking fees increased the transit mode share by 81 percent (17 percentage points) and led to a 31 percent VTR as measured over the 1989–2004 period (see “University of Washington’s U-PASS Program—Seattle, Washington” case study). AM peak period traffic counts taken in 2002 were 18 percent below 1983 levels (Association for Commuter Transportation et al., 2004). A transit pass program for Husky Stadium (free transit scrip for all ticket purchasers plus new park-and-ride services) increased game attendee transit share from 29 percent to 34 percent and dropped the auto mode share from 71 percent to 66 percent (Comsis et al., 1996).

- **University of California (Los Angeles):** Provision of an unlimited-access pass program, in the first year of promotion, increased commuting to campus via transit by 56 percent, decreased solo driving by 20 percent, and released at least 1,020 parking spaces (Georggi et al., 2007).

- **Ann Arbor:** A discounted or free transit pass program (depending on level of employer involvement), introduced to employees in the downtown between 2000 and 2001, reduced vehicle trips by 3.5 percent while bus passenger trips increased by 9.2 percent (Association for Commuter Transportation et al., 2004).

Reflecting again on the 82-program sample of employers provides additional insights on the role and impact of transit subsidies. Individual program examples featuring transit subsidies as their principal financial incentive measure have been selected from the tabulation for listing in Table 19-13. (This comparison is different from the Table 19-12 subsample because it takes transit availability into account.) An argument can be made that the impact of transit subsidies is likely to be greater if, in fact, there is good-to-reasonable transit service available to the site. Based also on the evidence that
parking constraints (supply or pricing) have a strong disincentive effect on driving, the sample of sites has been divided into three groupings that are distinguished in relation to both transit availability and restricted parking.

Table 19-13  Comparative Impact of Transit Subsidies in Relation to Parking Controls and Transit Availability (VTR in Parentheses)

<table>
<thead>
<tr>
<th>Medium and High Transit Availability (VTR)</th>
<th>Low Transit Availability (VTR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted/Priced Parking</td>
<td>Free Parking</td>
</tr>
<tr>
<td>AT&amp;T Silver Spring (24.0%)</td>
<td>Aetna (0%)</td>
</tr>
<tr>
<td>Bellevue City Hall (30.0%)</td>
<td>Boulder Hospital (14.1%)</td>
</tr>
<tr>
<td>Bonneville Power (25.6%)</td>
<td>G-Street Fabrics (11.8%)</td>
</tr>
<tr>
<td>City Place Mall (26.7%)</td>
<td>IT Corporation (12.1%)</td>
</tr>
<tr>
<td>Hartford Steam Boiler (36.4%)</td>
<td>Hillsboro County (3.4%)</td>
</tr>
<tr>
<td>Johnson &amp; Higgins (44.2%)</td>
<td>Shur-Lok Corp. (12.1%)</td>
</tr>
<tr>
<td>NOAA (36.0%)</td>
<td>Walker Richer &amp; Quinn (0%)</td>
</tr>
<tr>
<td>Nuclear Reg. Comm. (30.6%)</td>
<td></td>
</tr>
<tr>
<td>Swedish Hospital (28.2%)</td>
<td></td>
</tr>
<tr>
<td>W. H. Mercer (22.7%)</td>
<td></td>
</tr>
</tbody>
</table>

(Average VTR = 30.4%) (Average VTR = 7.6%) (Average VTR = 2.4%)

Note: A negative VTR implies that the sample program(s) had vehicle trip rates that were actually greater than the average from the surrounding area with which they were compared.

Source: Appendix Table 19-A.

In the Table 19-13 listing, those programs offering transit subsidies in the presence of both good transit and restricted parking have a significantly higher VTR (30.4 percent) than those with good transit but free parking (averaging a 7.6 percent VTR) or those with both free parking and limited transit availability (averaging a 2.4 percent VTR). Other details associated with these programs are found in Appendix Table 19-A.

A somewhat different take on the same question of transit pass program effectiveness in relation to the quality of transit service has been tested using Employee Commute Options survey data in Portland, Oregon. The researchers used a multiple regression approach to explore the relative importance of a list of employer-provided incentives—including particularly the transit agency’s PASSport program—on employee transit mode share. TriMet’s PASSport (introduced earlier in this section) allows employers to purchase transit passes for all employees at a cost based on only the number of employees who actually use transit.
The analysis, in addition to reflecting whether or not an employer offered PASSport to its employees and the proportion of cost paid by the employer, also considered the effects of transit proximity (within 1/4 mile of either a light rail transit (LRT) station or a frequent bus route), street connectivity (using an intersection ratio), and location of the worksite (in or out) in relation to Portland’s “Fareless Square,” a free transit zone covering downtown Portland and adjacent Lloyd Center. A dummy variable was used to reflect the offering of one or more other incentives such as flextime, CWW, guaranteed ride home, or company car (Dill and Wardell, 2007).

At the top of the list of key findings was that the location of an employer within the Fareless Square accounted for a 26 percentage point difference in transit mode share relative to employers not so located. (Note that the Fareless Square provides free transit rides internal to the zone but not for riding into the zone from outside or vice-versa.) As modeled on the full, unstratified data set, offering PASSport contributed 6.9 percentage points to transit mode share. Being within 1/4 mile of an LRT station added 4.1 percentage points, while being within 1/4 mile of frequent bus added 1.8 percentage points. Ideal street connectivity, relative to the worst encountered, added about 3.7 percentage points taking the variable construct into account.

Part of the reason that the Fareless Square was such an important determinant is thought to be its “urban” characteristics such as priced parking (on- and off-street) and more compact (and typically mixed-use) development patterns. When the study sample was split based on location relative to the Fareless Square, the PASSport incentive became worth 11.8 percentage points of transit share inside the fare-free zone versus 5.4 percentage points outside. Similarly, if the sample is split based on location within 1/4 mile of LRT, PASSport is worth 12 percentage points in transit share inside of the 1/4 mile range versus only 3.5 percentage points outside. Basically, the PASSport incentive has the greater effect on transit mode share where the employment location is more urban (with parking fees) and/or the transit service is better (Dill and Wardell, 2007).

Vanpool and Other Subsidies. Transit subsidies are clearly the most common alternate mode subsidies, in large part because of the favorable tax treatment they receive. Extension of comparable tax treatment to vanpools has increased the attractiveness of subsidy incentives to that mode, although most of these programs are already implicitly subsidized through the employer-provided vanpool program. Within the 82-program sample, 21 employers were identified as operating or facilitating an employee vanpool program. Employer-defrayed or shared costs in such areas as vehicle acquisition/financing, maintenance, insurance, fuel, and the like, already discussed under “Response to Employer Transportation Services”—“Employer-Assisted Vanpool Service,” constitute in-kind subsidies. Monetary subsidies differing from these in-kind discounts may consist of vanpool-driver subsidies (to attract good volunteer drivers), empty-seat subsidies (to maintain a reasonable average fare level), or start-up subsidies.

Only seven of the 82 employers offered a vanpool subsidy among their incentives without actually operating a vanpool program: Bellevue City Hall, California Franchise Tax Board, the City of Pleasanton, City and County of Denver, Hartford Steam Boiler, Shur-Lok Corporation, and Walker, Richer & Quinn. In all of these seven cases, the stand-alone vanpool subsidy was offered along with a transit subsidy and often other financial incentives, such that its effect is difficult to separate. It is judged to be minimal.

Targeted subsidies to modes other than transit or vanpool are less common, probably because they have not been receiving favorable tax treatment. The sparse data make it difficult to generalize the traveler response. An example that does provide results for incentives as applied to various individual modes is the 1970s TVA program outlined earlier under “Response to Employer Transportation Services”—“Additional Evidence of Transportation Services Effects”—“Transportation Brokerage.”
Table 19-8 listed the mode shares obtained before and after each stage of the program. The TVA example, although dated, is of particular interest because the transportation services were implemented as a first stage, and the incentives were provided as a second stage, allowing the impact of the incentives to be viewed in at least partial isolation.

Table 19-14 is designed to illuminate this additional perspective on the TVA results by highlighting the incremental percentage point changes in mode shares attained with incentives as contrasted to the initial mode shifts achieved with transportation services alone. Incentives included bus and vanpool fare subsidies and inexpensive parking for carpools. (Otherwise it is inferred that parking prices appropriate to the downtown location applied.)

Table 19-14 Mode Shifts by Stage of the TVA Transportation Brokerage Program

<table>
<thead>
<tr>
<th>Nature of Effect by Stage</th>
<th>Percentage Point Mode Share Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drive Alone</td>
</tr>
<tr>
<td>Combined effect of transportation services...</td>
<td>-23%</td>
</tr>
<tr>
<td>Additional (incremental) effect of incentives...</td>
<td>-24%</td>
</tr>
</tbody>
</table>

**Source:** Adapted from Wegmann, Chatterjee, and Stokey (1979).

Response to the initial stage, services without incentives, was given an unexpected boost by the first 1970s fuel crisis and associated gasoline price increases. The second 1970s gas crisis was late enough in the decade that it did not occur between measurement of first stage results without incentives and measurement of the second-stage results with incentives (Pratt and Copple, 1981). This timing makes the shifts in response to incentives all the more notable.

Table 19-14 makes it clear that the mode shifts obtained for the vanpool, express bus, and other alternative modes, as well as the net effect on driving alone, were larger for the addition of incentives than for the original provision of transportation services. Only carpooling and regular bus ridership were largely insensitive to the incentives, perhaps because other alternative modes became more attractive. Although the effects of incentives were not boosted by additional gasoline price increases, they undoubtedly were enhanced by the vanpool and express bus service increases necessitated by the sheer volume of new users. Some of the incentives would have been worthless without the provision of transportation services. Prior to the program there was no express bus service or vanpool offering at all.

Typically, carpool subsidies are conveyed via a more general instrument, such as HOV parking discounts, parking cash-out, or transportation allowances, and—as with vanpool subsidies provided independent of a vanpool program—tend to be part of a broad package of financial and other incentives. The same is true with subsidies for biking, walking or other modes like ferry. In these situations too few observations are available or too many other measures are being applied to allow clear-cut attribution of impact to the subsidy.
Transportation Allowances. A transportation allowance is similar in function to parking cash-out in that it provides a sum of money that can be used at the employee’s discretion toward the cost of his/her own chosen option, though the amount is not necessarily related to the employer’s cost for parking. In the 82-program sample, 10 employers used some variation of parking cash-out or transportation allowances as part of their program. These 10 cases are among those detailed in Table 19-12. It is instructive to examine them with regard to how their program success may be related to the measures they applied:

- Southern California Gas (47.4 percent VTR), offered a $50/month Travel Allowance in conjunction with parking fees and HOV parking discounts.
- City of Simi Valley, California (43.5 percent VTR), used a $2–$3/day travel allowance, plus a $0.75/day bus subsidy, and a CWW policy with 90 percent employee participation.
- CH2M Hill in Bellevue, Washington (38.9 percent VTR), provided a $40/month travel allowance, plus a $15 subsidy for transit or carpool users, and restricted/priced parking.
- Atlantic Richfield Company in downtown Los Angeles (34.5 percent VTR), offered a $15/month travel allowance in conjunction with restricted and priced parking.
- Commuter Transportation Services in Los Angeles (17.5 percent VTR), used a $40/month travel allowance combined with parking fees.
- Kirkland, Washington, City Hall (16.3 percent VTR), had a $25/month travel allowance and parking fees.
- Pacific Pipeline (15.1 percent VTR), gave a $24/month travel allowance if an alternative mode was used at least 60 percent of the time, in a context of restricted/priced parking.
- Cedars Sinai Hospital in Los Angeles (12.6 percent VTR), used a parking cash out policy in conjunction with restricted and priced parking.
- Nike of Beaverton, Oregon, offered $1 per day for alternate mode use, but presumably because its parking was unpriced and unrestricted, its VTR was only 5.7 percent.
- Similarly, the City of Pleasanton, California, offered a $1/day cash-out incentive, but with unpriced and unrestricted parking, its VTR was only 5.6 percent.

Financial Incentive Experimentation. An experiment in Atlanta motivated by air quality objectives offers additional perspective on the role of financial incentives focused on the work commute. Implemented under the regional Clean Air Campaign and named “Cash for Commuters” (CFC), it was an incentive program that rewarded SOV commuters who agreed to switch to a commute alternative for a specified period of time. Eligible commuting alternatives included carpooling, transit, cycling, walking, or teleworking. Commuters who participated in the program could earn up to $180 in cash over a 90-day period at the rate of $3 per day that an alternative was used. Participants were required to live in the 13-county Atlanta region, register for the program, and affirm that they had not used any of the alternative commute modes more than 5 times during the preceding 90-day period. To receive compensation, participants were required to submit a travel log at the end of the enrollment period, which had to be verified and signed by the commuter’s employer supervisor. Three separate program waves were conducted, during the 2002, 2003, and 2004 smog seasons, involving a total of 5,460 participating commuters.
An evaluation survey was conducted to track the behavior of the Wave 1 participants and gauge both initial impact on behavior and long-term effect on alternative mode-use rates. Prior to program enrollment, commuters in the Wave 1 group drove alone on 85 percent of their commute trips. During the period that they were receiving a CFC incentive, driving alone dropped to 14 percent of all trips, thus 86 percent of trips were made by an alternative. In 3 to 6 months after completing the CFC program, the proportion of drive-alone trips increased to 38 percent, by 9 to 12 months it reached 47 percent, and by 18 to 21 months after the program the drive-alone rate was at 53 percent. It appears that the financial incentive not only had a significant impact on initial disposition to use alternatives, but also led to a fairly high rate of alternatives use even 18 to 21 months past the time of the incentive offering (Center for Transportation and the Environment, 2004).

**Financial Incentives in General.** One attempt to sort out the relative importance of various economic incentives in employer TDM programs was made in the study of TDM at medium-sized employers that has contributed 38 employer case study examples to the 82-program sample. As illustrated in Figure 19-1, the researchers used linear regression analysis to estimate the relationship between the application of economic incentives and SOV rates (SOV commute mode shares). For the analysis, only economic incentives that apply to all employees were used to calculate a net HOV incentive. Parking charges and alternate mode travel allowances were counted as additive HOV incentives, whereas a general travel allowance was assumed to decrease the HOV incentive of a parking charge. In other words, if an employer had both a parking charge and a general travel allowance, the allowance is subtracted from the parking charge to get the net HOV incentive value. The resultant regression equation (sample size of 38, \( r^2 = 0.54 \)) implies a reduction in SOV commuting rate of 0.27 percent for every $1 of monthly incentive (Rutherford et al., 1994).
In-Kind Incentives. In lieu of cash, employers have attempted to encourage use of transportation alternatives through in-kind incentives with a tangible monetary value. The most popular among these methods are periodic raffles and time off with pay. Table 19-12 shows that 12 of the 56 employers in the 82-program sample who provided incentives offered some form of in-kind incentive. Allergan, Arlington Heights, the City of Simi Valley, Gotcha Sportswear, and Heller Financial all offered time off with pay for alternative mode use. Allergan, Chubb Insurance, the City of Pleasanton, IT Corporation, and Varian had raffles for alternative mode users, offering a chance at major cash or other prizes. Other interesting approaches include the Puget Sound Blood Center, which offered one day of free parking to qualifying alternate mode users; Ventura County and State Farm Insurance, who paid employees for not driving (similar to parking cash-out); and US West in Bellevue, which offered equipment rebates for bike commuters.

Unfortunately, it is difficult from the available data to quantify the effectiveness of these strategies on travel behavior, since in almost all cases they are grouped with one or more other strategies that would appear to have at least as great an impact as the in-kind measure. Only Ventura County, with a 13.3 percent VTR, and Gotcha Sportswear, with a 34.1 percent VTR, relied exclusively on their respective in-kind incentive for their TDM program.
A 1992 study by Commuter Transportation Services reported on the experience of five employers in the Los Angeles area who offered time off with pay as an incentive. As summarized in Table 19-15, there is a relatively modest financial value represented by these incentives. The first program, offered by the bank, seems to have been offering the highest incentive level and—probably not coincidentally—exhibited the highest VTR at 16.7 percent. Correspondingly, the software developer’s program appears to have been offering the smallest incentive and had the lowest VTR achieved in the group (Stewart, 1992).

Table 19-15 Sample Programs Using Time Off with Pay as a Financial Incentive

<table>
<thead>
<tr>
<th>Type Employer</th>
<th>Size</th>
<th>Time Off Policy and Requirements</th>
<th>Other Cash/Prize Incentives</th>
<th>Initial AVR</th>
<th>Update AVR</th>
<th>VTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank</td>
<td>108</td>
<td>10 min. for each non-drive day; 40 hour/year max.</td>
<td>Quarterly $300 cash prize drawings</td>
<td>1.08</td>
<td>1.26</td>
<td>16.7%</td>
</tr>
<tr>
<td>Software Developer</td>
<td>150</td>
<td>1 point for every non-drive day (1/2 for 1-way ridesharing); 100 points = 1 day off; annual maximum = 16 hours</td>
<td>$10 monthly cash subsidy plus $100 gift certificate drawing if rideshare 75% of month</td>
<td>1.12</td>
<td>1.12</td>
<td>0%</td>
</tr>
<tr>
<td>Financial Services</td>
<td>250</td>
<td>Employees not driving alone 3 days per week for a month get to leave 1 hour earlier on a Friday the following month; annual maximum of 1 full day and 12 single hours</td>
<td>$20 and $40 cash subsidies and prize drawings for gift certificates</td>
<td>1.18</td>
<td>1.28</td>
<td>8.5%</td>
</tr>
<tr>
<td>Aircraft Parts</td>
<td>300</td>
<td>Employees not driving alone 3 days/week for 1 quarter receive 4 hours; 3 days/week for 4 quarters receive bonus day off; annual max. of 24 hours (3 days)</td>
<td>$10 monthly cash subsidy if rideshare average ≥ 3 days per week; monthly $100 gift certificate drawing</td>
<td>1.08</td>
<td>1.18</td>
<td>9.3%</td>
</tr>
<tr>
<td>Mortgage Provider</td>
<td>250</td>
<td>1 point for each non-drive day; 40 points earns 4 hours off; annual maximum of 24 hours (3 days)</td>
<td>Employees with 40 points in quarter enter drawing for 15 $50 checks plus free ice cream party</td>
<td>1.14</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Note: AVR = Average Vehicle Ridership.


Response to Alternative Work Arrangements

Alternative work arrangement actions are strategies that modify the time at which travel occurs or the frequency of travel. From a TDM perspective, their objective is either to reduce the concentration of travel in a peak travel period or to reduce the overall number of trips made on a daily or weekly cycle to an employment site. The strategies included in this group were defined in the
“Overview and Summary” section under “Types of TDM Strategies,” but a quick review of important characteristics will assist in interpretation of their effects:

- Flexible work hours are where employees are given freedom in choosing their starting and quitting times. Flextime programs fall into two important groups, those where employees are allowed to adjust their arrival and departure times in order to avoid traveling during the most congested time periods, and those where employees are explicitly permitted to adjust their schedules to meet transit, carpool, or vanpool scheduling requirements. Most of the programs reviewed here are of the latter type, designed essentially as an incentive (removal of an impediment) to use an alternative mode. General shifting of work hours to avoid congestion is less common, although it was an important strategy for meeting the requirements of peak traffic reduction ordinances common in the late 1980s.

- Staggered work hours are generally unique to large employers, where some departments or employee groups are assigned to a different but set work day schedule to reduce the impact of having all employees arriving at or departing the site at the same time. This is not to be confused with shift schedules, such as are found at large manufacturing establishments or health centers, which are for purposes of evening and night staffing, not travel management. Neither should it be confused with flexible work hours, which are discussed in the preceding paragraph.

- Compressed work week (CWW) programs enable employees to work fewer days per week (or bi-week) in exchange for working longer hours each day. The two most common arrangements are the 9/80 schedule, where employees work a 9-hour day and receive the tenth day of the 2-week cycle off, and the 4/40 arrangement, where employees work four 10-hour days and receive the fifth day off. In both cases, the transportation benefit is that the employee is able to forego physical commutation to the work site one day per cycle. A secondary benefit is that the longer work day pushes the timing of the commute trip outside the standard peak period as defined by 8-hour work days.

- Telecommuting, also known as telework, allows the employee to work from home some number of days per week or month, usually by virtue of an electronic connection that keeps the employee in continuous real-time contact with the work site. A less common alternative is where the employee works from a special satellite “telework” center.9

Alternative Work Arrangements Insights from the 82-Program Sample

A key question regarding alternative work schedule strategies is whether or not they are supportive of TDM strategies that encourage use of alternative modes and thereby reduce vehicle trip rates and, if not, whether their introduction leads to a net reduction or gain in vehicle trips. Alternative work arrangements that allow employees to synchronize their work schedules with the demands of an alternative mode are designed to explicitly encourage alternative mode use. Conversely, policies

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9 Telecommuting evaluation is complicated by the fact that there are three distinct forms of working at home, of which telecommuting is only one. Another is home-based-business (HBB) workers, self-employed individuals who operate or manage their business primarily from the home. HBB workers may or may not be segregated out from telecommuters in surveys, research, and summaries. The third form is overtime homeworkers, who go to the formal workplace but bring home work to do, primarily outside of normal working hours. This third kind is of little interest to transportation planning, because it does not have much effect on the occurrence of travel (Tang, Mokhtarian, and Handy, 2007).
that allow employees to shift their travel outside of the peak, CWW, and telecommuting may or may not detract from the appeal of alternative mode use by either reducing the pressure of peak-period congestion or disrupting a routine daily schedule that might better support ridesharing arrangements and transit use.

Ability to ascertain the net effect of these potentially opposing outcomes from the 82-program sample is impeded by the nature of the data as it pertains to CWW programs and telecommuting. The data limitations involved were highlighted in the “Analytical Considerations” discussion of the “Overview and Summary” and have been referred to in previous “Response by Type of Strategy” subsections. To summarize, in virtually all cases within the 82-program sample, there is only sufficient employer survey data to calculate a vehicle trip rate based on modal split reported for commute trips which actually occur. To do more, it would be necessary to know exactly what type of CWW arrangement the employee opted for (4/40 or 9/80 arrangement), or how many days per week the employee telecommuted. Although in some cases there may be an indication of the percentage of employees who are using the measures in question, none of these cases offers the details necessary to calculate the net effect on bottom-line vehicle trip rates.

To illustrate the interplay of mode shift and trip elimination effects involved, assume an employee has been commuting 5 days per week in a two-person carpool. He/she has been generating the equivalent of 0.5 vehicle round trips per day. Now the employee is offered a telecommuting choice, and chooses to work from home 2 days per week. That eliminates two commute round trips outright. However, if that employee now opts to make the three weekly trips to the worksite by driving alone, she now averages 0.6 vehicle trips per day—a 20 percent increase in the daily vehicle trip rate, apart from any increase in non-work travel which may be occurring on telecommute days. However, if the employee were required to remain in the pre-existing two-person carpool arrangement, the average daily vehicle trip rate would only be 0.3, which would qualify as a 40 percent trip reduction. Obviously, accounting for the precise combination of strategies and resulting changes in behavior is critical to determining the net effect of CWW and telecommuting on vehicle trip making. For analysis it would be necessary to have a record of the commuter’s behavior on each day of the travel “cycle” in question. In most cases this would be a 5-day week, though in the case of a 9/80 compressed work week it would be longer.

In the 82-program sample, only the average vehicle trip rate for a “typical” day can be ascertained, and not in full consideration of the combined effect as depicted above. Mode shifts are taken into account (such as the shift from two-person carpool to drive alone in the example above) but trips eliminated outright cannot be (such as the 2 telecommute-day trips not made in the example). It is important to be aware of this distinction when reviewing the calculation results provided in Table 19-16 and the following discussion on relationships observed in the 82 example programs. The data limitations lead to an understatement of overall CWW and telecommute vehicle trip travel savings, but they do directly shed light on the issue of variable work hours effects on alternative mode use.

**Overall Effect of Alternative Work Arrangement Strategies.** Table 19-16 summarizes the comparative trip reduction performance among the 82 examples from the perspective of alternative work arrangement strategies. Focusing first on the boldface “All” row in the table, the VTR performance of each of the four alternative work schedule strategies—shown with and without the respective strategy in place—can be compared. What is evident is that only in the case of flexible hours is the calculated VTR substantially greater in the presence of the strategy than without it. Of employers in the 82-program sample, 45 offered flexible hours and averaged 20.1 percent VTR, compared to 13.1 percent VTR for the 37 employers where it was not offered. With staggered hours,
only seven employers offered this program, and they averaged a 15.9 percent VTR compared to 17.0 percent for the 75 who did not. With CWW, the 54 employers who offered the program averaged a calculated VTR of 15.8 percent, well below the 19.1 percent VTR for the 28 who did not, but not necessarily less effective given the computational limitations described above. For telecommuting, the 65 who offered the program had an average calculated VTR of 17.1 percent, barely above the 16.5 percent for the 17 who did not. Again, the CWW and telecommuting calculations reflect only mode shifts and not trip avoidance effects.

**Alternative Work Arrangements in Relation to Transit Availability.** Flexible hours seem to have their positive impact only when applied in the presence of medium or low transit availability. Perhaps this is where employees who would use transit find the transit schedules least accommodating, and thus are more substantively aided by work hours flexibility. In high transit availability areas there is less than a percentage point of difference in average VTR between programs with flexible hours and those without.

Programs offering staggered hours have the opposite relationship with transit availability. Staggered hours implemented in the presence of high transit availability exhibit a difference in average VTR of only 1.5 percentage points with versus without staggered hours. However, for those situations where transit availability is medium or low, the programs where staggered hours are not offered have higher average VTRs than those where they are. It should be noted that these latter staggered hours programs are represented by very small sample sizes.

Both CWW and telecommuting have marginally better VTR performance, as computed on the basis of mode shifts alone, when implemented with high transit availability. For CWW, programs with high transit availability average a VTR of 27.4 percent, compared to 25.1 percent without. Programs with telecommuting average a VTR of 26.4 percent with high transit availability versus 25.9 percent without. At medium and low transit availability levels the effects vary as to whether the work schedule program is associated with a positive or negative difference.

**Alternative Work Arrangements in Relation to Level of Employer Program Support and Employer Transportation Services.** No clear or intuitive relationships emerge from examining alternative work arrangements in the context of employer support levels. For the most part, the same must be said for combinations involving transportation services. In the case of transportation services, particularly small sample sizes impede the effort to reach substantive conclusions.
<table>
<thead>
<tr>
<th>Other Conditions or Programs</th>
<th>Flexible Hours</th>
<th>Staggered Hours</th>
<th>Compressed Work Week</th>
<th>Telecommuting</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With</td>
<td>W/out</td>
<td>With</td>
<td>W/out</td>
<td>With</td>
</tr>
<tr>
<td>All</td>
<td>20.1% (45)</td>
<td>13.1% (37)</td>
<td>15.9% (7)</td>
<td>17.0% (75)</td>
<td>15.8% (54)</td>
</tr>
<tr>
<td>Transit Availability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>25.8% (16)</td>
<td>26.4% (8)</td>
<td>27.2% (4)</td>
<td>25.7% (20)</td>
<td>27.4% (9)</td>
</tr>
<tr>
<td>Medium</td>
<td>15.4% (10)</td>
<td>8.3% (9)</td>
<td>-12.7% (1)</td>
<td>13.4% (18)</td>
<td>2.4% (2)</td>
</tr>
<tr>
<td>Low</td>
<td>17.9% (19)</td>
<td>9.9% (20)</td>
<td>7.7% (2)</td>
<td>14.1% (37)</td>
<td>15.6% (15)</td>
</tr>
<tr>
<td>Level of Support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>17.9% (24)</td>
<td>22.6% (8)</td>
<td>18.1% (2)</td>
<td>19.1% (30)</td>
<td>19.7% (15)</td>
</tr>
<tr>
<td>Medium</td>
<td>21.9% (17)</td>
<td>9.5% (16)</td>
<td>22.9% (2)</td>
<td>15.5% (31)</td>
<td>21.5% (10)</td>
</tr>
<tr>
<td>Low</td>
<td>26.3% (4)</td>
<td>11.6% (13)</td>
<td>9.9% (3)</td>
<td>16.1% (14)</td>
<td>8.3% (3)</td>
</tr>
<tr>
<td>Transportation Services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transit</td>
<td>35.3% (2)</td>
<td>2.6% (2)</td>
<td>28.2% (1)</td>
<td>15.8% (3)</td>
<td>20.5% (3)</td>
</tr>
<tr>
<td>Vanpool</td>
<td>18.5% (6)</td>
<td>24.7% (5)</td>
<td>n/a</td>
<td>21.3% (11)</td>
<td>22.2% (3)</td>
</tr>
<tr>
<td>Transit &amp; Vanpool</td>
<td>15.6% (6)</td>
<td>22.6% (5)</td>
<td>11.9% (2)</td>
<td>20.3% (9)</td>
<td>15.4% (2)</td>
</tr>
<tr>
<td>Use of Co. Vehicles</td>
<td>28.0% (10)</td>
<td>&lt; 0% (1)</td>
<td>n/a</td>
<td>24.6% (11)</td>
<td>24.2% (7)</td>
</tr>
<tr>
<td>No Services</td>
<td>17.9% (25)</td>
<td>9.7% (25)</td>
<td>14.9% (4)</td>
<td>13.5% (44)</td>
<td>16.2% (16)</td>
</tr>
</tbody>
</table>

(continued on next page)
Table 19-16  (Continued)

<table>
<thead>
<tr>
<th>Other Conditions or Programs</th>
<th>Flexible Hours</th>
<th>Staggered Hours</th>
<th>Compressed Work Week</th>
<th>Telecommuting</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With</td>
<td>W/out</td>
<td>With</td>
<td>W/out</td>
<td>With</td>
</tr>
<tr>
<td><strong>Incentives</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restricted Parking</td>
<td>28.5% (20)</td>
<td>19.2% (15)</td>
<td>19.2% (5)</td>
<td>25.4% (30)</td>
<td>29.1% (11)</td>
</tr>
<tr>
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<td></td>
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</tr>
<tr>
<td>Parking Fees</td>
<td>25.2% (21)</td>
<td>23.4% (10)</td>
<td>27.2% (4)</td>
<td>24.2% (27)</td>
<td>28.2% (11)</td>
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<tr>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>HOV Discounts</td>
<td>24.0% (16)</td>
<td>30.2% (6)</td>
<td>21.1% (2)</td>
<td>26.1% (20)</td>
<td>29.0% (8)</td>
</tr>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Transit Subsidy</td>
<td>23.9% (26)</td>
<td>15.2% (16)</td>
<td>16.2% (6)</td>
<td>21.3% (36)</td>
<td>24.7% (15)</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanpool Subsidy</td>
<td>11.2% (6)</td>
<td>19.5% (6)</td>
<td>7.7% (2)</td>
<td>17.2% (10)</td>
<td>8.3% (3)</td>
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<tr>
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</tr>
<tr>
<td>Travel Allowance</td>
<td>23.9% (14)</td>
<td>12.8% (10)</td>
<td>21.1% (2)</td>
<td>19.1% (22)</td>
<td>24.4% (9)</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>Other Monetary</td>
<td>24.8% (9)</td>
<td>15.4% (2)</td>
<td>n/a (0)</td>
<td>23.1% (11)</td>
<td>29.2% (5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>In Combination with Other Work Hours Programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexible Hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staggered Hours</td>
<td>27.2% (4)</td>
<td>19.5% (41)</td>
<td>24.2% (21)</td>
<td>16.6% (24)</td>
<td>19.1% (12)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comp. Work Week</td>
<td>24.2% (21)</td>
<td>4.1% (7)</td>
<td>17.5% (5)</td>
<td>19.5% (23)</td>
<td>17.1% (13)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telecommuting</td>
<td>19.1% (12)</td>
<td>10.4% (5)</td>
<td>16.9% (2)</td>
<td>16.5% (15)</td>
<td>17.1% (13)</td>
</tr>
<tr>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Note: Compressed work week and telecommuting VTRs as calculated reflect only mode shift effects and not trip elimination benefits.

Sources: Derived (see Appendix Table 19-A) from Comsis (1994), Comsis and ITE (1993), Rutherford et al. (1994), and Comsis et al. (1996).
It can be said, however, that programs offering vanpool or vanpool-plus-transit services perform better overall without work hours strategies than in their presence. Employer programs without any transportation services are the ones that appear to do better with alternative work arrangements strategies. Among programs without services the highest calculated VTRs are found in the presence of flexible hours (17.9 percent VTR with versus 9.7 percent without) and CWW (16.2 percent VTR with versus 12.3 percent without).

**Alternative Work Arrangements in Relation to Parking Pricing and Management.** The top portion of the second page of Table 19-16 highlights the effects of alternative work hours strategies when combined with restricted parking, parking fees, and HOV parking discounts. Of the 35 programs with restricted parking, 20 also featured flexible hours, five had staggered hours, 11 offered CWW, and five had telecommute programs. In all cases except staggered hours, the work hours strategy is associated with a greater VTR when it is included than when it is not. Restricted parking with flexible hours exhibits an average VTR of 28.5 percent compared to 19.2 percent without flexible hours; restricted parking with CWW has a 29.1 percent VTR versus 22.5 percent without; and restricted parking with telecommuting added has a slightly higher VTR with (26.5 percent) versus without (24.3 percent). As a reminder, these VTRs are computed with reference to mode shifts alone. Where staggered hours are found with restricted parking the VTR is 19.2 percent compared to 25.4 percent without.

The apparent effect of linking work hours strategies with parking fees is similar in pattern to that of restricted parking, but less pronounced. Flexible hours found in the presence of parking pricing yields an average VTR of 25.2 percent, versus 23.4 percent without flexible hours. Staggered hours in this case exhibits a positive association, showing an average VTR of 27.2 percent with staggered hours and 24.2 percent without. CWW teamed with parking fees has a VTR of 28.2 percent, compared to 22.3 percent without CWW. Telecommuting has the most neutral association of the work hours strategies, showing essentially no difference between programs with versus without parking pricing when examined on the basis of mode shifts alone.

Finally, variable hours in relation to HOV parking discounts present a mixed bag. Table 19-16 indicates that HOV parking discounts exhibit higher VTRs in the presence of CWW and telecommuting than without, while the opposite occurs in the presence of flexible and staggered hours. Exactly why this may be is unclear. With CWW and telecommuting, the direction of the effect is consistent with the restricted parking and priced parking relationships, but with staggered hours and particularly flexible hours, it is not.

**Alternative Work Arrangements in Relation to Modal Subsidies.** Flexible hours appear to combine well with transit subsidies, travel allowances, and other monetary incentives, but not with vanpool subsidies. This parallels the earlier observation that flexible hours seem to have a positive relationship with employer-provided transit service, but a negative effect with vanpool and transit/vanpool. The same is seen for CWW, with VTR impacts complementary for all incentive strategies but vanpool subsidies. Telecommuting shows a positive effect only with transit subsidies, as calculated on the basis of mode shifts alone. Finally, staggered work hours show a positive effect only with the travel allowance incentive.

**Alternative Work Arrangements in Relation to Each Other.** The final comparison in Table 19-16 examines the outcome when different alternative work hours strategies are combined with each other. Note that to read and interpret this table, the same rules of order apply as in the preceding comparisons: For a program with the strategy listed as a row, each VTR number in the row corresponds to the average observed when the strategy listed as the corresponding column is or is not applied. To illustrate, of the 45 employer programs offering flexible hours, four of those programs
also included staggered hours (presumably for different employees). They have an average VTR of 27.2 percent, while those without staggered hours average 19.5 percent. (One might well surmise that the reason for the significantly enhanced performance of these particular four programs is something more than just inclusion of a staggered work hours strategy.)

Reviewing the table, flexible hours programs exhibit a higher calculated VTR when combined with staggered hours (27.2 versus 19.5 percent VTR) and CWW (24.2 versus 16.6 percent), but not when telecommuting is offered (19.1 versus 20.5 percent). Staggered work hours programs are apparently enhanced by the addition of each of the other work hours strategies. CWW programs are found to perform better when combined with flexible work hours (24.2 versus 4.1 percent). The sampled CWW programs exhibit somewhat lower efficacy in combination with staggered hours and telecommuting. Like staggered hours, telecommuting programs appear to be enhanced with the addition of any of the other work hours programs. They exhibit higher VTRs in the presence of flexible hours (19.1 versus 10.4 percent), staggered hours (16.9 versus 16.5 percent), and CWW (17.1 versus 14.6 percent).

As stressed in the introduction to this discussion, all combinations involving compressed work hours and telecommuting would be associated with higher VTRs than reported above and in Table 19-16 were it possible to include the effect of trips eliminated outright in computations made with the 82-program sample. It is thus particularly important to make full use of such additional research evidence as it is available, which is the subject of the next subsection.

**Additional Research Evidence on Alternative Work Arrangements**

While alternative work arrangement strategies like flexible work hours, CWW, and telecommuting are widely applied as TDM strategies, the amount of quality public information providing a quantitative insight into the effectiveness of these programs is surprisingly limited—most particularly for recent years. This research shortcoming notwithstanding, this subsection supplements the preceding descriptive analysis of the 82-program sample with a selection of individual studies out of the literature that offer additional information on this important category of TDM strategies. While some of these examples are rather dated, several represent carefully constructed experiments, and their value—as should be evident—is not necessarily diminished by time.

The one major question with respect to the older studies, especially those from the 1970s, is whether and to what extent the fresh ground plowed by the early experiments and demonstrations focused on mitigating traffic peaking still exists. The U.S. Department of Labor data reviewed immediately below suggests that the baseline ambient peak-spreading effects of flextime in particular must now be more extensive than earlier. The further peak-spreading possibilities for alternative work hours may thus be diminished by the smaller remaining increment of potential. The degree to which this may pertain can be assessed in individual cases by determining the amount of travel peaking found in the “before” condition. Note that the concern expressed here is much less likely to be of importance with regard to either mode shift or trip reduction findings/outcomes.

**Flexible Work Hours.** The U.S. Department of Labor has reported that, in 2002, almost 29 percent of the U.S. workforce of full-time wage earners and salaried employees had schedules permitting them to vary the time they begin or end their day. Interestingly, only about one-third of those employees worked for companies with official flextime policies. The proportion of such workers has grown slightly since the U.S. Department of Labor’s previous survey in 1997, when 26.6 percent reported working flexible schedules. More striking is the comparison with 1991, when just 15 percent of workers had flexible hours options. Flexible schedules were found, in 2002, to be most
common among executives, administrators and managers, with 45.5 percent able to vary their schedules. Almost 41 percent of sales personnel were also able to adjust their schedules (Associated Press, 2003).

At Bishop Ranch in exurban San Francisco, flextime policies were a major part of employee commute assistance programs for major employers relocating to this business park from downtown San Francisco. Faced with a local traffic management ordinance requiring a reduction not only in vehicle trips, but also in the number of those trips occurring in the peak hour, flextime was found to be very effective in shifting employee arrival times to less congested periods. A survey of 14,800 employees 2 years after the opening of Bishop Ranch showed an increase from 8 percent to 17 percent in the percentage of employees starting work before 7:00 AM. The percentage starting after 9:00 AM increased from 1 percent to 9 percent. Departure peaking also was reduced, with the percentage of workers leaving before 4:00 PM increasing from 12 percent to 17 percent (Beraldo, 1990).

About 6,000 employees from 23 San Francisco employers participated in a broad-scale trial offering of flextime in the 1980s. Post-implementation surveys showed at least one-half of the participants arriving to work 30 or more minutes earlier than before flextime, with many arriving before 7:00 AM. By traveling before the main peak period, those arriving by car or by carpool saved an average of 9 minutes each trip, with over 60 percent reporting much less congestion on the way to work (Jones, 1983).

The larger trial in San Francisco was preceded by the Downtown San Francisco Flextime Demonstration Project. Through surveys of participating employees, researchers found that the start-time peaks of three employers offering flextime were significantly smaller than the peak for downtown employees as a whole and/or they occurred before the downtown peak. Employers surveyed included the California State Automobile Association (CSAA), Metropolitan Life, and Fireman’s Fund, with findings as illustrated in Table 19-17. The peak 30-minute arrival period for downtown employees as a whole was 8:00 to 8:30 AM. Of all employee arrivals, 61 percent occurred during that period. Among variable work hours participants, the CSAA employee arrival peak was 40 percent, during the same time period; the Metropolitan Life peak was 53 percent, occurring between 7:00 and 7:30 AM; and the Fireman’s Fund peak was 34 percent between 7:30 and 8:00 AM (Harrison, Jones and Jovanis, 1979). This experience provided early corroboration with other evidence that typical flextime employees in the United States, as well as in Germany’s extensive programs, select earlier arrival schedules than the pre-existing norm (Pratt and Copple, 1981).

In 1978, the U.S. Department of Transportation’s Transportation System Center (now Volpe Center) in Cambridge, Massachusetts, conducted a 1-year experiment of flextime offered to its 600-person staff. It was able to stage an evaluation of the test using the monitoring resources of its Service and Methods Demonstration program.
Beginning in March 1978, Transportation System Center employees were given the flexibility to shift their time of arrival from the existing 8:15 AM to a larger period extending from 7:00 AM to 9:30 AM. A core workday of 9:30 AM to 4:45 PM was maintained, and employees could arrive and depart when they chose around these hours so long as they worked a full 8-hour day with a mandatory 30-minute lunch period.

The majority of employees opted to adjust their schedules under this arrangement, shifting the mean arrival time to 7:55 AM. The distribution of arrival times around this mean was fairly symmetrical, with a 32-minute standard deviation. About 56 percent arrived at or before 8:00 AM, and 14 percent at or after 8:30, meaning that 30 percent arrived in the 8:00 to 8:30 time frame. In this program, employees were also allowed to vary their schedules from day to day without prior approval. This feature showed surprising variation, with more than one-half of all workers deviating more than 10 minutes from their mean arrival time more than one-half of the time. Among the reasons given for adjusting their schedules, the top two reasons were “to accommodate after-work activities” (72 percent of all responding) and “avoiding traffic congestion” (cited by 69 percent of respondents) (Ott, Slavin, and Ward, 1980).

In September 1974, the Port Authority of New York and New Jersey began a flexible hours experiment that lasted 8 months and involved about 850 headquarters staff. Those involved in the experiment included employees previously on staggered hours and also those on a normal work schedule. The basic 5-day work week remained unchanged for flexible hours program participants. The total expanded day covered the period between 8:00 AM and 5:30 PM, during which time employees were required to be at work for a core period between 9:30 AM to 4:00 PM. Workers were given 45 minutes for lunch. The 1-1/2 hour periods preceding and following the core period were flexible periods within which the employee could vary time to any extent, as long as a 40-hour work week requirement was fulfilled.

To support evaluation, arrival and departure counts were made before and after the experiment, for both participants and also two control groups of employees whose work schedule (floating day and normal) did not change. Because the different participating and control groups also worked on separate floors, arrival and departure times by floor could be meaningfully com-

Table 19-17 Employee Arrival Times at Three San Francisco Employers Adopting Variable Work Hours

<table>
<thead>
<tr>
<th>Arrival Time</th>
<th>Fireman’s Fund (Self-Staggered Start)</th>
<th>CSAA (Flextime)</th>
<th>Metropolitan Life (Flextime)</th>
<th>All Downtown Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 – 7:30 AM</td>
<td>31%</td>
<td>16%</td>
<td>53%</td>
<td>8%</td>
</tr>
<tr>
<td>7:30 – 8:00 AM</td>
<td>34%</td>
<td>31%</td>
<td>24%</td>
<td>13%</td>
</tr>
<tr>
<td>8:00 – 8:30 AM</td>
<td>20%</td>
<td>40%</td>
<td>14%</td>
<td>61%</td>
</tr>
<tr>
<td>8:30 – 9:00 AM</td>
<td>10%</td>
<td>7%</td>
<td>6%</td>
<td>1%</td>
</tr>
<tr>
<td>After 9:00 AM</td>
<td>5%</td>
<td>6%</td>
<td>3%</td>
<td>17%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Note: Earliest sanctioned arrival time at CSAA was 7:30 AM.

Source: Harrison, Jones, and Jovanis (1979).
pared, as illustrated in Table 19-18. Fifteen-minute work floor arrival and departure peaks were decreased by 13 percentage points (from 31 percent to 18 percent) and 10 percentage points (from 35 percent to 25 percent), respectively, on floor A, where the majority of employees changed from a conventional fixed schedule to flextime. Meanwhile, peaking changes were insignificant on the floors that changed from staggered hours to flextime (Port Authority of New York and New Jersey, 1975).

Table 19-18 Port Authority of New York/New Jersey Flextime Experiment—
15-Minute Peaking Before and After Flexible Work Hours

<table>
<thead>
<tr>
<th>Work Floor / Work Hours Programs</th>
<th>Peak 15-Minute Arrivals</th>
<th>Peak 15-Minute Departures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent of 7:30-10:00 AM Arrivals</td>
<td>Peak AM Time Period</td>
</tr>
<tr>
<td>Floor “A”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before (Conventional Hours)</td>
<td>31%</td>
<td>8:45-9:00</td>
</tr>
<tr>
<td>After (Flexible Hours)</td>
<td>18%</td>
<td>8:45-9:00</td>
</tr>
<tr>
<td>Floor “B”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before (Staggered Hours)</td>
<td>20%</td>
<td>8:15-8:30</td>
</tr>
<tr>
<td>After (Flexible Hours)</td>
<td>20%</td>
<td>8:15-8:30</td>
</tr>
<tr>
<td>Floor “C”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before (Staggered Hours)</td>
<td>28%</td>
<td>8:15-8:30</td>
</tr>
<tr>
<td>After (Flexible Hours)</td>
<td>24%</td>
<td>8:30-8:45</td>
</tr>
<tr>
<td>Floor “D” (control)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before (Floating Day)</td>
<td>24%</td>
<td>8:15-8:30</td>
</tr>
<tr>
<td>After (Floating Day)</td>
<td>29%</td>
<td>8:15-8:30</td>
</tr>
<tr>
<td>Floor “E” (control)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before (Conventional Hours)</td>
<td>27%</td>
<td>8:30-8:45</td>
</tr>
<tr>
<td>After (Conventional Hours)</td>
<td>27%</td>
<td>8:15-8:30</td>
</tr>
</tbody>
</table>

Note: Arrivals and departures were surveyed on the individual work floors. The surveys included some employees not participating in the flexible work hours experiment.

Source: Port Authority of New York and New Jersey (1975).

The association between allowing flexible arrival/departure times and employee choice of mode is somewhat unclear, and may depend significantly on the conditions placed on the flextime policy by the employer or institution. In many of the examples within the 82-program sample, flextime was a special privilege made available to employees using alternative modes, with flextime intended to provide additional latitude for accommodating the schedules of transit service or of a ridesharing unit. Indeed, the regional rideshare agency in the San Francisco Bay area found the placement rate among its rideshare applicants on flextime to be 30 percent compared to 16 percent for applicants not on flextime (Burch, 1988).
In the Transportation Systems Center flextime study described above, 9 percent of workers were found to have changed modes due to flextime, with a small net change in favor of ridesharing (+2.0 percent) and transit (+1.0 percent) and a reduction in driving alone (−3 percent), primarily attributed to savings in travel time offered by a schedule shift (Ott, Slavin, and Ward, 1980). Employee surveys in Pleasanton, California, suggested that only 7.6 percent of workers under flextime also rideshare, compared to 11.4 percent of the entire Pleasanton workforce (Cervero, 1988). Another study covering flextime, as introduced at the Tennessee Valley Authority (TVA), suggests a 2 percent loss in vanpool ridership paired with a much larger loss in bus ridership. Vanpoolers adjusted vanpool schedules to meet rider preferences for earlier arrivals, but bus schedules were not changed in a similar way, and bus ridership fell by 21 percent (Wegmann and Stokey, 1983).

In-depth survey results for the CSAA organization (see Table 19-17 for arrival times) showed that flextime had especially aided work trip ridesharing among friends and family, a particularly resilient form of carpooling (Harrison, Jones, and Jovanis, 1979; Pratt, Pedersen, and Mather, 1977). Among six early implementers of flextime in the San Francisco Bay Area, ride-sharing was the big beneficiary, with shared-ride increases ranging from 1 percent to 28 percent.10 Drive-alone activity decreased in all cases, with declines between 3 and 26 percent for the three employers with significant drive-alone activity. Transit mode share impacts were mixed, with shifts ranging from −22 percent to +8 percent, with three losers and three gainers (Harrison, Jones, and Jovanis, 1979; Jovanis and May, 1979).

The early observation that “The majority of actual before and after survey data . . . indicates at worst an insignificant or neutral effect on single occupant auto usage and gives some evidence of a predominance of mode shifting to carpools” (Pratt and Copple, 1981) seems borne out by more recent information. However, there is one caveat: Particular circumstances, as in the TVA example above, may cause atypical and undesirable shifts.

Staggered Work Hours. The state of Hawaii, as a demonstration project to determine whether spreading arrival times of downtown workers would relieve peak-period congestion, changed official office hours for state, city, and county employees from 7:45 AM–4:30 PM to 8:30 AM–5:15 PM for a test period covering February 22 through March 18, 1988. Private sector participation was encouraged but not required. About one-half of all public sector employees shifted their work hours to the prescribed later schedule, while only 8.4 percent of private employees shifted schedule (Giuliano, 1992).

The net effect was that about 4,000 workers, or 6 to 7 percent of the downtown workforce, participated in the project. The shift in start times was judged to have had a significant positive effect on traffic conditions. Average estimated time savings for commuters were 3 to 4 minutes, or 7 to 9 percent of the average 45-minute commute time. Travel-time savings differed by route and time of day. The project did spread out peak travel, which improved conditions for those traveling during the most-congested time periods, but made conditions slightly worse for those already traveling during the less-congested time periods.

Most project participants experienced little or no significant change in travel conditions during the project, with some important exceptions. Participants from the most distant suburbs who had previously worked the 7:45 AM–4:30 PM schedule saved 9 to 15 minutes (15 to 25 percent), while those

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10 The percents reported here are not percentage point changes but are relative percentage shifts.
who had been starting work prior to 7:30 AM experienced increased travel time of up to 10 minutes (30 percent relative to their originally shorter travel times). Demographic characteristics of participants and non-participants were quite different. Non-participants had more children, used child care services, were younger, and a higher percentage were female. Participants were more likely to be in professional or technical occupations and to be from households with fewer numbers of workers. Participants were also more likely to be car drivers, and reported more problems with time pressures or schedule constraints (Giuliano, 1992).

Flexible and Staggered Hours Employee Involvement. An important consideration in any variable work hours program, be it flexible/staggered work hours or CWW, is that a sufficiently high percentage of the employment base needs to participate in the program. If peak-spreading and congestion reduction are the primary objectives (as opposed to mode shifts and vehicle trip reduction), then enough employees must be involved in order to have a tangible effect on total travel volumes.

In Ottawa, for example, where the Canadian government is the dominant employer, it was possible to include almost all government workers—and thus almost 50 percent of the central area workforce—in a variable work hours program. Peak hour to peak period ratios for transit rider loads were reduced by 8 to 19 percent at the downtown Ottawa cordon and even more as measured at the workplace (Safavian and McLean, 1975). (See “Site- Versus System-Level Impacts” under “Related Information and Impacts” for additional detail on Ottawa highway and transit impacts.) About 100,000 out of some 480,000 Lower Manhattan employees eventually became involved in a program jointly sponsored by the Port Authority of New York/New Jersey and the Downtown-Lower Manhattan Association. Transit passenger counts at key subway stations were lowered by 18 to 26 percent (O’Malley and Selinger, 1973). (See the case study “Staggered Work Hours in Manhattan—New York, New York” for more.) Thanks to U.S. federal government support, circa 1980 variable work hours programs in Washington, DC, and Denver likewise involved substantial portions of both the federal, as well as the overall, employment base (Pratt and Copple, 1981).

Given a choice, uninitiated employers—at least prior to more experience with flextime—have preferred the concept of staggered hours to flexible hours, since flexible hours puts considerably more discretion in the hands of the individual employees, making the number of employees who will show up at any given time less certain. However, evidence from the 1970s experiments in Manhattan and San Francisco suggested that employees on flexible hours do tend to stagger their own work hours. Between 73 percent and 75 percent of employees involved in those flextime programs reported selecting work arrival and departure times designed to avoid traffic and transit congestion. The trip timing results were comparable to those achieved with typical staggered hours schedules (Pratt and Copple, 1981). It should be noted, however, that certain more recent suburban applications (Bishop Ranch and Pleasanton in California) stand as exceptions.

Compressed Work Week. In the early 1980s, a carefully controlled experiment involving CWW schedules was staged in Denver, involving about 9,000 federal employees in 42 separate agencies. The participation within federal agencies exposed to the program was 65 percent. The most popular schedules were the 9/80 and the 4/40, which resulted in participants arriving at work an hour earlier and departing about an hour later than before. The program was shown to flatten the peak, with the maximum percentage of total arrivals in the peak half hour declining from 56 percent to 42 percent, and the equivalent percentage of departures dropping from 47 percent to 34 percent. Evaluations suggested that the CWW strategy had only small effects on aggregate ridesharing and transit mode shares. Within the aggregate figures, matched data did show that non-participating employees showed decreased ridesharing and increased solo driving and transit use, largely counterbalanced by increased ridesharing by participants. It was inferred that ridesharing arrangements had been disrupted for non-participants, but it was also evident that those electing CWW had been able
to form carpools and to do so to a greater degree than before (Atherton, Scheuernstuhl, and Hawkins, 1982; Cambridge Systematics, 1980).

The Denver Federal Employee CWW experiment found, with regard to travel mitigation, that net household VMT reductions for both work and non-work travel together averaged 14 to 15 percent for participating employees. This determination took into account not only commute VMT savings from the 1 or 2 days per week where travel to work was not required, but also household travel effects for the full 7-day week. The strong implication from the Denver evaluations is that CWW allowed more efficient accomplishment of non-work travel objectives, may have discouraged travel on the inherently longer workdays, and did not induce expanded weekend travel. Similarly, no expansion of out-of-area travel and no offsetting of work trip VMT savings were observed in Washington, DC, federal CWW applications (Cambridge Systematics, 1980; Skinner and Shea, 1981; Atherton, Scheuernstuhl, and Hawkins, 1982).

As part of its effort to meet the trip reduction requirements of the Air Pollution Control District’s Rule 210 (predecessor to Regulation XV), Ventura County tested a variable work hours program consisting of flextime and both 9/80 and 4/40 work weeks. Commuter Transportation Services, Inc. (CTS) conducted a 6-month pilot project to determine the impact on ridesharing and organizational effectiveness. A total of 367 employees were involved, with 172 adopting a 9/80 schedule, 76 on flex-time, and 33 on a 4/40 schedule. The remaining 86 either did not opt for one of the variable work hours offerings or chose to discontinue participation somewhere in the 6-month program.

Survey information revealed that drive-alone rates in the sample of 367 declined from 82.2 percent to 76.6 percent over the course of the project, while ridesharing rates increased from 8.0 percent to 12.8 percent, and use of “other” methods increased from 9.8 percent to 10.6 percent. While the CTS evaluation also determined that commute time decreased for persons participating in one of the variable work hours programs, the actual amount of time saved was not determined, nor was a link drawn between the specific variable work hours program and the pattern of mode shifts. The time savings was believed to be related to shifting out of peak period traffic and possibly also to the ability of ridesharing participants to use carpool lanes (Freas and Anderson, 1991).

A 1995 study of the effects of CWW on employee travel by the California Air Resources Board found that 2,600 Southern California employees on CWW schedules reduced their net number of trips by an average of 0.5 per week. Those employees working a 9/80 schedule drove an average of 13 fewer miles per week, while those working a 4/40 schedule drove an average of 20 fewer miles per week (Association for Commuter Transportation et al., 2004).

Analysis of Washington State CTR Program data indicates that employee participation in CWW schedules at CTR-covered employers grew steadily from 14.5 percent in 1993 to 20.0 percent in 2005. The 2005 rate was in a context where roughly 2/3 of CTR Program employees were apparently eligible to choose CWW. Participation in 9/80 schedules doubled between 1993 and 2005, to 5.8 percent. Participation in 4/40 schedules grew more slowly, but still remained most prevalent at 7.3 percent. The 3/36 variation, common in health care facilities, attracted 2.3 percent of employees covered by the CTR program in 2005, with a health care worker participation rate of 33.6 percent. A related notable statistic was the craft/production/labor employee CWW participation rate of around 24 percent, actually a shade higher than the rate for professional/technical employees (Zhou and Winters, 2008). More information on relationships between CWW involvement and worker characteristics is found in the upcoming “Underlying Traveler Response Factors” section, under “Individual Behavioral and Awareness Considerations”—“Alternative Work Arrangements Considerations.”
Telecommuting. A 1992 national telecommuting survey obtained information on telecommuting behavior from 16 organizations representing almost 5,000 telecommuters. The organizations consisted primarily of government agencies (13) and telecommunications companies (2). One of the 16 was a telework center. While the overall size of these organizations is not known, the number of telecommuters ranged from seven to 2,600, with a mean of 310 and a median number of participants of 82. The great majority of employees taking part in these telecommute programs were found to be in professional (61 percent) or managerial (23 percent) occupations, with clerical and data entry (14 percent) and other classes of employees (2 percent) making up the remainder (Rathbone, 1992). (More information on telecommuter demographics, job types, and workplace characteristics is found in the above-mentioned “Individual Behavioral and Awareness Considerations” discussion.)

The most common telecommute schedule found in the 1992 survey was 1 day per week, representing 55 to 59 percent of the sample (depending on interpretation), followed by 18 percent who telecommuted 2 days per week. On the other hand, 12 percent were found to telecommute 5 days per week. The organization with 2,600 participants, a county government, reported telecommuting frequency distributions of 5 days per week (1 percent), 4.5 days (6 percent), 3 days (14 percent), 2 days (53 percent), 1 day (8 percent), 1 day per 2 weeks (13 percent), and 1 day or so per month (5 percent) (Rathbone, 1992), for an average of 1.96 days per week. Most of the 16 organizations surveyed reported telecommuting rates that average 1 to 2.3 days per week. The 2 outliers are the telework center with 24 participants averaging 4.8 days a week and a transit agency with 10 clerical workers telecommuting 5 days a week (clearly a telephone service-information operation). The average for the overall sample is 1.8 days per week and the median is 1.6.

It is important to note that only a fraction of responding organizations in the 1992 survey reported telecommuting at frequencies of less than 1 day per week, creating some ambiguity. A 2002 Southern California Association of Governments (SCAG) home-based survey of about 5,000 Southern California residents does fully address infrequent telecommuting, having first identified persons in the workforce, and then the telecommuters among them, and finally those who telecommuted in the previous week. A strict definition of telecommuting was utilized, eliminating home-based-business workers and overtime home-workers. Out of 2,766 workers, 24.6 percent were employees reporting at least 1 day of teleworking in the last 2 months, 7.0 percent were home-based-business workers, and 68.4 percent were non-teleworking employees. Table 19-19 provides a telecommuting frequency analysis derived using a final frequency analysis sample of 499 telecommuters (Walls, Safirova, and Jiang, 2007).
From Table 19-19 it may be calculated that workers who had telecommuted the previous week averaged 3.2 days per week of telecommuting. If one makes an assumption that the remaining telecommuters averaged 0.25 telecommutes per week, then the average per week for all persons in the telecommuter sample was 1.7 telecommutes per week. Applying this all-telecommuter rate back to the full sample suggests an all-worker rate of 0.4 telecommutes per week for the 2002 Southern California working population as a whole.

There are contemporary estimates of telecommuting that may appear to be, but are not necessarily, higher. For example, it has been concluded that data collected in national workplace surveys suggest that “the incidence of work at home at least one day per week ranges from 8.9 percent of all employed persons in Ireland to 11.1 in the UK and 15 percent in the US” (J. H. Pratt as quoted in Lyons, Farag, and Haddad, 2008). From the SCAG survey findings for telecommuters, it may be computed that 12 percent of Southern California employees telecommute at least 1 day per week (48 percent of 24.6 percent). However, since the quoted international comparison appears to include home-based-business workers and may even include overtime home-workers, which the SCAG analysis does not, the Southern California rate is most likely highest when placed on equal footing.

A definitively higher estimate of telecommuting comes from Washington State, although this estimate is based on surveys limited to firms in the state’s CTR program (generally firms of over 100 employees). In 2007, telecommuting displaced about 2 percent of commute trips among the covered firms. Periodic surveys have showed a slow but steady increase in telecommuting (Hillsman, 2009). Quite possibly increasing gasoline prices were a factor up through the latest available survey dates. Increases in telecommuting have also been reported from the United Kingdom, which lags a little behind the United States in adoption (Lyons, Farag, and Haddad, 2008).

Turning to observed commuter response to telecommuting, there are several demonstration programs of interest. Beginning in 1990, the Washington State Energy Office staged a 2-year Telecommuting Demonstration project in the Puget Sound area involving 25 public and private organizations and 280 participants. In structuring the monitoring and evaluation of the experi-

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### Table 19-19  Telecommuting Frequency Analysis of 2002 Southern California Workers

<table>
<thead>
<tr>
<th>Days Telecommuted in the Previous Week</th>
<th>Number of Telecommuters</th>
<th>As a Percentage of Telecommuters</th>
<th>As a Pct. of Workers Telecommuting in the Previous Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>258</td>
<td>52%</td>
<td>—</td>
</tr>
<tr>
<td>1</td>
<td>54</td>
<td>11%</td>
<td>22%</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>9%</td>
<td>19%</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>5%</td>
<td>11%</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
<td>4%</td>
<td>8%</td>
</tr>
<tr>
<td>5</td>
<td>97</td>
<td>19%</td>
<td>40%</td>
</tr>
<tr>
<td>Subtotal telecommuting in previous week</td>
<td>241</td>
<td>48%</td>
<td>100%</td>
</tr>
<tr>
<td>Total telecommuting in previous 2 months</td>
<td>499</td>
<td>100%</td>
<td>—</td>
</tr>
</tbody>
</table>

Source: Derived from Walls, Safirova, and Jiang (2007).
ment, the researchers obtained information through surveys, travel logs, and related media using four groups of people: telecommuters, their supervisors and co-workers, and a comparison group. Most of the telecommuters were home-based, but 24 individuals from nine organizations used the Energy Office’s new State Telework Center. Pre-program surveys revealed that 61 percent of the telecommuters previously drove alone to work, 18 percent used carpools, 17 percent used transit, and the remainder walked, biked, or were dropped off. The comparison group was similar, but with lower use of carpools (12 percent). These proportions did not change significantly over the demonstration, with 63 percent of telecommuters and 64 percent of the controls reporting drive alone as their usual method of reaching work. Average commute trip length for telecommuters was 18 miles, compared to 8 miles for the comparison group and 10 miles on average in the Puget Sound region, suggesting that telecommuting is particularly attractive to employees living a long distance from work.

The survey data indicated that by the end of the demonstration, telecommuters had reduced their total commute trips by about 26 trips per year, while members of the comparison group reduced their trips by 10 per year, primarily as a result of shifts in mode motivated by the employers’ commute assistance programs. A travel log analysis revealed that telecommuters were saving trips and miles traveled on their telecommute day, and not making up for lost trips on their non-telecommute days. Before the program began, the telecommute participants made 4.3 trips per day, corresponding to 52 miles in 101 minutes. One year later, they made 2.6 trips per day on telecommute days, traveling 13 miles in 35 minutes, and on non-telecommute days made 3.9 trips, going 49 miles in 91 minutes. Sample size limitations prevented an analysis of use by other household members of the telecommuter’s car on telecommuting days. Telecommuting was estimated to have reduced average commute VMT per telecommuter on telecommute days by 36 miles, netting out to 29 miles after accounting for mode shifts.

In the special case of the telework center, travel data indicated that vehicle trips did not decrease for these participants, since they still had to commute to the center. Furthermore, while only 56 percent of these telecommuters drove alone to the main work site, 83 percent drove alone to the telework center (Washington State Energy Office, 1992).

A Southern California telecommuting test among SCAG employees in 1988 showed a reduction in person trip miles as a result of work trips avoided and shorter trips to telework satellite centers. The average net person trip distance reduction was 46 miles for each telecommute occasion. Allowing for the usual mode of travel for telecommuters—accounting for the fact that some normally used transit or carpool—31 vehicle miles of travel were saved per telecommute. Fourteen percent of SCAG’s employees participated in the experiment, with average participation being once every 9 days. Most worked from home, and one worked at a satellite work center. The SCAG experiment showed some increase in non-work trips due to telecommuting. It was estimated that VMT “created” as a result of working at home amounted to 14 percent of the miles saved; therefore, the net savings in VMT per telecommute was 26 miles, not 31 (SCAG, 1988).

The state of California also conducted a pilot telecommuting project in the late 1980s, involving over 400 state employees across 13 agencies (both participants and non-participating “controls”). The findings suggested that physical trips to work by telecommuters decreased by 30 percent, from 0.90 to 0.63 trips per day, compared with non-telecommuters whose rates did not change. Those participating were found to telecommute 1 to 2 days per week. Preliminary findings showed no increase in non-work trips by telecommuters, but instead found a reduction in non-work trips for other household members. Non-work person trips fell by 35 percent, from 3.6 to 2.3 per day (Kitamura et al., 1990).
In Hawaii, the state department of transportation conducted a satellite telecommute demonstration project in which it established a telework center in Mililani, Oahu, located 20 miles from downtown Honolulu. Seventeen employees participated in the demonstration (seven public sector and 10 private sector). An evaluation found that 93 percent of the employees experienced a reduction in number of work trips and an average drop in fuel consumption of 29 percent. Travel time savings averaged 7.4 hours per week (Giuliano, 1992).

An important 1990s synthesis-type study on telecommuting aimed at providing a framework for more accurately estimating the travel benefits associated with telecommuting. A model proposed on the basis of this synthesis accounts for two essential factors when attempting to estimate telecommute VMT savings:

1. Determining the amount of telecommuting that occurs on a given day.

2. Determining the actual vehicle miles of travel avoided as a result of a telecommute event.

In addressing the first factor, cross-sectional data from various telecommute programs (including Puget Sound and the state of California) were used to conclude that about 16 percent of all employees are in a type of occupation where they can reasonably telecommute, that 50 percent of these will want to telecommute, 76 percent of these will actually participate, and—based on an average frequency of 1.2 days per week—about 24 percent will telecommute on a given day. When these proportions are jointly accounted for, the model projects that about 1.5 percent of the workforce could and would telecommute on a given day (Mokhtarian, 1998).

In terms of the second factor, telecommute day VMT reduction, the study points out that not every telecommute event results in a VMT reduction equal to the commute trip length. The reasons are that not all of these trips are otherwise made as drive-alone, that some workers actually drive in to the worksite for all or part of their telecommute day, and that there may also be an increase in non-work trips taken that day. The analysis estimates that about 82 percent of telecommuters normally drive alone—compared to a national average for all commuters of 73.2 percent in 1990—and that about 6 percent will actually commute on the telecommute day. These estimates suggest that a telecommute day only eliminates a vehicle trip 76 percent of the time (82 percent drive alone less 6 percent actually commuting). When taken together with the proportion of the workforce that would telecommute on a given day, the evaluation framework estimates that the average daily VMT reduction per employee achievable with a (regional) telecommuting program would be 0.5 miles on an average round trip by SOV of 43 miles, or roughly 1 percent.

In light of these calculations, the researcher concludes that it would be unlikely that a TDM program based purely on telecommuting would ever reduce travel sufficiently to obviate the need for new transportation capacity. Also, if certain assumptions are made in the model with regard to residential relocation or induced demand enabled by telecommuting, the travel stimulation effects could equal or exceed the VMT reductions from telecommuting (Mokhtarian, 1998).

**UNDERLYING TRAVELER RESPONSE FACTORS**

The travel response of commuters to TDM initiatives involves many of the same underlying individual behavioral and decision processes found to influence response to most types of transportation system changes. In the case of TDM, however, there are more layers of factors involved. Some are fairly unique to TDM. The environment is relatively atypical as well. While individual com-
mater response to TDM in part involves normal travel choice and decisionmaking functions, the context is one where peer (or supervisor) influences and corporate culture may be uniquely important. The “changes” involved—produced by the TDM strategies themselves—are dependent on choices by the employer or institution. Employee awareness of travel options can also be significantly affected by the organization.

These managerial outcomes in turn will have been influenced by the needs being addressed by the TDM program and the laws and regulations involved (or not involved). Overall effectiveness will be a function of not only employee participation and response, but also the precursor employer participation and response. This section, along with additional topics in the “Related Information and Impacts” section, seeks to illuminate key aspects of these underlying influences on how TDM programs are likely to be implemented and how effectively they will influence travel decisions.

Individual Behavioral and Awareness Considerations

As alluded to previously, a commuter’s travel response to TDM programs represents a complex intermixture of individual behavior presumed to conform with established travel demand theory plus less-well-understood interactions with workplace dynamics. Lifestyle and life cycle impacts also seem to be more evident than in the response to more conventional transportation system changes, either because they are in fact more important in the case of responses to TDM or perhaps because they simply have received more attention given the shorter-term focus and more individualized nature of TDM actions. This subsection starts with examining the role of tripmaker economic utility decisions and then proceeds through other layers of influences including barrier effects, interactions of the employer and employee, special considerations involved in alternative work arrangements, and employee awareness of available program elements.

Time, Cost, Convenience, and Barrier Effects

Travel demand theory suggests that travelers’ choice of travel mode is heavily tied to the comparative economic utility among the alternatives. This utility is most commonly expressed in terms of travel time, travel cost, and certain measures of convenience. In this paradigm, travelers see additional travel time, cost, or inconvenience as a “disutility,” and make their choices in such a manner as to minimize this disutility.

In the majority of cases facing commuters nationwide, the private automobile offers the lowest disutility. This is because its users have little difficulty accessing it at the beginning of the trip, generally pay no direct cost to use public roadways, and in most cases can park for free or at a substantial discount at the employment site. These advantages are particularly evident for commute trips beginning or ending in suburban areas. With such advantages, along with the convenience of being able to define one’s own schedule of departure and arrival, it is little surprise that the majority of commuters opt to use their private vehicle. The alternative commute modes involve the effort and time constraints of participating in a carpool or vanpool, or taking the time to travel by walking or bicycling, or having to drive or walk to a transit line where there may be a wait for the vehicle to arrive—with potentially no unoccupied seat and certainly requiring payment of an often substantial fare. The situation is not helped by the fact that, once in the carpool, vanpool, or transit vehicle, the commuter is most often stuck in the same traffic congestion as the private car, minimizing any apparent advantage to switching modes. There are also related barrier effects where, for example, use of transit may not be feasible because of lack of a connection or service at the needed time.
One thing TDM must do in order to be effective is to change the equation by making the alternative modes more attractive in terms of relative time, cost, and convenience and by addressing related barrier effects. Preferential closer-in parking for carpool and vanpool, and contract transit service enhancements that lessen wait for a bus, are examples of strategies with elements of time saving and enhancement of convenience.

Straightforward incentives and disincentives directly address the cost component of the utility equation. Transit, vanpool, carpool, and walk/bike subsidies provide monetary savings to the employee through choice of the covered alternative commute modes. Parking pricing impacts the cost equation by enhancing the out-of-pocket cost advantage of alternative modes. The companion strategy (or phenomenon, as the case may be) of restricted parking supply makes driving and parking less convenient and more time-consuming by increasing uncertainty about space availability and often lengthening the walk from parking to the workplace.

Commute mode choice response to travel time, cost, and certain convenience changes introduced by TDM actions may be anticipated using travel demand model relationships. Table 19-20 lists key mode choice model coefficients averaged across 1990–2002 modeling results from 26 urban areas across the United States. Ranges are also provided. These coefficients were assembled as part of an update to EPA’s COMMUTER model (U.S. Environmental Protection Agency, 2005), outlined in the “Additional Resources” section.

Each average coefficient in Table 19-20 is paired with commentary as to what it signifies with regard to how commuters weigh time, cost, and convenience factors in mode choice travel decisions. Convenience factors are implicit in the “Out-of-Vehicle” times: Walking implies something less than doorstep service, and waiting implies less than continuously or immediately available service. The higher these out-of-vehicle time values are the more inconvenience is implied.

### Table 19-20 United States 1990–2002 Mode Choice Model Coefficients with Interpretation

<table>
<thead>
<tr>
<th>Time or Cost Variable</th>
<th>Average Coefficient</th>
<th>Coefficient Range</th>
<th>Interpretation of the Average Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-Vehicle Time (minutes)</td>
<td>-0.0253</td>
<td>-0.0450 to -0.0113</td>
<td>(In-vehicle time is the time spent driving, or riding in a car, vanpool, or transit vehicle.)</td>
</tr>
<tr>
<td>Walk (Out-of-Veh.) Time (min.)</td>
<td>-0.0473</td>
<td>-0.0931 to -0.0186</td>
<td>Time that must be spent walking is roughly twice the disincentive as time spent in-vehicle.</td>
</tr>
<tr>
<td>Transit Wait (Out-of-Veh.) Time (min.)</td>
<td>-0.0466</td>
<td>-0.0978 to -0.0155</td>
<td>Wait time (1/2 the time between transit vehicles) is also about twice as onerous as in-vehicle time.</td>
</tr>
<tr>
<td>Auto Commuter Parking Cost (cents)</td>
<td>-0.0056</td>
<td>-0.0173 to -0.0004</td>
<td>One minute of in-vehicle-time is as important as 4.5¢ of parking cost ($2.70/hour value of time).</td>
</tr>
<tr>
<td>Transit Fare (cents)</td>
<td>-0.0040</td>
<td>-0.0135 to -0.0004</td>
<td>Dollar per dollar, transit fares are somewhat less onerous (less of a disincentive) than parking cost.</td>
</tr>
</tbody>
</table>

Notes: The coefficient ranges exclude certain values deemed by the researchers to be outliers.

The researchers report historic guidelines that conflict somewhat with certain interpretations provided in this table, most notably, that 1 minute of in-vehicle-time is only as important as 3 cents of parking cost ($1.80/hour value of time).

Source: U.S. Environmental Protection Agency (2005), with certain interpretations by the Handbook authors.
Barriers to the use of alternative commute modes are not amenable to incorporation as continuous variables in a forecasting relationship—they are more in the “go”/“no go” realm of cause and effect. Barriers are addressed by such actions as contracting to bring transit service to an otherwise unserved employment site. Shuttles connecting suburban worksites with outlying rail transit stations eliminate a barrier to employee use of time-competitive rapid transit or commuter rail services. Lockers and changing facilities address a barrier to active transportation—walking, jogging, or bicycling—by providing a place to freshen up and change out of athletic gear or informal clothing prior to reporting to work. Circulator shuttles or availability of company cars addresses the perceived or actual need for a car during the day for errands or company business, making use of any alternative commuting mode more tractable.

Need to drive alone in order to run errands or meet other family needs, such as childcare drop-offs and pickups en route to or from work, is a barrier effect similar to the need for having one’s own car at hand during the day. En route satisfaction of travel needs is a phenomenon addressed at the end of the “Underlying Traveler Response Factors” section, in the “Trip Chaining” subsection. A travel demand modeling effort to include both time, cost, and convenience factors on the one hand, and barrier (and other) effects on the other hand, is described in the “Related Information and Impacts” section under “Modeling Studies”—“California Air Resources Board Survey and TDM Program.”

**Facilitation and Encouragement**

Alternative mode use may involve new ways of doing things for the employee that are, or at least seem to be, complex. For example, formation of a vanpool is not a simple endeavor for the uninitiated. Even forming a carpool requires hard-to-obtain information on who is commuting in about the same direction at about the same time. In addition, vanpool and carpool formation and continuation involves interpersonal influences that may include possible reluctance to travel with strangers or to assume a lead role in organizing rideshare arrangements. These concerns and also uncertainty as to the risks and responsibilities involved are thought to be major obstacles to ridesharing (Pratt and Copple, 1981).

Help and encouragement in crossing these thresholds, in the example of vanpooling, is the function of vanpool formation and cost sharing assistance. Such programs provide facilitation through varying degrees of employer involvement in vehicle purchasing or leasing, underwriting of insurance and maintenance costs, or possibly providing and maintaining the vehicles themselves or arranging with another entity to do the same.

For encouraging use of the broader array of alternative transportation choices, transportation coordinator support, on-site transit information and pass sales, and rideshare matching services all serve to overcome the information barriers, discomfort, and uncertainty associated with forming group travel arrangements or taking the leap to become a transit or walk/bike commuter. Indeed, the whole array of “Support Action” strategies, addressed at the beginning of the “Response by Type of TDM Strategy” section, are focused on facilitation and encouragement.

The fear of being stranded at work in an emergency or because of unscheduled overtime is still another barrier. Guaranteed ride home is the strategy geared to addressing situations where alternative modes can’t themselves meet such off-schedule needs.

A factor that has characterized a number of the most successful worksite TDM programs, but is very hard to propagate on a multi-employer basis, is a deeply supportive company culture. One of the best examples comes from the 1970s and 1980s in the form of a program with heavy vanpool
emphasis, that of the Minnesota Mining & Manufacturing Co. (3M) in St. Paul. During this period the 3M vanpooling program attracted usage that recognized rules of thumb suggest should be improbable. It is hypothesized that the program may have been operating in a “supersaturated” mode in response to not only the 1970s energy crises but also a very special corporate enthusiasm and ethic. For a full discussion of this example, see Chapter 5, “Vanpools and Buspools,” under “Response to Vanpool and Buspool Programs”—“Employer Sponsored Vanpool Programs”—“Outstanding Employer Vanpool Programs.”

Alternative Work Arrangements Considerations

Variable work hours arrangements are somewhat unique among TDM strategies in that the trip timing decision process of the individual employee comes into full play when employees are given the discretion to choose their own work times, as with flextime. This decision process involves trade-offs among at least partially conflicting factors. A survey of California State Automobile Association (CSAA) employees early in the development of discretionary alternative work arrangements found four causal factors to be particularly important. These considerations were occupational factors (deemed important by 81 percent of surveyed employees), travel congestion effects (75 percent), social/family responsibilities (71 percent), and issues related to the use of alternative modes (92 to 36 percent depending on mode).

Occupational factors relate to employee matching of work hours to the needs of the office, which include work coverage requirements such as receptionist duties. Congestion effects relate to desired avoidance of rush hour conditions in order to shorten travel times or minimize the discomfort of crowding. Social/family responsibilities include the desire to spend more productive time at home with friends and family, and such responsibilities as seeing that children get to school or day care. Modal usage factors encompass the trip coordination required to participate in vanpools and carpools (increasingly important with increasing numbers of passengers) and to match transit schedules (50 percent responding important in the CSAA interviews) (Harrison, Jones, and Jovanis, 1979; Jovanis and May, 1979).

Modal usage factors would vary by location—the CSAA offices were in downtown San Francisco—and occupational factors would obviously vary in response to employer requirements. The interplay and relative importance of factors influencing changes in travel mode in conjunction with work time shifts have been difficult to research. Outcomes in relation to individual categories of employer and institutional TDM strategy have been examined in each subsection of the preceding “Response by Type of TDM Strategy” section.

Compressed work week (CWW) options introduce another dimension of travel pattern effects. They bring the opportunity and/or necessity for major non-work travel adjustments. Evidence from the federal employee experimental programs indicates that travel on the weekday off typically consists of urban trip tours of linked trips to multiple destinations, like normal Saturday travel, with trip purposes similar to the usual weekday non-work trips. Extension of weekday work trips to include intermediate linked-trip destinations becomes less common, either because non-work travel needs are met on the weekday off, or because the workday simply becomes too long for much detouring. Previous weekend travel may also be shifted to the weekday off (Cambridge Systematics, 1980; Skinner and Shea, 1981).

Regression analysis of CWW schedule participation among workers under the Washington State Commute Trip Reduction (CTR) program suggests that CWW is more attractive for employees with supportive employers, long commutes, and multi-modal commutes such as drive to transit. CWW participation is less among single-mode transit and shared-ride commuters. Work in man-
ufacturing and health care industries, along with government, was found to be a positive indicator for CWW choice. Work in information service/software was found to be negative for CWW, along with jobs involving management and administration (Zhou and Winters, 2008).

As will be seen, the employment-related positive/negative indicators for CWW participation have major differences compared to telecommuting. Indeed, few manufacturing firms are typically found among any other forms of TDM involvement. CWW appears to work well (quite likely in non-optional applications) for industries where workers must be present at their jobs, on a regular schedule. It thus may fill an important gap in the spectrum of TDM strategies. With regard to the lesser CWW participation among single-mode transit and shared-ride commuters, it is not clear if such commuters feel less urgency to work fewer days, prefer regular hours to support their choice of mode, or are more likely to give up on single-mode transit and shared-ride commuting.

Telecommuting adds even more decision dimensions, because it involves an actual shift in work location away from company facilities to the home or sometimes a telework center. Examination of telecommuter trip characteristics, demographics, job types, and characteristics of their employers, along with other information, provides a basis to make inferences about factors affecting telecommuting. The following information summarization is drawn from the literature reviews and modeling efforts of two California studies, one utilizing the 2002 home-based Southern California Association of Governments (SCAG) survey (Walls, Safirova, and Jiang, 2007) and the other a survey of residents in eight Northern California neighborhoods (Tang, Mokhtarian, and Handy, 2007):

- Longer commute trip distance and time are positive indicators for telecommuting adoption. (One reviewed study found the converse, but may have included home-based-business workers, with their trip distance of zero.) Modeling success using the square of distance suggests a heightening of positive impact for particularly long commute trips.

- Pay parking at the workplace is a positive indicator, as is the opportunity to make more money as a telecommuter. An increase in work-related costs and substantive technology requirements are negative indicators, as is reduced salary. Both the trip distance/time finding and these cost/income findings demonstrate once again the importance of time and money in commuting decisions.

- Findings are very mixed for the effect of gender. One reviewed study suggests, based on Montreal data, that the key relationship is one of more empowerment in the workplace being a positive indicator for telecommuting. Where women have less workplace responsibility and freedom of choice, the telecommuting rates tend to be higher for men relative to women.

- Presence of more than one adult in the household is a positive, but findings are very mixed for presence of children. If anything, children under 6 are a neutral or positive indicator, while older children (along with household distractions) are a neutral or negative indicator. Reported results are split between health limitations not being a factor and situations of disability or parental leave being a positive indicator for telecommuting.

- High incomes and a college education, along with other highly correlated factors such as age, are all broadly-reported strong positive indicators for telecommuting adoption—as is intensive and proficient use of computers.

- Work in architecture, engineering, other professions, education and training, sales, and senior or middle management are all positive indicators. Employment in the arts and entertainment, consulting, finance, insurance, and real-estate industries is likewise a positive indicator for telecommuting adoption.
• Work in health care, construction, maintenance, and production, along with employment in the transportation, communication, and retail trade industries are negative indicators. A distinction needs to be drawn between retail trade and sales, as the latter frequently involves home and business visits and is thus often conducive to telecommuting.

• Results are mixed for part-time work as an indicator. Being a contract or self-employed worker is a positive while being a full-time regular employee is a negative indicator.

• As might be expected, job suitability for telecommuting is a positive indicator, whereas the converse is a negative indicator, along with workplace misunderstanding and lack of manager support. Individual perception of a need for office discipline or desirability of face-to-face-communication or social interaction with co-workers is a negative indicator.

• Being a driver or driving to work is a positive indicator, along with perceiving the commute to be stressful. The influence of transit use or availability is mixed.

• Orientation to the family, desire for lifestyle quality improvement, enjoyment of walking, and preference for appealing outdoor landscapes are all positive attitudinal indicators for telecommuting adoption. A non-rural residential location and preference for regional accessibility tend to be negatives.

A potentially quite important finding from the SCAG survey modeling analysis is that employment in an organization with 25 to 249 employees is a negative indicator for telecommuting. The researchers hypothesize that the firms of under 25 employees offer a flexibility conducive to telecommuting, while firms of 250 and more employees are likely to have an established telecommuting program. Mid-size firms are thought not to offer either benefit, being too big for responsive flexibility and too small to support formal programs (Walls, Safirova, and Jiang, 2007).

Both of the California studies also looked at indicators of telecommuting frequency, as distinct from telecommuting adoption. Together, the literature reviewed and the studies’ original research suggest that many but not all of the same factors apply, certainly not always in similar degree, but generally in the same positive/negative relationships. Both studies in their own modeling efforts encountered more analysis difficulties with frequency than adoption (Walls, Safirova, and Jiang, 2007; Tang, Mokhtarian, and Handy, 2007). The eight-neighborhood Northern California study concluded that each of three different degrees of telecommuting frequency were associated with significantly different needs and desires (Tang, Mokhtarian, and Handy, 2007). The SCAG-survey-based analysis, in the context of having added a telecommuting program variable to the frequency formulation, found employer size not to be of importance to frequency. However, employees of firms with formal telecommuting programs were found to be 22 percent more likely to be high-frequency telecommuters (4 or 5 days a week) than others (Walls, Safirova, and Jiang, 2007).

Awareness and Comprehension of Options

Whatever influence the utility and characteristics of alternative commute modes have on commute mode choice is dependent on employee awareness and comprehension of the available options and support programs. In the previously mentioned 1993 study for the California Air Resources Board (CARB), a survey of 45 employers engaged in TDM programs in the Los Angeles and Sacramento areas found that a surprising percentage of the employees were unaware that their employer offered a particular type of TDM strategy. Because employees were asked to identify particular TDM incentives made available by their employer, it was possible to compare this knowledge with a listing of
the actual incentives supplied by the employer. From this comparison, level of employee awareness was calculated as the number of employees reporting that an incentive was available, divided by the number of employees who actually had the incentive available according to their employers. Employees whose employer did not report providing a particular incentive were not included in the computation. Table 19-21 shows how these awareness levels were found to vary across the different types of strategies.

Table 19-21  Average Levels of Employee Awareness of Offered TDM Strategies in Los Angeles and Sacramento Programs

<table>
<thead>
<tr>
<th>TDM Strategy</th>
<th>Percent Awareness</th>
<th>TDM Strategy</th>
<th>Percent Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike Racks</td>
<td>55%</td>
<td>Company Vanpool Vehicles</td>
<td>67%</td>
</tr>
<tr>
<td>Showers, Lockers, Changing Facilities</td>
<td>38</td>
<td>Guaranteed Ride Home</td>
<td>36</td>
</tr>
<tr>
<td>Bus Pass Discount</td>
<td>17</td>
<td>Rideshare Matching</td>
<td>70</td>
</tr>
<tr>
<td>Bus Pass Sales On-Site</td>
<td>41</td>
<td>Rideshare Prizes</td>
<td>64</td>
</tr>
<tr>
<td>Carpool Preferential Parking</td>
<td>77</td>
<td>Transportation Coordinator</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transportation Fairs</td>
<td>15</td>
</tr>
</tbody>
</table>

Note:  a Calculated as the number of employees who reported having each strategy, divided by the number of employees whose employer reported providing the strategy. Each calculation excludes employees whose employer did not report providing the measure.

Source: Comsis (1993a).

While two-thirds of employees were aware of employer-offered measures such as preferential parking and rideshare matching, awareness of certain other measures like transportation fairs and bus pass discounts was below one-fifth of employees. The findings were a revelation to all concerned, and argued strongly for more aggressive information and marketing efforts by the programs. The study concluded that annual TDM marketing plus administrative cost per employee offered the best explanation for variations in awareness. The implication of this relationship is that higher levels of marketing, outreach, and information exchange lead to better informed employees capable of more conscious transportation choices, which in turn translates to the TDM strategies having greater use and impact (Comsis, 1993a). The research effort in question is further described under “Related Information and Impacts”—“Modeling Studies”—“California Air Resources Board Survey and TDM Program.”

**Voluntary Versus Regulatory Employer Motivation**

To appreciate the full array of factors underlying employer and institutional TDM effectiveness, it is essential to recognize that degree of employee motivation is in large measure a function of employer motivation. TDM programs are generally motivated by one of two conditions:

- The employer or institution is facing issues with employee transportation, which are either affecting employee morale and retention or are raising the prospect of high costs and increasing resources devoted to employee transportation needs, particularly parking.
• The employer or institution is required under law or regulation to reduce its vehicle trip generation—particularly peak-period vehicle trips—in order to mitigate congestion, vehicle miles of travel (VMT), or emissions, or to forestall the need for new road capacity.

While a regulatory requirement can compel an organization to implement a TDM program, it is the first of these motivations that is most likely to lead to a productive in-house program. If its employees are suffering congestion delay with few existing options, or entailing the expense of driving long distances, the employer or institution has an economic self-interest in its TDM program success. Economic self-interest will also apply if the organization is seeking to avoid a major employee parking provision expense, be it building and maintaining more of its own facilities or subsidizing the cost of employee parking through a third-party provider. There are also other examples where self-interest pertains, such as when the organization needs to expand, but is opposed by neighbors concerned about traffic and pollution impacts.

In the case of a regulatory requirement, the employer or institution is obligated to implement a program of measures that have the objective of reducing its vehicle trip rate to a specified level. There is little doubt that such a requirement will capture the employer’s attention regarding its employees’ transportation activity, and equally little doubt that the vast majority of employer TDM programs have been initiated under such circumstances. Beyond that, however, the composition and ultimate impact of a program depends on factors that are much more related to the employer or institution, including:

• Whether the organization perceives employee transportation options improvement, trip reduction, and the opportunity to be a good citizen as a clear advantage to its operation or is simply out to meet the letter of the law.

• Whether the employer holds a fear of losing competitive advantage with its peers in attracting and retaining employees.

• Whether the company administration has an understanding of which strategies will have the desired impact.

While a regulatory requirement may force an employer’s hand in implementing a TDM program, the actual composition of that program can vary widely. No known employer TDM regulation specifies the exact strategies to be implemented, or penalizes an organization for failing to achieve a trip-reduction goal. Even in the experience of California’s Regulation XV—one of the most stringent TDM regulatory programs tried—employers faced only the pressure of having to revamp their plans at the end of an annual or bi-annual review cycle if they failed to achieve their trip reduction targets. Penalties were incurred only for failure to submit a plan, not for failing to achieve targets.

Lacking direction to the contrary, employers who fail to meet trip reduction targets have been found to generally opt for “more” TDM measures in their revamped plans rather than shift to the more influential financial incentive or disincentive measures. In a review of employer performance under Regulation XV for the South Coast Air Quality Management District (SCAQMD), instances were found where employers had introduced literally dozens of measures into their programs in the hopes of finally finding the right combination. However, most often the simplest programs—those with few measures but including monetary incentives and perhaps one or more transportation services—had the most demonstrable impact on travel behavior and vehicle trip reduction (VTR) (Comsis, 1993b).

It is generally difficult to persuade employers or institutions to adopt financial measures, particularly disincentive actions like parking management or pricing, unless they see a clear benefit to
their bottom line. Hence, the existence of a regulatory requirement is no guarantee that this class of measures will be widely adopted. The experience gleaned from the 82-program sample reinforces this conclusion, in that while a number of “success stories” may emanate from areas with regulatory requirements, almost as many of the successful examples come from areas where there is no formal motivation beyond economics, concern for employees, or peer pressure.

These conclusions are supported by the data in Table 19-22, which shows the frequency with which particular TDM strategies are applied in regulatory versus voluntary environments. The first two columns characterize the types of strategies offered by employers and institutions in the 82-program sample, in which 59 programs were conceived under regulatory pressures while the remaining 23 were “voluntary” (although this latter group may have experienced tacit pressure from the community or peers to participate). What can be seen in this initial two-column comparison is that, overall, there is not a substantial difference in terms of how frequently many of the strategies appear in TDM programs.

Most regulatory programs have required provision of certain basic measures, especially marketing and promotion, information on alternatives, rideshare matching, an employee transportation coordinator (ETC), guaranteed ride home, bike racks, and preferential carpool parking. In this respect, the regulatory programs do show somewhat higher participation in these strategies. However, for the more material measures, such as pioneering a vanpool program, managing parking, or providing financial incentives, the voluntary programs in the sample have action inclusion rates that are similar—and sometimes superior—to the regulatory programs.

While there is a higher rate of occurrence of parking fees among the regulated employers, in the vast majority of cases—both voluntary and regulatory—the parking fees existed before the TDM program was enacted. Almost none of the firms reviewed in the sample explicitly chose to levy parking fees as an integral part of their program. Those that did, such as CH2M Hill and US WEST in Bellevue, Washington, encountered parking fees as a consequence of office relocation, and simply went on to use the fees as a mechanism in their program. Most with pre-existing parking fees altered the structure of those fees, generally to provide cost incentives to carpools and vanpools through High Occupancy Vehicle (HOV) parking discounts, and/or they used the parking revenues to help subsidize other program measures, such as modal subsidies. These pricing strategies, however, were not found to be unique to either regulated or voluntary programs. Indeed, turning from parking pricing to parking availability, the voluntary examples exhibit a slightly greater degree of restricted parking. Constrained parking may help explain the employer’s interest in having an effective TDM program.

Strategy-frequency assessments of two specific regulatory programs, those in Los Angeles and Sacramento, are highlighted in the last two columns of Table 19-22. Here a slightly different perspective is seen in the approach to TDM. In particular, the “perfunctory” measures are shown to occur with high frequency, including marketing and information (90 to 100 percent of all employers offering); rideshare matching (84.7 percent in Los Angeles); bike racks, showers, and changing facilities (70.7 to 80.6 percent); and guaranteed ride home (65.5 to 71.8 percent). ETCs were not broken out in these studies, but are specified in the regulations and are probably subsumed in the marketing and information category.
Table 19-22  Relative Frequency of TDM Strategy Offerings in Employer TDM Programs

<table>
<thead>
<tr>
<th>TDM Strategy</th>
<th>82 Programs&lt;sup&gt;a&lt;/sup&gt; “Regulated”</th>
<th>82 Programs&lt;sup&gt;a&lt;/sup&gt; “Voluntary”</th>
<th>Los Angeles&lt;sup&gt;b&lt;/sup&gt; Regulation XV</th>
<th>Sacramento&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing, Information, and Promotions</td>
<td>30.5%</td>
<td>30.1%</td>
<td>90.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Rideshare Matching</td>
<td>72.9%</td>
<td>65.2%</td>
<td>84.7%</td>
<td>n/a</td>
</tr>
<tr>
<td>Employee Transportation Coordinator</td>
<td>64.4%</td>
<td>47.8%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>67.8%</td>
<td>57.2%</td>
<td>71.8%</td>
<td>65.5%</td>
</tr>
<tr>
<td>Preferential Parking</td>
<td>49.1%</td>
<td>39.1%</td>
<td>n/a</td>
<td>62.1%</td>
</tr>
<tr>
<td>On-Site Pass Sales</td>
<td>20.3%</td>
<td>30.4%</td>
<td>54.6%</td>
<td>n/a</td>
</tr>
<tr>
<td>Bike Racks, Lockers, Showers</td>
<td>52.5%</td>
<td>43.4%</td>
<td>80.6%</td>
<td>70.7%</td>
</tr>
<tr>
<td>Vanpool Program</td>
<td>18.6%</td>
<td>39.1%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Shuttle/Buspool</td>
<td>49.1%</td>
<td>13.0%</td>
<td>n/a</td>
<td>15.3%</td>
</tr>
<tr>
<td>Use of Company Vehicles</td>
<td>11.9%</td>
<td>8.7%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Flextime</td>
<td>59.3%</td>
<td>47.8%</td>
<td>29.5%</td>
<td>n/a</td>
</tr>
<tr>
<td>Compressed Work Week</td>
<td>44.1%</td>
<td>26.1%</td>
<td>23.3%</td>
<td>70.7%</td>
</tr>
<tr>
<td>Telecommuting</td>
<td>18.6%</td>
<td>17.4%</td>
<td>10.2%</td>
<td>23.3%</td>
</tr>
<tr>
<td>Transit Subsidies</td>
<td>71.2%</td>
<td>65.2%</td>
<td>48.5%</td>
<td>53.4%</td>
</tr>
<tr>
<td>Other Modal Subsidies</td>
<td>47.5%</td>
<td>65.2%</td>
<td>29.8%</td>
<td>21.9%</td>
</tr>
<tr>
<td>Parking Cash Out or Transportation Allowance</td>
<td>8.5%</td>
<td>4.3%</td>
<td>0.7%</td>
<td>8.3%</td>
</tr>
<tr>
<td>Parking Fees</td>
<td>40.6%</td>
<td>30.4%</td>
<td>6.3%</td>
<td>36.2%</td>
</tr>
<tr>
<td>Restricted Parking</td>
<td>45.7%</td>
<td>52.2%</td>
<td>5.8%</td>
<td>22.6%</td>
</tr>
</tbody>
</table>

Sample Size 59 23 4,999 58

Sources:  
<sup>a</sup> Classified as “regulated” (59 programs) or “voluntary” (23 programs) from the 82-program sample, Appendix Table 19-A.  
<sup>b</sup> Young and Luo (1995).  
<sup>c</sup> Schreffler (1997).
Transit subsidies were also relatively common offerings in both locations—48.5 percent of all cases in Los Angeles and 53.4 percent in Sacramento—probably because of the tax advantages and the strong statement it makes in the employer’s transportation management plan as a legitimate financial incentive. Transit use by commuters in both of these California metropolitan areas is relatively small by national standards, primarily because transit service is not a strong alternative in many locations. Hence, most of the trip reductions have been the result of shifts to carpooling, even though subsidies for modes other than transit were considerably less frequent (21.9 to 29.8 percent). The higher incidence of parking fees in the Sacramento findings compared with Los Angeles is a result of the Sacramento program having been instituted by the city, leading to more focus on employers within the core urban area (Young and Luo, 1995; Schreffler, 1997).

Alternative work schedules are an interesting element in all programs. For the most part, the relatively frequent appearance of flextime in these examples was for the purpose of facilitating alternative mode use, rather than for encouraging travel outside the peak period. Most of the legal requirements studied here did not grant credit for peak shifting. However, most of the regulatory programs did grant trip reduction credit for CWW and telecommuting. One analysis found employers in the Los Angeles Regulation XV environment to have opted for such strategies in later stages of their programs, when the traditional mode shift strategies were not proving sufficient to achieve targets (Comsis, 1994). (Data presented further on in Table 19-27 present a more mixed picture for program Years 1 and 2 in this regard.)

There has been considerable question about the effectiveness of mandatory employer TDM programs, particularly from the standpoint of their regional benefit in reducing congestion or improving air quality in relation to the cost imposed on employers. The issues of air quality and cost-effectiveness are addressed in a subsequent section (see “Energy and Environmental Relationships” and “Cost-Effectiveness” under “Related Information and Impacts”). In terms of net behavior change, however, Table 19-23 provides some insight on the measured impact of the programs on choice of commute method (including both mode and alternative work arrangements). Shown in the table are before-and-after percentage shares obtained from three regulatory programs. The first two are the Los Angeles and Sacramento examples, which were profiled in Table 19-22. The third is taken from Portland, Oregon’s Employee Commute Options program, for which equivalent data on adopted TDM measures were not available (TriMet, 2000). In all 3 cases, the averages presented are for employers in the mandatory program only, exclusive of exempted employers.

The Los Angeles program was perhaps the most stringent of the three, requiring employers with 100 or more employees to meet a specified Average Vehicle Ridership (AVR) goal within one year of approval of a trip reduction plan. A rigorous plan approval process was designed to determine whether individual plans were capable of achieving their goal. If they were deemed not sufficient, the employer was persuaded to try new or additional strategies. Employers could be fined for non-compliance, but in virtually all cases where fines were levied, it was for not submitting a plan or for failing to implement strategies that were promised rather than failing to meet an AVR target. Results shown in Table 19-23 for Los Angeles are over a 5-year period, for 4,999 employers that had submitted at least two plans.

In Sacramento, an initial ordinance required employers to reduce peak-period employee single occupant vehicle (SOV) use by 35 percent, and required annual travel surveys and management plans. However, the city attorney’s office soon determined that the city could not mandate such a requirement, at which point participation became voluntary. The results shown in the table are for 58 large employers (100 or more employees) participating in the program between 1990 and 1996.
The program in Portland required all employers with 50 or more employees to reduce vehicle trips by 10 percent over 3 years; there were no penalties for non-compliance. The data in Table 19-23 represent 503 employers and 127,000 employees, with a mixture of participation time ranging from 320 sites with only 1 follow-up survey (average of 1.3 years), to 165 sites with two follow-up surveys (average of 2.6 years), and 18 sites with three follow-up surveys (average of 3.9 years).

The overall results in Table 19-23 indicate that each program resulted in a reduction of SOV share of less than 10 percentage points—from a high of 7.6 percent in Sacramento to a low of 5.4 percent in Portland—among the population of large employers. There are interesting differences in how those reductions came about. In Los Angeles and Sacramento, the changes were primarily achieved through a shift to carpool and vanpool, whereas in Portland—with its strong regional focus on its MAX light rail transit (LRT) system and complementary bus services—more of the reductions were the result of shifts to transit. There was little or no change observed in walk or bike use, or in telecommuting, though both Los Angeles and Portland showed above average increases in CWW.

These are, of course, jurisdiction-wide perspectives. A look at one specific district within Portland is provided by the example “Lloyd District Travel Demand Management—Portland, Oregon,” found in the “Case Studies” section. In the Lloyd District, initial shifts were to carpooling, followed by a later overriding shift toward greater transit usage—quite possibly associated with LRT service expansion. Between 1997 and 2005, the employee drive-alone share dropped from 60 percent to 43 percent (Bianco, 2000; Victoria Transport Policy Institute, 2008; TriMet, 2009). Also of interest in assessing the local area potential of mandatory TDM (under favorable circumstances) is the description of central Seattle I-5 corridor CTR program outcomes. This description starts in the “End Results of Dissipation” discussion under “Related Information and Impacts”—“Site-Versus System-Level Impacts” and is taken through the “Cost-Effectiveness” and “Energy and Environmental Relationships” subsections. The CTR program is credited with avoiding, on aver-

### Table 19-23  Shifts in Commute Mode Shares (Percent)—Three Regulatory Programs

<table>
<thead>
<tr>
<th>Commute Option</th>
<th>Los Angeles&lt;sup&gt;a&lt;/sup&gt; (Regulation XV)</th>
<th>City of Sacramento&lt;sup&gt;b&lt;/sup&gt; (Employer TSM Ordinance)</th>
<th>Portland, OR&lt;sup&gt;c&lt;/sup&gt; (Employee Commute Options Rule)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Alone</td>
<td>73.5%</td>
<td>67.2%</td>
<td>- 6.3%</td>
</tr>
<tr>
<td>Carpool</td>
<td>15.5%</td>
<td>21.4%</td>
<td>+ 5.9%</td>
</tr>
<tr>
<td>Vanpool</td>
<td>1.2%</td>
<td>1.9%</td>
<td>+ 0.7%</td>
</tr>
<tr>
<td>Transit</td>
<td>4.0%</td>
<td>4.3%</td>
<td>+ 0.3%</td>
</tr>
<tr>
<td>Walk/Bike</td>
<td>3.0%</td>
<td>3.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Compressed Work Week</td>
<td>1.3%</td>
<td>1.9%</td>
<td>+ 0.6%</td>
</tr>
<tr>
<td>Telecommute</td>
<td>1.4%</td>
<td>0.3%</td>
<td>- 1.1%</td>
</tr>
</tbody>
</table>

Sources:  
<sup>a</sup> Young and Luo (1995).  
<sup>b</sup> Schreffler (1997).  
<sup>c</sup> TriMet (2000).
Critics of mandatory TDM as a means of cost-effective, region-wide solution to congestion and air quality problems point to both the relatively small number of employers whose programs have substantial trip reduction impacts and the dilution of these impacts over a large employment base and background regional traffic. A 1993 article written at the height of the regulatory controversy by Kenneth Orski acknowledged that there were compelling examples of substantial modal shifts and trip reductions achieved at individual employment sites, but questioned whether comparable reductions could be achieved at a regional level. He argued, firstly, that work trips constituted only about 25 percent of all daily trips, and were not more than 40 percent of the trips occurring in the peak period. Secondly, he contended that work trips to major employment sites (those with 100 or more employees) constituted only about 40 percent of total work trips, hence about 10 percent of daily trips (16 percent of peak-period trips) and 13 percent of daily VMT would be the maximum affected by a mandatory TDM program. He then calculated that a full 25 percent increase in average vehicle ridership (the theoretical target) would produce a 2 to 3 percent decrease in regional vehicle trips and about a 3 to 4 percent decrease in regional VMT (Orski, 1993).

While such a reduction might prove cost-effective in particular situations, it is well to recognize the relationship between the achievements of a few excellent TDM programs and measurable impact at a regional, corridor, or subarea level. The relationships between individual employer-level results and regional- or facility-level results are further dissected in the above-mentioned “Site- Versus System-Level Impacts” subsection.

**Characteristics of Employer**

It may be rightly asked whether there is any relationship between the characteristics of the employer or institution staging a TDM program and the types—and thus combined effectiveness—of strategies which are employed. Tables 19-24 and 19-25 explore this question on the basis of two characteristics, type of employer and employer size, once again drawing upon the 82-program sample as described in Appendix Table 19-A.11 This investigation only attempts to chart the types of strategies which may be more common to particular types of employers, and does not address the implications of these strategy preferences on outcome, namely vehicle trip reduction. Earlier sections have examined the relative effectiveness of various types of strategies versus others.

Many of the conclusions that might be drawn from these displays should be treated with special caution, given the sparse sample sizes for many of the strata. For example, the commercial/service, utility, medical institution, university, and other institution groupings are each represented by less than 10 observations. The samples of employer groupings of fewer than 100 employees, and 500 to 1,000 employees, are represented by only two and seven observations, respectively. Hence, the data should be used only for broadly descriptive purposes.

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11 For an alternative perspective on the mix of strategies offered by employers, focusing on strategy combination information rather than employer type stratification, see the discussion surrounding Table 19-31, “CUTR Worksite Trip Reduction Model—Ranking by Frequency of Occurrence of the 50 Most Common Program Combinations,” found in the “Related Information and Impacts” section under “Modeling Studies”— “CUTR Worksite Trip Reduction Model.”
With respect to type of employer (Table 19-24), it can be seen that the practice noted earlier of providing basic employer support type strategies—such as offering commute information, rideshare matching, and guaranteed ride home—is widely followed across all of the employment types. It would appear, though, that office, utility, government, universities, and other institutions are somewhat more likely to offer these strategies with high frequency compared to commercial, manufacturing, and medical types of employers. Interestingly, utilities and universities are the most likely to have limited parking and to charge for that parking, while commercial, manufacturing, government, and other institutions are more likely to have ample parking and to provide it without charge.\textsuperscript{12}

The offering of preferential parking appears to coincide with the restricted/priced parking that more frequently occurs with utilities, universities, and other institutions, possibly because these are also generally large employers with large parking facilities, where offering close-in parking for HOVs could actually be a meaningful incentive. Consistent with this reasoning, a high percentage of industrial/manufacturing employers (64.3 percent) also offer preferential parking despite the fact that only 14.3 percent report restricted parking capacity. Conversely, medical institutions do not offer preferred parking because, in general, their parking is at such a premium given the multitude of uses (staff, visitors, outpatients) that they have no surplus capacity to part with. (For more insight on the particular circumstances faced by medical institutions, consult Dowling, Feltham, and Wycko, 1991, or the summary provided in this Handbook’s Chapter 18, “Parking Management and Supply,” under “Response by Type of Strategy”—“On-Street Residential Neighborhood Parking Management”—“Effects on TDM Program Effectiveness”).

In terms of transportation service type strategies, particularly vanpool programs, it appears that these occur most frequently among industrial/manufacturing employers, utilities, and universities, in part because of the large sizes and often remote campus locations involved. Transit subsidies are offered at a high rate across the entire set of employers, but have their highest prevalence in professional/office, government, utilities, medical, and other institutions. Provision of modal subsidies other than transit is most prevalent at office, government, and medical institutions.

\textsuperscript{12} There is an odd result in the “Other Institution” category where only 28.6 percent have restricted parking but 42.9 percent charge for it. This is not a data error, but rather reflects the policy of the organizations in the sample.
<table>
<thead>
<tr>
<th>TDM Strategy</th>
<th>Percent of Employers Offering Given Strategy by Employer Type (Sample Size in Parentheses)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prof./Office (25)</td>
</tr>
<tr>
<td>Info. Center/ETC</td>
<td>80.0%</td>
</tr>
<tr>
<td>Rideshare Matching</td>
<td>60.0</td>
</tr>
<tr>
<td>Guaranteed Ride</td>
<td>60.0</td>
</tr>
<tr>
<td>On-Site Pass Sales</td>
<td>20.0</td>
</tr>
<tr>
<td>Fairs/Promotions</td>
<td>12.0</td>
</tr>
<tr>
<td>On-Site Services</td>
<td>8.0</td>
</tr>
<tr>
<td>Preferential Parking</td>
<td>28.0%</td>
</tr>
<tr>
<td>Bike Racks/Shower</td>
<td>36.0</td>
</tr>
<tr>
<td>Company Vehicles</td>
<td>12.0</td>
</tr>
<tr>
<td>Vanpool Program</td>
<td>32.0</td>
</tr>
<tr>
<td>Transit Services</td>
<td>8.0</td>
</tr>
<tr>
<td>Restricted Parking</td>
<td>56.0%</td>
</tr>
<tr>
<td>Parking Fees</td>
<td>52.0</td>
</tr>
<tr>
<td>HOV Parking Discounts</td>
<td>36.0</td>
</tr>
<tr>
<td>Transit Subsidies</td>
<td>80.0</td>
</tr>
<tr>
<td>Trnsp. Allow./Cash-Out</td>
<td>12.0</td>
</tr>
<tr>
<td>Other Mode Subsidies</td>
<td>52.0%</td>
</tr>
<tr>
<td>Other Monetary</td>
<td>12.0</td>
</tr>
<tr>
<td>Flextime</td>
<td>52.0</td>
</tr>
<tr>
<td>Staggered Hours</td>
<td>0.0</td>
</tr>
<tr>
<td>Comp. Work Week</td>
<td>24.0</td>
</tr>
<tr>
<td>Telecommuting</td>
<td>4.0</td>
</tr>
</tbody>
</table>

**Sources:** Derived (see Appendix Table 19-A) from Comsis (1994), Comsis and ITE (1993), Rutherford et al. (1994), and Comsis et al. (1996).
Finally, with respect to alternative work arrangements, several but not all relationships appear to confirm intuition on the types of employment that are best suited or not suited to these relaxations from a standard 40-hour/5-day work week. For example, government and utilities appear most inclined to offer flextime, while manufacturing and medical institutions do not. Surprisingly, 3/4 of commercial/service employers in the sample offer flextime. Perhaps in-store schedule adherence needs are counterbalanced by order-taking, administrative, and off-site functions. What also seems an anomaly is finding that 1/2 of medical institutions allow telecommuting, despite the critical nature of physical presence at the institution. Other institutions, medical institutions, utilities, and government seem to be the most likely to allow CWW, with a lower but not insubstantial rate of involvement (about 1/4) for office, commercial, manufacturing, and universities. Telecommuting appears at a low rate overall in this sample, more likely to be encountered among government, medical, and other institutions, and less so at office, commercial, manufacturing, utilities, and universities.

Table 19-25 portrays the frequency by which individual TDM strategies are applied in relation to employer/institution size. Unfortunately, uncontrollable irregularities in the distribution of the sample result in too few observations of smaller employers (under 100 employees) and those in the medium-to-large category (500 to 1,000). Limiting the comparison mainly to the 100-to-500 size versus the over-1,000 size employers suggests the following trends: First, those TDM strategies that seem to be offered more frequently by larger employers are rideshare matching; on-site pass sales; transportation fairs and promotions; preferential HOV parking; bike racks and changing facilities; vanpool and supplemental transit programs; parking fees; modal subsidies; other monetary incentives (raffles, prizes, award points, time off with pay); and telecommuting. Strategies where size of employer does not obviously correlate with higher frequency of offering include information center/ETC, guaranteed ride home, use of company vehicles, transit subsidies, HOV parking discounts, flextime, and CWW.

Partially compensating for the lack of information on smaller employers in Table 19-25, Table 19-26 shows the rates at which particular strategies were adopted by employers in their introductory plans for compliance under Regulation XV in Southern California. These data were compiled from SCAQMD’s Regulation XV database in a study of TSM Measures in Suburban Settings (JHK & Associates, 1992). The strategies in the table appear in order of the frequency with which they were applied by the largest employers (more than 1,000 employees), although it will be noted that the distribution for the large (500 to 1,000) and medium (100 to 499) size employers is similar in pattern. For the smaller employers, however, the pattern begins to diverge a bit, apparently in relation to the lesser resources of the smaller employers.

A common phenomenon across employers of all sizes is the very infrequent use of parking management, pricing, and direct financial incentives. Also, work at home and alternative work schedules were not particularly popular strategies in the first year of these programs. What is perhaps surprising is the relatively high rate of employers offering transit subsidies, even among the smaller employers, and even when transit service is not particularly good. One conclusion that might be drawn is that as employers are compelled to add strategies, it is relatively inexpensive to offer transit subsidies if it isn’t likely that they will actually be used.
Also of interest is what happens over time to TDM programs, as experience is gained and the need arises to either secure more trip reduction impact or improve cost-effectiveness. The same study that provided the information for Table 19-26 developed a comparison on how the preference for strategies changed between program Years 1 and 2. The results are shown in Table 19-27, which compares the frequency of offered strategies in terms of the number of employees exposed to them. Next to the number is the corresponding rank, with “1” being the most commonly applied strategy in that year. The final column shows the change in rank between Years 1 and 2, calculated as the difference between the first- and second-year rankings. The top 10 strategies in Year 1 were, in order: (1) on-site services, (2) ongoing transit subsidy, (3) regional ridematching, (4) commuter information center, (5) internal rideshare matching, (6) flextime for ridesharers, (7) preferential parking, (8) drawings and prizes, (9) guaranteed ride home, and (10) transit information. In Year 2, the preference order changed to: (1) showers and lockers, (2) on-site services, (3) regional ridematching, (4) commuter information center, (5) marketing/other, (6) guaranteed ride home, (7) internal rideshare matching, (8) drawings and prizes, (9) preferential parking, and (10) passenger loading areas.
<table>
<thead>
<tr>
<th>TDM Strategy</th>
<th>&lt; 100 (43)</th>
<th>100-199 (96)</th>
<th>200-499 (278)</th>
<th>500-1,000 (383)</th>
<th>&gt; 1,000 (584)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferential Parking Areas</td>
<td>27</td>
<td>64</td>
<td>197</td>
<td>252</td>
<td>436</td>
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<tr>
<td>Ongoing Transit Subsidies</td>
<td>31</td>
<td>57</td>
<td>146</td>
<td>217</td>
<td>326</td>
</tr>
<tr>
<td>Prize Drawings, Raffles</td>
<td>27</td>
<td>47</td>
<td>153</td>
<td>208</td>
<td>295</td>
</tr>
<tr>
<td>Bike Racks</td>
<td>24</td>
<td>50</td>
<td>130</td>
<td>178</td>
<td>250</td>
</tr>
<tr>
<td>Regional Rideshare Matching</td>
<td>21</td>
<td>43</td>
<td>107</td>
<td>142</td>
<td>218</td>
</tr>
<tr>
<td>Transit Information/Racks</td>
<td>14</td>
<td>27</td>
<td>89</td>
<td>133</td>
<td>210</td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>17</td>
<td>33</td>
<td>79</td>
<td>117</td>
<td>207</td>
</tr>
<tr>
<td>Flextime for Ridesharers</td>
<td>12</td>
<td>21</td>
<td>78</td>
<td>134</td>
<td>197</td>
</tr>
<tr>
<td>Employer Rideshare Matching</td>
<td>14</td>
<td>30</td>
<td>84</td>
<td>129</td>
<td>181</td>
</tr>
<tr>
<td>Ongoing Carpool Subsidies</td>
<td>7</td>
<td>29</td>
<td>97</td>
<td>138</td>
<td>180</td>
</tr>
<tr>
<td>New Hire Orientation</td>
<td>18</td>
<td>26</td>
<td>67</td>
<td>118</td>
<td>166</td>
</tr>
<tr>
<td>Commuter Info Center</td>
<td>9</td>
<td>14</td>
<td>74</td>
<td>110</td>
<td>157</td>
</tr>
<tr>
<td>Employee Benefits and Services</td>
<td>20</td>
<td>31</td>
<td>73</td>
<td>105</td>
<td>151</td>
</tr>
<tr>
<td>Showers and Lockers</td>
<td>10</td>
<td>26</td>
<td>58</td>
<td>78</td>
<td>149</td>
</tr>
<tr>
<td>Marketing Elements - Other</td>
<td>11</td>
<td>20</td>
<td>84</td>
<td>118</td>
<td>147</td>
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<tr>
<td>On-Site Services</td>
<td>13</td>
<td>19</td>
<td>49</td>
<td>69</td>
<td>120</td>
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<tr>
<td>Bike to Work Subsidies</td>
<td>6</td>
<td>20</td>
<td>64</td>
<td>91</td>
<td>114</td>
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<td>Ongoing Vanpool Subsidies</td>
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<td>8</td>
<td>46</td>
<td>50</td>
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<td>Walk to Work Subsidies</td>
<td>13</td>
<td>28</td>
<td>65</td>
<td>92</td>
<td>109</td>
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<tr>
<td>4/40 Work Schedule</td>
<td>3</td>
<td>11</td>
<td>37</td>
<td>74</td>
<td>108</td>
</tr>
<tr>
<td>Company Owned/Leased Vans</td>
<td>3</td>
<td>5</td>
<td>35</td>
<td>64</td>
<td>108</td>
</tr>
<tr>
<td>Commuter Fairs</td>
<td>4</td>
<td>7</td>
<td>36</td>
<td>65</td>
<td>87</td>
</tr>
<tr>
<td>Use of Company Vehicles</td>
<td>2</td>
<td>10</td>
<td>27</td>
<td>43</td>
<td>82</td>
</tr>
<tr>
<td>Company Recognition</td>
<td>11</td>
<td>17</td>
<td>44</td>
<td>48</td>
<td>70</td>
</tr>
<tr>
<td>Work At Home</td>
<td>3</td>
<td>5</td>
<td>27</td>
<td>33</td>
<td>68</td>
</tr>
<tr>
<td>On-Site Auto Services</td>
<td>22</td>
<td>24</td>
<td>34</td>
<td>41</td>
<td>59</td>
</tr>
<tr>
<td>Direct Financial Incentives</td>
<td>6</td>
<td>10</td>
<td>25</td>
<td>29</td>
<td>55</td>
</tr>
<tr>
<td>9/80 Work Schedule</td>
<td>1</td>
<td>7</td>
<td>11</td>
<td>37</td>
<td>41</td>
</tr>
<tr>
<td>Additional Time Off with Pay</td>
<td>3</td>
<td>13</td>
<td>21</td>
<td>19</td>
<td>39</td>
</tr>
<tr>
<td>Subsidized Rideshare Parking</td>
<td>1</td>
<td>5</td>
<td>7</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>3/36 Work Schedule</td>
<td>1</td>
<td>4</td>
<td>10</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>Facility Improvements</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Parking Management Strategies</td>
<td>2</td>
<td>5</td>
<td>12</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>Passenger Loading Areas</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Parking Fees for Drive Alones</td>
<td>4</td>
<td>9</td>
<td></td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Childcare Services</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Work at Satellite Center</td>
<td>1</td>
<td>7</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Transportation Allowance</td>
<td>1</td>
<td>2</td>
<td></td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Table 19-27  Change in Type of Strategies Offered in Year 2 Versus Year 1—SCAQMD (Los Angeles)

<table>
<thead>
<tr>
<th>TDM Strategy</th>
<th>Year 1</th>
<th>Rank</th>
<th>Year 2</th>
<th>Rank</th>
<th>Rank Change (Year 1 to Year 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Loading Areas</td>
<td>4,364</td>
<td>31</td>
<td>53,178</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>Showers and Lockers</td>
<td>15,886</td>
<td>16</td>
<td>198,945</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Marketing Elements - Other</td>
<td>22,935</td>
<td>13</td>
<td>65,785</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Direct Financial Incentives</td>
<td>3,304</td>
<td>33</td>
<td>5,390</td>
<td>26</td>
<td>7</td>
</tr>
<tr>
<td>On-Site Auto Services</td>
<td>5,181</td>
<td>27</td>
<td>9,856</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td>Additional Time Off with Pay</td>
<td>2,883</td>
<td>35</td>
<td>4,168</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>New Hire Orientation</td>
<td>14,405</td>
<td>17</td>
<td>27,662</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Company Recognition</td>
<td>16,674</td>
<td>15</td>
<td>31,697</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>32,877</td>
<td>9</td>
<td>61,430</td>
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<td>3</td>
</tr>
<tr>
<td>Parking Fees for Drive Alones</td>
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<td>3,362</td>
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<td>1,824</td>
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<tr>
<td>Work At Home</td>
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<td>36</td>
<td>1,858</td>
<td>35</td>
<td>1</td>
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<tr>
<td>Parking Management Strategies</td>
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<td>4,812</td>
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<td>Commuter Fairs</td>
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<td>17</td>
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<tr>
<td>Work at Satellite Center</td>
<td>603</td>
<td>38</td>
<td>32</td>
<td>38</td>
<td>0</td>
</tr>
<tr>
<td>Prize Drawings, Raffles</td>
<td>38,090</td>
<td>8</td>
<td>55,236</td>
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<tr>
<td>Commuter Info Center</td>
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<td>80,675</td>
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<td>87,658</td>
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<tr>
<td>Walk to Work Subsidies</td>
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<td>30</td>
<td>3,477</td>
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<tr>
<td>Bike Racks</td>
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<td>24</td>
<td>5,399</td>
<td>25</td>
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<tr>
<td>3/36 Work Schedule</td>
<td>10,414</td>
<td>19</td>
<td>15,083</td>
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<tr>
<td>On-Site Services</td>
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<td>97,734</td>
<td>2</td>
<td>-1</td>
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<tr>
<td>Bike to Work Subsidies</td>
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<td>32</td>
<td>2,839</td>
<td>34</td>
<td>-2</td>
</tr>
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<td>Subsidized Rideshare Parking</td>
<td>5,466</td>
<td>25</td>
<td>4,872</td>
<td>27</td>
<td>-2</td>
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<tr>
<td>9/80 Work Schedule</td>
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<td>22</td>
<td>6,223</td>
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<td>-2</td>
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<tr>
<td>Facility Improvements</td>
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<td>6,965</td>
<td>23</td>
<td>-2</td>
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<td>Ongoing Vanpool Subsidies</td>
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<td>20</td>
<td>8,266</td>
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<tr>
<td>Preferential Parking Areas</td>
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<td>53,398</td>
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<td>Employer Rideshare Matching</td>
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<td>56,102</td>
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</tr>
<tr>
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<td>25,213</td>
<td>15</td>
<td>-3</td>
</tr>
<tr>
<td>Transit Information/Racks</td>
<td>28,603</td>
<td>10</td>
<td>31,610</td>
<td>13</td>
<td>-3</td>
</tr>
<tr>
<td>4/40 Work Schedule</td>
<td>19,120</td>
<td>14</td>
<td>20,085</td>
<td>18</td>
<td>-4</td>
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<td>Ongoing Carpool Subsidies</td>
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<td>11</td>
<td>24,940</td>
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<td>-5</td>
</tr>
<tr>
<td>Flextime for Ridesharers</td>
<td>46,003</td>
<td>6</td>
<td>37,193</td>
<td>11</td>
<td>-5</td>
</tr>
<tr>
<td>Introductory Transit Subsidies</td>
<td>5,927</td>
<td>23</td>
<td>4,767</td>
<td>29</td>
<td>-6</td>
</tr>
<tr>
<td>Company Owned/Leased Vans</td>
<td>5,256</td>
<td>26</td>
<td>3,323</td>
<td>33</td>
<td>-7</td>
</tr>
<tr>
<td>Childcare Services</td>
<td>4,751</td>
<td>28</td>
<td>1,344</td>
<td>37</td>
<td>-9</td>
</tr>
<tr>
<td>Ongoing Transit Subsidies</td>
<td>95,461</td>
<td>2</td>
<td>19,116</td>
<td>19</td>
<td>-17</td>
</tr>
</tbody>
</table>

Table 19-27 is ordered by which strategies had the biggest changes in rank. At the top of the list, passenger loading areas gained 21 net points in rank, showers and lockers gained 15 points, marketing gained 8, direct financial incentives gained 7, and on-site services gained 6. Most of these measures are “soft” strategies, as previously noted in the “Voluntary Versus Regulatory Employer Motivation” discussion above.

Ongoing transit subsidies fell by 17 ranking points, company vans by 7 points, and introductory transit subsidies by 6 points. One should also look at the actual employee participation numbers as well as the rank change, in order to have a proper appreciation of the relative scale of each strategy’s popularity. For example, while SOV parking fees increased in rank by 2 points, this only represents a change in position from 34th to 32nd place.

These SCAQMD-regulated employer shifts in strategy, with their failure to take on or even stick with much in the way of financial incentives and disincentives or transportation services, held trip reduction to modest levels. Employment sites involved for the longest time period achieved, in 3-plus years, slightly over a 7 percent average reduction in journey-to-work vehicle trips per employee. Results from sites with greater progress were partially washed out in regulated-employer averages by diminished success on the part of a number of firms that actually started out with high performance. SCAQMD results are further discussed in the “Related Information and Impacts” section under “Site- Versus System-Level Impacts”—“Intermediate Effects of Dissipation.”

**Land Use and Site Design**

A growing number of research studies have investigated the link between transportation and land use at the residential end of the trip, but fewer have probed the synergy between travel behavior and land use at the destination. It would seem reasonable to assume that a work site located in an attractive setting with good walkability, access to transit, and convenient proximity to attractions and services would find it easier to entice commuters from their cars. A major reason often given for driving to work is that the worksite is located in an area that is isolated from any other activities, requiring a personal vehicle to tend to midday needs for lunch, errands, or going to meetings. A more complete discussion of such relationships is found in Chapter 15, “Land Use and Site Design.” See also Chapter 17, “Transit Oriented Development,” for additional information. Reported on here in Chapter 19 are two studies specifically designed to examine the relationship of employment area land use and site characteristics to TDM effectiveness.

TCRP Project B-4, introduced earlier and described in Footnote 2, obtained information via survey from 50 different employers on their TDM programs and also on employer and site characteristics. With this information, an attempt was made to determine the approximate number of services reachable within a 5-minute walk. Correspondence between this local accessibility and the calculated VTR was found to be surprisingly strong. The 11 employment sites rated as having “poor” access to services (2 or less) averaged a VTR of only 5.3 percent. The 11 sites rated as having “fair” access (3 to 5 services) averaged an 8.3 percent VTR, while those 25 with “good” access (more than 5 services) averaged 21.5 percent.

Influences beyond local accessibility were quite possibly a factor—the accessibility measure may have acted as a surrogate for urban conditions in general. The types of TDM programs implemented in these various settings do show some important differences, with 23 of the 25 programs in the “good” access category offering financial incentives. On the other hand, eight of the 11 programs in the “fair” category and seven of the 11 in the “poor” category also offered financial incentives (Comsis, 1994).
A more deliberate and comprehensive attempt to investigate the synergy between land use and TDM impact was made in a study for the Federal Highway Administration (FHWA). The researchers selected a sample of 330 employment sites in Los Angeles County that were participating in the Regulation XV program, and appended information on a wide range of land use and site design characteristics to existing data file information on TDM program characteristics and employee travel. The expanded data were then analyzed both descriptively and statistically.

Overall, the sample of 330 programs indicated the following shifts in behavior in relation to the first Regulation XV plan (Cambridge Systematics, 1994):

- Drive-alone share decreased from 76.2 percent to 71.4 percent, while carpool/vanpool share increased from 13.4 percent to 18.8 percent.
- Small mode share losses were incurred by both transit (down from 4.6 to 4.4 percent) and bike/walk (down from 5.8 to 5.4 percent) as an apparent result of the initial program.

It is not clear whether this outcome reflected an overemphasis on programs and incentives for ridesharing (as suggested by the study) or whether transit and bike/walk were simply not as viable as ridesharing in this travel market. Flexible work schedule shares (telecommuting and CWW) also declined, from 3.8 to 3.1 percent. AVR increased from 1.213 to 1.245, equating to a VTR of 2.5 percent.

The 330 sites were a randomly selected subsample from a database of 1,100 employers who had completed at least one trip reduction plan under Regulation XV. The land use data were compiled for the following three different levels of geographic resolution (Cambridge Systematics, 1994):

- The surrounding subarea (1/2 to 2 square miles), recording land use mix, predominant land use type, building types and special features, main streets, traffic levels, sidewalks, and landscaping.
- The immediate environs (1/4-mile radius), recording horizontal and vertical land use mix, specific land uses present, number and type of and distance to services, street characteristics, “streetwall” characteristics, sidewalks, pedestrian activity, and landscaping.
- The actual site, recording the number and characteristics of parcels and blocks, building architecture, size and orientation, on- and off-street parking, access to bus stops, sidewalks, and street life.

The research approach was then try to explain the change in modal share for the 330 employers based on both the characteristics of their TDM programs and the land use characteristics of the sites. Given the large number of TDM strategies and land use/site descriptors, it was found necessary to pare and consolidate the list of measures into index-type variables. TDM program strategies were divided into five categories: assistance programs, financial incentives, awards programs, flexible work schedules, and other. The land use characteristics were also partitioned into five categories, as follows:

- Mix and variety of land uses within 1/4 mile.
- Availability of convenience services (number and mix of key services within 1/4 mile).
- Walk accessibility to convenience services (design of area to promote walking).
• Perception of safety (sidewalks, street lights, pedestrian flow, number of vacant lots).

• Aesthetics (sidewalk widths, landscaping, absence of graffiti).

Initial analysis of the link between the observed changes in mode share and the TDM strategies applied at the 330 employers revealed that only financial incentive strategies were statistically significant. Therefore, for the TDM aspect of the analysis the researchers basically distinguished programs (employers) with financial incentives from those without. The five land use measures were similarly treated as having a “low” or “high” value for the particular index. A summary of the findings corresponding to this structure is presented in Table 19-28 (Cambridge Systematics, 1994).

Overall, the findings suggest that for drive alone, carpool/vanpool, and flexible work schedules, the impact of the TDM financial incentives is measurably more important on changing share than any of the land use measures. In fact, for carpool/vanpool, better land use—specifically as represented by land use variety, availability of convenience services, and walk access to services—actually was associated (at least in the model) with a decrease in the use of that mode. With transit, however, and to a lesser extent bike/walk, supportive land use proved to be very important, increasing the shares for these modes.

It is also interesting to note that the combination of financial incentive TDM programs with better land use is almost always synergistic, i.e., it produces a higher net effect on both mode share and AVR than the two measures independently. The notable exception is carpool/vanpool, where combining the measures was identified as being detrimental to carpool/vanpool share in all but the category of aesthetic appeal, which—somewhat surprisingly—is overall the most influential measure of land use identified by the study. It is difficult to comprehend how the elements captured in the aesthetics measure would have more influence on mode share than the other four measures, unless the measure is somehow acting as a surrogate for other aspects of the environment that were not captured by the set of indices.
Table 19-28  Combined Effect of TDM Financial Incentives and Land Use Characteristics on Mode Share and AVR

<table>
<thead>
<tr>
<th>Presence of TDM Financial Incentives (Without/With)</th>
<th>Modal Share with Low and High Prevalence of Specified Land Use Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Variety of Land Uses</td>
</tr>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Drive Alone</td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td>77.2%</td>
</tr>
<tr>
<td>With</td>
<td>71.7%</td>
</tr>
<tr>
<td>Transit</td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td>3.6%</td>
</tr>
<tr>
<td>With</td>
<td>2.9%</td>
</tr>
<tr>
<td>Carpool/Vanpool</td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td>13.4%</td>
</tr>
<tr>
<td>With</td>
<td>18.7%</td>
</tr>
<tr>
<td>Bike/Walk</td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td>3.0%</td>
</tr>
<tr>
<td>With</td>
<td>2.6%</td>
</tr>
<tr>
<td>Flexible Work Schedules (Percent Flexing Schedules Without and With Financial Incentives)</td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td>2.4%</td>
</tr>
<tr>
<td>With</td>
<td>4.0%</td>
</tr>
<tr>
<td>AVR</td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td>1.218</td>
</tr>
<tr>
<td>With</td>
<td>1.230</td>
</tr>
</tbody>
</table>

Trip Chaining

A significant issue related to the importance of the land use adjacent to the work site is the matter of trip chaining. It has been argued that a major deterrent to shifting commuters away from driving alone and into transit, ridesharing, or other alternatives is the degree to which they are dependent upon their cars for needs and activities which occur at, or on the way to or from, the work site. Particularly in suburban areas, where work sites tend to be isolated from other land uses (especially services), commuters can feel justifiably nervous about abandoning their cars.

In response to this isolation and dependency, commuters double-up on the purpose of their commute trip by incorporating additional stops on the way to or from work. These multi-stop trip tours, or “trip chains,” introduce an additional challenge and complexity to planning for TDM programs. Multi-task commute trips are commonplace, and often hard to accomplish when not driving alone. When trying to entice the drive-alone commuter into a wholesale shift to an alternative mode, much depends on how essential these intermediate stops are to the household, how frequently they are made, and whether or not there are options at the home or work end of the commute trip that can satisfy the same needs.

A thorough study of this phenomenon was performed in the Brentwood area of Nashville, Tennessee, using survey data obtained from a sample of 1,845 employees representing 42 employers in this predominately suburban district. The survey probed in detail into the frequency with which the commuters made stops on the way to or from work, and also into their purpose. The survey found that only 9 percent of all workers surveyed traveled directly to and from work— the vast majority made routine stops. It also found that stops on the return-home trip were twice as likely as stopping on the way to work. Table 19-29 gives an indication of how frequently trip chaining occurred (Davidson, 1991).

Table 19-29 Frequency with which Non-Work Stops Are Not Added to the Commute Trip, Suburban Nashville, Tennessee

<table>
<thead>
<tr>
<th>Trip Direction</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Work</td>
<td>49%</td>
<td>18%</td>
<td>11%</td>
<td>5%</td>
<td>2%</td>
<td>15%</td>
</tr>
<tr>
<td>From Work</td>
<td>19%</td>
<td>22%</td>
<td>26%</td>
<td>15%</td>
<td>5%</td>
<td>13%</td>
</tr>
</tbody>
</table>


The display shows the frequency with which employees traveled to or from work without making additional stops along the way. It reveals that almost one-half, 49 percent, of the commuters studied essentially never stopped on the way to work, although only 19 percent traveled from work to home without making a stop at least 1 day a week. So, viewed the opposite way, 51 percent of commuters stopped at least once a week on the way to work, and 81 percent stopped at least once a week on the way home from work. The other interesting statistic in this display is the proportion of commuters who always stopped along the way: 15 percent of commuters stopped daily on the way to work and 13 percent stopped daily on the way from work. The average number of days a stop was made on the way to work is 1.38, while on the way home the average is 2.0 days per week.
The predominant reason given for stopping was to get fuel for the vehicle. This activity accounted for 45 percent of the stops on the way to work and 63 percent of the stops on the way home from work. In approximate order of decreasing prevalence, other reasons given were: going to the bank (23 percent of trips to work and 50 percent of trips from work), visiting the dry cleaners (19 percent to and 31 percent from), getting something to eat (16 percent to and 20 percent from), shopping (12 percent to and 56 percent from), work-related activity (10 percent to and 13 percent from), child care (10 percent to and 10 percent from), taking a child to or from school (10 percent to and 6 percent from), visiting a doctor (6 percent to and 14 percent from), transporting another person including carpool (7 percent to and 7 percent from), exercise (2 percent to and 11 percent from), and entertainment (1 percent to and 9 percent from) (Davidson, 1991).

The data were also manipulated to examine patterns in the way trips were grouped into chains and correspondence between morning and evening stops. For example, it was noted that the purposes which most often occurred on both the trip to work and the trip home were child care (91 percent), dropping off children (80 percent), stopping to eat (33 percent), and stopping at the dry cleaners (33 percent). It was also discovered that for those commuters who stopped for gas on the way to work (45 percent), 21 percent would also stop to eat, 16 percent would visit a dry cleaner, 16 percent would stop at the bank, and 12 percent would attend to child care.

This latter type of assessment begins to suggest strategies for successful TDM efforts. For example, if a drive-alone commuter were to shift to a vanpool, the need to stop for fuel could be virtually eliminated. However, to make the shift more permanent, it would be necessary to find a way to provide better access to banking, dry cleaners, and eating establishments on or near the site. Employees’ expressed preferences for on- or near-site services included: post office (32 percent), restaurant (31 percent), general retail (25 percent), snack bar (20 percent), exercise facility (19 percent), convenience store (18 percent), dry cleaners (11 percent), and medical care (10 percent). The conclusion drawn by the study was that while linked trips had a negative effect on TDM efforts, a better mix of land uses or the delivery of services to employer sites might go a long way toward reducing auto dependency and making TDM more effective (Davidson, 1991).

RELATED INFORMATION AND IMPACTS

Synergy and Complementarity

The body of empirical information compiled on TDM programs makes it fairly evident that the effectiveness of these programs depends on several key factors:

- Marketing, information, and promotional strategies are clearly important catalysts in successful TDM programs by raising awareness, knowledge of, and interest in commute alternatives. However, ultimately a TDM program has to offer the commuter an attractive alternative to driving alone, in which instance the marketing and promotion is essential in ensuring that the employee understands the advantages of the choice. However, if competitive alternatives are not provided, simply trying to convince the commuter that driving is wrong and some other approach is more acceptable will be ineffective and short-lived in changing behavior.

- Driving alone has many strong advantages for the commuter, including schedule management, travel time, and even out-of-pocket cost in many cases. Travel demand research tells us that travel time and cost are primary determinants in the choice among modes. If a traveler cannot
save time by choosing an alternative mode (because buses or carpools travel the same congested roads as SOVs) or cost (cars are given free parking whereas transit users must pay a fare), it is difficult to persuade the commuter that it makes economic sense to not drive. Hence, any strategies that help even out this competitive disadvantage—management of the supply or price of employee parking, priority access or routing for buses or car/vanpools, or modal subsidies—make an alternative mode easier to promote.

- Strategies must be appropriate to the travel environment in which they are applied; for example, widespread offering of transit subsidies may not mean much if the level or quality of transit service is poor.

- The effect of individual strategies is enhanced if they are combined with other strategies which are known to be “synergistic.” For example, providing transportation services is likely to have greater impact if the offering is paired with financial incentives such as user subsidies, and providing carpool matching services and HOV reserved spaces is more likely to be effective if employees driving to the worksite are not guaranteed free parking.

- The synergy of employer commitment and engagement has a key role to play as well. “Employment-based programs work when a party accountable for performance . . . is experiencing a critical problem (parking, congestion, regulation) that demand management can solve, puts resources into solutions, follows through on implementation, changes activities and resources based on actual performance, and demands results” (Valk, 2007).

- Alternative work hours/schedules may have conflicting effects. Evidence suggests that a policy of flexible work hours can be an important incentive for employees who rideshare or use transit, as it allows them greater latitude to deal with the scheduling demands of those modes. On the other hand, strategies like CWW and telecommuting appear to be more neutral and—although more research is needed—may even detract from the use of alternative modes. Attractive combinations within the 82-program sample occur when the privilege of a modified work schedule is tied to the use of alternative modes.

Informed program design and development is obviously crucial. Efforts to enhance the TDM program development process, largely in the hands of employers, are covered in the next two subsections in particular.

**Program Development Outreach and Support**

The success of TDM programs clearly depends on the level of information and assistance that is made available to the individual employers. Employers faced with a requirement or need to reduce vehicle trips are placed into unfamiliar territory, where they must somehow identify a set of actions that not only will help meet their trip reduction goal, but also be affordable and compatible with the type of business activity in which they are engaged. Whether motivation to reduce employee vehicle use is caused by regulation or a desire to either reduce demand for scarce parking or to provide helpful alternatives for employees stuck in traffic, employers are typically ill-equipped to design and implement effective programs. They are also constrained by an underlying concern of not wanting to frustrate employees or impose an action that will threaten their competitive advantage in finding and retaining workers/staff.

Agencies such as the South Coast Air Quality Management District (SCAQMD), which was charged with administering the requirements of Regulation XV in Southern California, have employed a
variety of methods to provide guidance and technical assistance to affected employers. SCAQMD
developed a range of tools to help employers learn how to develop a trip reduction plan, and
increasingly (as more information became available) provided technical support for selection of
strategies. Consultant expertise increased as well. Ultimately, SCAQMD, with help from CARB,
undertook development of a Travel Demand Management Program to provide improved guidance
on selection of strategies capable of achieving trip-reduction goals. This information was made
available to employers in the form of software and also a hard-copy manual. A description of this
research is provided in the next subsection, “Modeling Studies.”

Other, less formal approaches to sharing information, building support, and shaping effective
programs than those of the regulatory agencies are evident in the marketing and outreach pro-
grams of local and regional governments, transportation agencies, and transportation manage-
ment associations (TMAs). Most metropolitan planning agencies actively support employer TDM
efforts, often in support of efforts to attain or maintain federally mandated air quality standards.
For example, the Metropolitan Washington Council of Governments operates an ambitious suite of
programs, termed Commuter Connections, through which it provides a range of information, out-
reach, and technical assistance in support of TDM (LDA Consulting, 1999). Commuter Connections
operates an employer outreach program to encourage large, private sector employers to volun-
tarily implement TDM strategies to reduce vehicle trips by employees. It offers an integrated
rideshare program that provides regional rideshare matching as well as information on other
alternative modes to all who receive a matchlist, a guaranteed ride home program in which it runs
a regional emergency ride service for participating employers across the region, a telework resource
center through which it provides information and assistance to commuters and employers to fur-
ther in-home and satellite center telework programs, and a network of information kiosks in many
locations to provide transit route and schedule information, maps, and rideshare information.

Sometimes TDM program development information and technical assistance is provided by the
public transit agency, through a special regional ridesharing organization, or through TMAs.
Many transit agencies actively work with employers to provide better information to employees
on transit alternatives, to assist in selling commuter passes on-site, and to encourage employers
to subsidize their employees’ transit costs through programs like TransitChek in New York and
Philadelphia and Snap Pass/PASSport in Portland, Oregon, both of which have been discussed
earlier in this chapter. At one time, regional ridesharing agencies were popular fixtures in many
urban areas, such as Commuter Transportation Services in Los Angeles and Commuter Computer
in Pittsburgh. These organizations eventually broadened their scope to promote alternative modes
other than just ridesharing or vanpooling. A number were assimilated into the corresponding
Metropolitan Planning Organization (MPO) when air quality became an important driver for pro-
moting alternative modes, following the passage of the Clean Air Act Amendments of 1990, and
the introduction of transportation conformity legislation in several states and jurisdictions.

A highly innovative program was conceived and implemented by Seattle Metro, now King County
Metro, the public transportation agency for Seattle/King County, in the mid-to-late 1980s. Beginning
with the development of its 1990 Transit Plan in 1981, the agency realized that it needed to broaden
its base of products and services beyond simply fixed-route transit service. Proliferation of signif-
icant new activity centers outside the Seattle CBD posed an entirely different set of travel needs
than those served by traditional CBD-oriented bus service. In January 1986, Metro undertook a
restructuring that reflected a shift to a market-oriented approach, emphasizing different products
and services for the new developing markets.

One element of this shift was to incorporate Commuter Pool, the regional carpool and vanpool
agency, into Metro. Another element was the establishment of a Research and Market Strategy
function to act as a leading edge in identifying, marketing, and evaluating new products and services. This action morphed Metro into more of a “mobility broker,” packaging and selling both services and assistance appropriate to the marketplace. Included were a wide range of transit services and High Occupancy Vehicle (HOV) facilities, service contracts with major employers, and a giant university pass program (U-PASS at the University of Washington), as well as carpool matching, vanpool program management, and telecommute program assistance. To make these programs as effective as possible, Metro worked extensively with local communities, TMAs, and with individual employers to design the programs and ensure maximum flow of information down to commuters (Comsis, 1991).

Perhaps one of the most interesting elements of Metro’s program activities was the HOV/TSM evaluation study, a 2-year study to evaluate the effectiveness of a set of transportation programs, incentives, and promotional techniques applied in four project areas in King County. Beginning in 1987, Metro began monitoring the performance of TDM programs at 52 suburban employment sites, each having received some program assistance from Metro to establish a TDM program. These sites, along with a group of regional control sites where no special actions were taken, were tracked using employee surveys. The results were used to ascertain employee awareness of programs and incentives available to them, and to track changes in mode shares as influenced by the programs.

As a primary tactic, transportation coordinators were hired for each project area to provide personalized assistance to employees in planning their commute and taking advantage of marketed transportation programs and incentives. The initial evaluation surveys, as previously discussed in connection with Table 19-21, demonstrated a surprisingly low level of employee awareness of particular programs and incentives that were available to them. The most visible effect of the transportation coordinators’ (TCs) efforts was on measurable increases in employee awareness.

Between 6 percent and 19 percent of employees in the four project areas changed commute mode between 1988 and 1989, and overall, 5.5 percent of employees in these four areas stopped driving alone and began using an HOV mode. However, the same proportion discontinued their HOV use and began driving alone, with the result being no net change in mode split. Meanwhile, at the control sites, 4.7 percent of employees shifted from driving alone to use of an HOV mode, but a slightly greater percentage, 6.0 percent, changed from HOV to driving alone.

The interpretation of these results by Metro was that in an environment where there are few good alternatives, plenty of free parking, and considerable staff turnover with new hires, the TDM outreach activities helped prevent net losses in HOV mode use in the managed areas. For those employees who shifted from driving alone to an HOV mode, 48 percent of those individuals cited one or more of the TC activities as affecting their choice, whereas 39 percent of employees at the control sites cited TC activities. Among employees who switched from HOV to driving alone, only 18 percent of those working in the four project areas cited TC activities as affecting their choice, and 11 percent of employees in control areas cited TC activities (Municipality of Metropolitan Seattle, 1990).

**Modeling Studies**

**California Air Resources Board Survey and TDM Program**

Critical limitations in the travel and impact data compiled and released in the large-scale state and regional employer TDM programs have been outlined in the “Analytical Considerations” subsection of the “Overview and Summary.” In appreciation of these shortcomings, CARB spon-
sored a research study, in 1993, centered on the collection of original travel survey data from an acceptably large and diverse employer sample in the Los Angeles and Sacramento air quality management areas.

The objective was to develop a mathematical tool that would be credible for designing or testing the capability of employer TDM programs to meet mandated trip reduction goals. Detailed travel data were acquired from 2,437 employees at 45 different employers, along with sufficient information to permit geocoding of trip origin and destination, which was used to append corresponding travel time and cost of available travel alternatives from the respective regional travel models. An attempt was then made to evaluate the effectiveness of particular TDM strategies through the estimation of logit-type mode choice models. These models were structured to predict the probability of choosing a particular travel option in relation to individual travel characteristics and the strategies applied by the respective employer (Comsis, 1993a).

The results of this modeling exercise are summarized in Table 19-30, presenting parameter estimates for those variables that were found to be statistically meaningful in selection of the respective travel mode. The first group of variables in the table represents the travel time and cost variables typically at the heart of mode choice models. The modeling analyst compared the coefficients for in-vehicle time, transit out-of-vehicle time, auto operating cost, transit fare, and parking cost with the estimates from ten other metropolitan area travel models and found them to be satisfactorily comparable in both relative and absolute magnitude.
Table 19-30  CARB TDM Model Parameter Estimates

<table>
<thead>
<tr>
<th>Variable</th>
<th>Drive Alone</th>
<th>Carpool</th>
<th>Vanpool</th>
<th>Transit</th>
<th>Bike/Walk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mode-Specific Constants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Travel/Transportation-System Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-Vehicle Time (IVT-minutes)</td>
<td>-0.0399</td>
<td>-0.0399</td>
<td>-0.0399</td>
<td></td>
<td>-0.0110</td>
</tr>
<tr>
<td>Out-of-Vehicle Time (OVT-min.)</td>
<td></td>
<td></td>
<td></td>
<td>-0.0165</td>
<td>-0.0441</td>
</tr>
<tr>
<td>Operating Cost/Fare (cents)</td>
<td>-0.0034</td>
<td>-0.0034</td>
<td>-0.0034</td>
<td></td>
<td>-0.0061</td>
</tr>
<tr>
<td>Parking Cost (cents)</td>
<td>-0.0086</td>
<td>-0.0086</td>
<td>-0.0086</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability of Bike Lanes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.220</td>
</tr>
<tr>
<td><strong>Employee Characteristics Variables</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laborer (1=Yes)</td>
<td>0.3999</td>
<td></td>
<td></td>
<td></td>
<td>0.9367</td>
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<td>Professional (1=Yes)</td>
<td>-0.2666</td>
<td>0.9054</td>
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<td></td>
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<tr>
<td>Manager (1=Yes)</td>
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<td></td>
<td></td>
<td></td>
<td>-1.064</td>
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<tr>
<td>Gender (1 = Male)</td>
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<td></td>
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<td>0.8727</td>
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<tr>
<td>Elderly (1=Yes)</td>
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<td>0.4355</td>
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Notes:  Unless otherwise noted, all coefficients are significant at 95 percent confidence level.

- Value constrained to 1.5 times IVT coefficient.
- Significant at 80% confidence level.
- Not significant at 80% confidence level.
- Coefficient derived from other sources.

Source:  Comsis (1993a).
The second group of variables represents employee characteristics. The estimates imply that workers who are laborers are more likely to choose carpool or transit, especially transit, while professionals and managers are among the least likely to choose those modes. Professionals are most likely to choose vanpooling as a commute alternative. Males are the most likely to bike or walk, while the likelihood of carpooling, vanpooling or taking transit is clearly greater for older workers. Persons who must make midday business trips are fairly unlikely to want to carpool, but for some reason that effect doesn’t seem to carry over to vanpooling or transit.

A modeled relationship that seems inconsistent with other findings is that employees on staggered work hours are much more likely to take transit. Part-time workers are more likely to opt for transit as an alternative, not surprising since other ridesharing modes require daily commitment. Employees who are the sole worker in the household are less likely to carpool, but do not seem to be discouraged by transit or vanpooling, while married employees are most likely to choose vanpooling.

A limited set of worksite characteristics constitutes the third group of variables. Testing of the worksite variables suggests that transit use is likely to be less where parking space ratios are higher, that carpooling is less likely at campus locations or institutions, and that as the number of adjacent retail land uses increases, the rate of carpooling and transit use will increase (Comsis, 1993b).

The above relationships helped set the stage for evaluating the contributions of TDM strategies (labeled “incentives” in the study). The TDM strategies shown in the lower portion of Table 19-30 were the only “incentives” that could be quantified as strategy-specific variables in the models. Their relationships with the respective mode choice observations were strong enough that statistical significance could be demonstrated. This does not mean, however, that the value of individual coefficients is regarded as wholly plausible in all cases.

Having an employee transportation coordinator (ETC) and offering rideshare matching is estimated to have a moderately positive influence on employee choice of carpooling or vanpooling (the two measures were only significant when combined), as does the offering of preferential parking. Predictably, maintaining a transit information center and offering on-site transit pass sales has a fairly solid positive influence on choice of transit, while offering bike racks or showers/lockers has a moderately positive effect on the decision to bike or walk. Offering use of company vehicles has a clearly positive effect on carpooling or vanpooling choice, while providing company vans has a very substantial effect on vanpooling choice.

A dilemma arises in the estimates shown for Guaranteed Ride Home (GRH) and the monetary incentives (modal subsidies). GRH has a surprisingly large effect in the model on commuter choice of all alternative modes, at a level (model coefficient of 0.4476) that exceeds most other strategies. This finding stands in contrast to the relatively modest effect of providing modal subsidies (0.0125). The offering of prizes, free meals, and awards also garners a higher coefficient value (0.0826) than does provision of modal subsidies.

There are several possible explanations for this apparent anomaly. First, GRH has been demonstrated to be a very popular and highly demanded feature of an employer TDM program, so it is possible that it actually does carry a higher value in employee choice of alternative commute modes. Second, the survey did not ask what the monetary value was of either the financial incentives or the cost of parking at the worksite, so a wide range of dollar magnitudes was presumably lumped together. Third, it is probably useful to note that, while the data collected explicitly for this study were both more reliable and less aggregated than those found in the regulatory agencies’ databases, they do represent only a single point in time—when the survey was conducted. They reflect behavior inside an employer that was applying certain combinations of TDM strategies, but how
long it had been since the strategies had been implemented could not be known, nor could there
be empirical identification of the degree to which introduction of any of the individual strategies
directly affected employee travel choice.

Another matter of interest is the degree to which individual employees were aware of the availabil-
ity or implication of particular TDM strategies. Because employees were asked to identify particular
TDM strategies made available by their employer, it was possible to cross-check against what strate-
gies were actually available. As described and tabulated in the “Underlying Traveler Response
Factors” section, under “Individual Behavioral and Awareness Considerations”—“Awareness and
Comprehension of Options” (see Table 19-21), the program awareness of employees ranged from
77 percent for preferential parking down to only 17 percent for bus pass discounts and 15 percent
for transportation fairs.

Awareness was seen as such an important issue that it was decided to attempt to model the per-
cent awareness for the eight TDM incentives that were included in the mode choice model. Sub-
models were calibrated to accompany the mode choice model, with separate equations calculated
for each incentive. Test plots led to the use of annual ETC marketing plus administrative cost per
employee as offering the best explanation for variations in awareness.

The implication of this relationship is that higher levels of marketing, outreach, and information
exchange lead to a more informed, and hence more “aware” employee, which translates to the TDM
strategies having greater use and impact. Ultimately, this chain of mode choice-TDM Incentive-
awareness relationships provided the basis for a software tool known as the Travel Demand
Management Program, which was pilot tested by SCAQMD in Los Angeles (Comsis, 1993a). The
software’s Users Guide summarizes the default coefficient values for each model (Comsis, 1993b).

Center for Urban Transportation Research Worksite Trip Reduction Model

A more recent attempt to model the effects of TDM strategies on travel behavior was undertaken by
the University of South Florida’s National Center for Transit Research Program at CUTR. This
research set out to use as its primary data source the employer plan data compiled under California’s
Regulation XV/Rule 2202 program, as well as comparable data from Washington State’s Commute

The CUTR researchers quickly recognized the same challenges in working with these data that
had been experienced by the research efforts mentioned earlier, namely problems of aggregation,
missing or incomplete employer plan records, and insufficient information on the nature or mon-
etary value of key incentive actions. The strength of these data are in the large number of records
(submitted plans), the diversity of programs and settings, the derivation of employee travel from
a 5-day work week cycle, and the ability to compare the same employer over time. Nevertheless,
the nature of the data makes it difficult to assess the effects of individual TDM strategies through
statistical methods like multiple regression.

A principal reason for this difficulty is the inability to construct a framework around those key
determinants of travel choice that are largely peculiar to the individual—such elements as trip
length, availability and quality of travel alternatives like transit, nature of occupation, and even
income and auto ownership. With the regulatory program data, the conceptual framework must
be limited to analyzing changes in aggregate employer vehicle trip rate in relation only to the iden-
tified strategies in the trip reduction plan.

19-110
In response, the researchers opted for a different analytic approach, based on the neural network concept. Neural networks are described as “a group of highly interconnected and relatively simple computational units” (representing a structure of links and nodes). “Each of these computational units performs processing of its inputs to produce a single output. The neural network connects the output of each unit to the inputs of many other units through different weights.” The process of calibrating the different units and paths is characterized as “learning,” in the context of “training,” in which one of several learning techniques is used to modify the weights in an orderly fashion. Since it is not the purpose of this summary to appraise the theory or accuracy of the neural network approach, the reader with an interest in better understanding this approach is advised to consult an authoritative source, starting with the project report (CUTR, 2004). This discussion will focus primarily on the findings from the CUTR application.

Standard linear regression models were used by CUTR in an early exercise to sort through and rank the relative importance of the numerous incentive measures. Because many measures were found to be quite similar, it was decided to group them into 12 categories, consisting of the following (CUTR, 2004):

- Facilities and Amenities: Passenger loading areas, facility improvements, preferential parking areas, bike racks and lockers, showers, and changing facilities.
- Guaranteed Ride Home: TMA provided program, company vehicle use, emergency guaranteed ride, rental car guaranteed trip, and taxi guaranteed trip.
- Flexible Schedules: Flextime for ridershareers including work shifts and grace periods.
- Marketing Programs: Information center, transportation fairs, focus groups, posted materials, new-hire orientation, personal communication, company recognition, special interest clubs, TMA membership, written materials, and zip code meetings.
- Rideshare Matching: Regional commuter matching agency and employer-based matching system.
- Financial Incentives: Transportation allowances, walk or bike-to-work subsidies, carpooling subsidies, and other direct financial subsidies.
- Parking Management: Increased parking fees for drive-alone commuters and subsidized parking fees for rideshare units.
- Telecommuting and Telework: Work at home and work at satellite center.
- On-Site Services: On-site childcare, cafeteria, ATMs, postal facility, fitness center, transit information, or pass sales.
- Non-Financial Incentives: Auto services (fuel, oil, tune-up); gift certificates; free meals; catalogue points; time off with pay; drawings; and awards.
- Commuter Tax Benefit Incentives: Introductory or ongoing transit passes or subsidies, subsidized vanpool seats, and ongoing vanpool subsidization.
The researchers used these 12 categories of strategies to sort and analyze the types of programs that were being implemented in the employer sample. They found 1,671 distinct strategy combinations among the sample plans, and out of these, identified the 50 most common applications. These are pictured in Table 19-31, in declining order of occurrence, from the most common combination—found in 1,036 plans—to the least, found in 76 plans. Together, this set of plan combinations accounted for 9,886 of all 21,267 plan records, or about 46 percent.

One feature of interest that can be observed in Table 19-31 is the frequency with which particular strategy types are employed in these most common programs. The most frequently applied strategies are shown in the leftmost column while the least frequent are on the right. The key trends shown here are the inclusion of marketing, facility amenities, rideshare matching, and guaranteed ride home in 90 percent or more of all programs. Non-financial incentives were present in 39 of the 50 programs, and on-site services were present in 33 of 50. Commuter tax benefit strategies, consisting of financial incentives that offer tax advantages (basically alternative mode subsidies) were present in a surprising 30 of 50 programs. Non-exempt financial incentives were only offered in 23 cases and parking management strategies showed up only in 1 of the 50 categories. Perhaps also surprisingly, alternative work schedule strategies—flexible work hours (13 programs), telecommuting/telework (eight programs), and CWW (16 programs)—were among the least frequently offered strategies. Overall, these findings have a basic similarity to those presented earlier in Table 19-27 from a 1992 study, supporting the assertion that marketing and other “soft” TDM strategies are the most commonly found in TDM programs, even those conceived under regulatory circumstances. The more influential “economic incentive” strategies are generally much less common.

The new Worksite Trip Reduction Model was then used to estimate the vehicle trip reduction impact of each of the 50 most common programs. To do this, the model was run parametrically, with different baseline conditions in terms of starting transit mode share and starting vehicle trip rate level. Results are presented in Table 19-32, organized according to starting ranges of transit mode shares and vehicle trip rates (CUTR, 2004).

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13 Note that VTR as used in the source document stands not for vehicle trip reduction, but rather for vehicle trip rate. The vehicle trip rate in the source and in Table 19-32 is computed in the form of vehicle trips per 100 employees, and is the inverse (times 100) of Average Vehicle Ridership (AVR).
Table 19-31  CUTR Worksite Trip Reduction Model—Ranking by Frequency of Occurrence of the 50 Most Common Program Combinations

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Table 19-32  CUTR Worksite Trip Reduction Model—Estimates of Vehicle Trip Rate Reductions for the 50 Most Common Employer TDM Program Packages

<table>
<thead>
<tr>
<th>Package Number</th>
<th>Starting Transit Shares (shown as percentage ranges) and Starting Vehicle Trip Rates (in italics as ranges)</th>
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</thead>
<tbody>
<tr>
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<td>100-90</td>
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(continued on next page)
Table 19-32  (Continued)

<table>
<thead>
<tr>
<th>Package Number</th>
<th>Starting Transit Shares (shown as percentage ranges) and Starting Vehicle Trip Rates (<em>italic</em> as ranges)</th>
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</thead>
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<tr>
<td></td>
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</table>

Note: The vehicle trip rates shown as ranges, and also the trip rate change estimates, are in units of average vehicle trips per 100 employees.

The reason it is necessary to specify the starting conditions in this manner is because the strategy combinations in each package affect the distribution of mode choices differently depending on the starting point. For example, if an employer currently has carpooling as the dominant mode among employees using alternative modes, and the package of strategies is such that transit use is predominately encouraged, the effect would be to move some percentage of both SOV commuters and carpoolers to transit. The proportionate shifts that occur among modes depend heavily on the starting modal distribution and the corresponding vehicle trip rate. A similar approach was used in Chapter 3 of the 1993 FHWA guidebook Implementing Effective Travel Demand Management Measures (Comsis and ITE, 1993).

Studying the vehicle trip reduction estimates in Table 19-32 suggests in general that any given program of strategies starting with a lower initial vehicle trip rate will normally have a lesser trip reduction impact than if it were to start with a higher vehicle trip rate. In other words, given the same set of TDM strategies, employers whose starting vehicle trip rate is already down in the 80-70 vehicle trips per 100 employees range will see less additional trip reduction than an employer whose starting vehicle trip rate is in the 100-90 range. The same is more-or-less true of higher starting transit mode shares, as it would appear that many of these strategies may appeal more to potential carpool/vanpool users than to potential transit users, and may even begin to lure some employees away from transit. At the extreme, the effect of the given TDM program may even be to begin increasing vehicle trip making through non-optimal modal shifts. Such results are reflected in the non-negative vehicle trip rate change entries in Table 19-32.

The results shown in Table 19-32 have been abstracted from Chapter 5 of the CUTR model report (CUTR, 2004), and should be taken as illustrative of the model’s behavior in forecasting the effects of typical TDM program packages over common background conditions as might be encountered in the field. For actual user applications, the model is accessible via the internet at http://www.nctr.usf.edu/worksite, allowing the user to input his/her own current conditions and to test combinations of TDM strategies on reducing their vehicle trip rate.

To illustrate the nature and sensitivity of the model, the Handbook authors executed a series of runs for a hypothetical employer of 100 employees, where as a starting condition 86 percent of employees drive alone, 2 percent take transit, 10 percent rideshare, and the remaining 2 percent bike or walk. These conditions correspond to a starting vehicle trip rate of 90.6. Using these conditions, the authors investigated the trip reduction impact which would result from the application of each of the 12 primary strategy groups—first individually, and then each paired with each of the others. The results of this exercise are shown in Table 19-33 in terms of the percentage vehicle trip reduction from the starting vehicle trip rate base of 90.6.

While readers will want to study the results in the table and develop their own conclusions, the following general observations are offered on the nature of the estimated vehicle trip reduction (VTR) results for this particular set of strategy conditions:

- The highest-impact strategies are the commuter tax benefit incentives (5.0 percent VTR), financial incentives (4.1 percent), and facilities and amenities (4.1 percent). The lowest-impact were guaranteed ride home (1.5 percent VTR) and non-financial incentives (1.3 percent), while rideshare matching (−0.3 percent) and on-site services (−0.7 percent) were projected to actually increase vehicle trips for this particular set of starting conditions.
Table 19-33  Vehicle Trip Reduction Estimates for TDM Programs and Combinations Based on CUTR TDM Model

<table>
<thead>
<tr>
<th>TDM Program Type</th>
<th>F&amp;A</th>
<th>GRH</th>
<th>FLEX</th>
<th>MRKT</th>
<th>RSMP</th>
<th>FIN</th>
<th>PMT</th>
<th>TELE</th>
<th>CWW</th>
<th>ONS</th>
<th>NONF</th>
<th>CTB</th>
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<tr>
<td>Guaranteed Ride Home</td>
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<td>Flexible Schedules</td>
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<td>2.5</td>
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<tr>
<td>Marketing</td>
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<tr>
<td>Rideshare Matching</td>
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<td>0.1</td>
<td>2.0</td>
<td>-0.3</td>
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<td>3.7</td>
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<td>2.9</td>
<td>1.7</td>
<td>0.8</td>
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<td>-3.2</td>
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<td>-0.1</td>
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<tr>
<td>Commuter Tax Benefit Incentives</td>
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<td>3.6</td>
<td>4.3</td>
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<td>2.4</td>
<td>4.7</td>
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<td>4.2</td>
<td>7.0</td>
<td>2.6</td>
<td>2.4</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Notes: Hypothetical employer of 100 employees, with starting employee mode shares of 86 percent drive alone, 10 percent rideshare, 2 percent transit, and 2 percent bike or walk (90.6 Vehicle Trips per 100 Employees).

A negative value indicates that the program or combination will actually increase vehicle travel under the conditions assumed.

Source: Illustrative model application prepared by the Handbook authors utilizing the CUTR Worksite Trip Reduction Model available at http://www.nctr.usf.edu/worksite (now superseded — see Footnote 14). Center for Urban Transportation Research. (Website accessed Winter/Spring 2007.)
The strongest two-category combinations were commuter tax benefits teamed with facilities and amenities (6.8 percent VTR) and commuter tax benefits teamed with CWW (7.0 percent). The poorest results seem to come when on-site services are combined with rideshare matching (~3.2 percent VTR), non-financial incentives are paired with rideshare matching (~1.5 percent), and non-financial incentives are teamed with on-site services (~1.3 percent). Such seeming anomalies often occur using models when complex modal tradeoffs are occurring in the calculations. In this particular test, however, a combination like rideshare matching with on-site services might be expected to lead to a more favorable result, given that the starting conditions are favorable to ridesharing over transit.

There are only eight cases in the 66 pairs pictured in Table 19-33 where the pairing actually results in a positive, or at least somewhat synergistic effect, i.e., the combination of the two strategies leads to a trip reduction impact that is larger than either strategy individually. These pairings are: commuter tax benefits teamed with CWW (7.0 percent VTR versus 5.0 percent and 3.8 percent individually) or with facilities and amenities (6.8 percent VTR versus 5.0 percent and 4.1 percent individually), CWW with facilities and amenities (5.7 percent versus 3.8 percent and 4.1 percent individually), parking management with facilities and amenities (4.2 percent VTR versus 3.0 percent and 4.1 percent individually) or with marketing (4.5 percent VTR versus 3.0 percent and 3.5 percent individually) or with financial incentives (4.8 percent VTR versus 3.0 percent and 4.1 percent individually), and financial incentives with facilities and amenities (4.9 percent VTR versus 4.1 percent and 4.1 percent individually) or with marketing (4.9 percent VTR versus 4.1 percent and 3.5 percent individually). In none of these scenarios is the synergy sufficient that the estimated trip reduction effect in combination is greater than the sum of the separately applied individual strategies.

The Worksite Trip Reduction Model would appear to be an excellent start toward a set of tools that can help TDM planners make sense of the vast number of strategies available to them. In addition to being easy to use, a very appealing aspect of this new tool is that it does not seem to generate unrealistic estimates of trip reduction. The predicted reductions are generally on the order of 3 to 6 percent. Reduction estimates of this magnitude compare more realistically with the typical employment site results seen within large area-wide programs than do the 15 percent to 30 percent reductions seen in the 82-program sample. It should once again be stressed that the 82 examples include many exemplary programs, and that that group should not in any way be construed as typical of what might be realized in a large area-wide regulatory program.¹⁴

Practitioners are urged to apply caution and common sense to any model projection, whether it be the two models featured in this subsection, or the FHWA TDM Evaluation Model, or the U.S. Environmental Protection Agency (EPA) COMMUTER Model introduced later in the “Additional Resources” section. Empirical case studies such as those presented in this chapter, or contained in a number of the recommended resources, always serve as a good way of cross-checking a TDM program’s potential impact.

International Experience

Outside the United States, interest in TDM has been particularly high in the Netherlands and in the United Kingdom. A study prepared for the British Department for Transport (DfT), Smarter

¹⁴ During the timeframe of the Chapter 19 review and publication process, CUTR issued an update to the Worksite Trip Reduction model, now renamed TRIMMS© (Concas and Winters, 2009). See the “Additional Resources” section for additional information.
Choices—Changing the Way We Travel (Cairns et al., 2002), provides a summary of TDM experience in those two venues. Key studies and findings from the experience reviewed are summarized in the following section.

**Making Travel Plans Work**\(^\text{15}\)

This analysis and report was originally prepared for the DfT in 2002 by Cairns, Davis, Newson, and Swiderska of ESRC Transport Studies Unit UCL, and Adrian Davis Associates. It represented the biggest study of British workplace travel plans to date and presents results based on an analysis of best practice at 20 organizations employing over 69,000 employees. These cases represented a range of public and private organizations, all of which were selected as examples of good (not average) practice. Taken overall, the 20 organizations had reduced the number of cars driven to work by 14 for every 100 staff, representing an average reduction of 18 percent in the proportion of commute trips by car driver. On average, the organizations had doubled the proportion of staff commuting by bus, train, cycling, and walking, and car sharing (carpooling) had also been reasonably successful.

A study of factors that made some travel plans more successful than others produced very few generalizations that could be made. All travel plans had involved real changes to employee travel options, so it was not possible to assess the effects of plans that focused on awareness-raising only. The one factor that did emerge was parking. For the 13 travel plans that had addressed parking, either by restricting supply, introducing charges, or providing incentive payments to those giving up a parking space, the proportion of commute trips made as car driver was reduced by 24 percent, compared to 10 percent for those plans that had not addressed parking (Cairns et al., 2002).

**Effective TDM at Worksites in the Netherlands and the United States**

This study, performed by Organisational Coaching and Schreffler in 1996, compared 20 paired case studies from the Netherlands and the United States. The organizations examined included a large hospital, a large manufacturer, a government organization or utility, a bank, an insurance or telecommunications organization, a major university, an airport, a consultancy firm, and a smaller employer with less than 250 employees. Again, examples chosen were all considered to be success stories. Results showed remarkable similarity across the two sets of case studies, with the programs in the United States revealing VTR rates in a range of 6 percent to 49 percent, with an average of 19 percent, while those in the Netherlands had reductions in vehicle kilometers of travel ranging from 6 percent to 32 percent, averaging 20 percent (Cairns et al., 2002).

**Netherlands Ministry of Transport Study**

A 1998 Dutch study by Ligtermoet included a review of new results from 40 organizations in the Netherlands plus other Dutch data. Analysis showed that plans with “basic” measures (such as car-sharing schemes) achieved vehicle kilometer reductions of 6 to 8 percent, while those with “luxury” measures (such as company buses) or “push” measures (such as parking management) achieved reductions in the range of 15 to 20 percent. This led to the conclusion that plans combining both “carrots and sticks” are the most effective (Cairns et al., 2002).

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\(^{15}\) A “travel plan” is the equivalent of what is known in the United States as a Transportation Management Plan (TMP) (Enoch and Zhang, 2008). United Kingdom experience with travel plan employer participation rates is included in the “Site-Versus System-Level Impacts” subsection which follows.
This review of Dutch travel plans by Touwen in 1999 concluded that travel plans consisting of communication/marketing measures, basic measures such as carpooling and cycle leasing, and organizational measures such as flextime achieved an average reduction of 8 percent in vehicle kilometers traveled. However, if luxury measures or disincentive measures were added, the average reduction was about 20 percent (Cairns et al., 2002).

This study by the Cairns organization itself tracked and reported on its own selection of 26 workplace travel plan case studies from locations in Birmingham, Bristol, Buckinghamshire, Cambridgeshire, Merseyside, Nottingham, and York. Although the study reports trip reductions, the strategies employed were not specified. The report seems to have been more oriented to exploring the process by which the programs were engineered, their costs, and projections of their possible effects at different levels of geographic resolution (Cairns et al., 2002).

The vast majority of travel demand management effectiveness data presented up to this point in Chapter 19 has been measured and analyzed at the site level, providing findings about TDM impact on travel to and from particular offices, campuses, and other specific employment and institutional sites engaging in specific sets of TDM strategies. Most of this data addresses only the effect on travel produced by the journey to and from work or school. Some results have been presented at a program level, such as employee or student pass programs facilitated by public transportation agencies but implemented at the site level in conjunction with individual employers or institutions.

This focus on site-level work-commute-trip impacts is consistent with the scope of this chapter, which (in accord with its title) addresses employer and institutional TDM strategies and not programs more or less independent of employers such as residence-based programs or area-wide agency programs. Examples of broader agency-implemented programs are wide-area transit improvements and regional rideshare matching programs.

Indeed, a number of important objectives associated with TDM apply at the site level, including employee and through-traffic congestion mitigation at site access points, site traffic pollutant emissions reduction, parking facility needs reduction, and employee benefits. Nevertheless, the question remains about the broader effects of site-based TDM on all employees within an urban sector, on overall peak-period area street traffic, on major transportation facilities, and on regional vehicle trip making and VMT. Information about such broader effects would be useful for a quantitative understanding of TDM efficacy in addressing objectives such as regional transportation facility congestion mitigation, energy conservation, improved regional air quality, and reduction in global warming gas emissions.

As one moves from the site level toward the broader area level or regional traffic facility level the following stages of impact dissipation apply (Pratt, 1990):

Stage 1. A leveling out of effects among differing participating employer and institutional scenarios, reflecting various types and sizes of employers and TDM programs, and averaging out of high-effectiveness and lower-effectiveness programs.
Stage 2. Dissipation of work-trip effects as average site-level effects are mixed with the unaffected commuting associated with non-participating employers.

Stage 3. Additional trip-reduction dissipation as work-commute trips are mixed in with non-work site-generated travel produced by both participating and non-participating employers and institutions along with other interspersed land uses.

Stage 4. Further leveling-out of impacts as locally generated trips and traffic are intermixed with other trips and traffic. On transit systems and local area streets only intra-regional through movements will normally be of significance, but on regional highway facilities, other traffic will include intercity travel.

These stages are referred back to, often with examples, in the discussion which follows.

Impacts at the site level vary according to employer type, most notably whether an office, retail, or industrial employer is involved, and size of employer. Although most studies have found no significant relationship among TDM program effectiveness levels for large, medium, and medium-small employers, it has generally been presumed that fewer TDM actions are workable for firms of less than 100 employees (Comsis and ITE, 1993). According to 2004 U.S. Census data, 36 percent of all employees work for firms with less than 100 employees (U.S. Census, 2007).°

**Degree of Employer Participation**

Site-level TDM impacts, even once averages are calculated (Stage 1 dissipation as identified above), apply only to employers actually participating in the employer-dependent TDM strategies. These impacts are diluted, on an employment-area level, by non-participating employers (Stage 2 above).

The degree of employer participation or non-participation is heavily impacted by the regulatory environment. Where no legal requirement compels participation, employer involvement is voluntary, and participation generally reflects the employer’s self-interest. Where a legal requirement for TDM program participation derives from the administration of land use and zoning regulations, the requirement may directly apply only to new sites and not to pre-existing employment. Full mandatory participation, such as applied in Southern California’s air quality Regulation XV program, does not really apply to all employers. “Full mandatory” participation typically applies only to employers of 100 (sometimes 50) or more employees. Further background on effects of employer type and regulatory influences is provided in the “Underlying Traveler Response Factors” section under “Voluntary Versus Regulatory Employer Motivation” and “Characteristics of Employer.”

Degree of employer participation has been approximated in some analyses by means of “employer participation rate” averages. Evaluating degree of site-level impact dilution by non-participating employers requires associating employer subgroups with their average employer participation rates (Comsis and ITE, 1993). Table 19-34 gives default experience-based employer participation rates for voluntary employer participation from the “FHWA TDM Evaluation Model” and indicates their empirical and/or judgmental basis. As can be seen, these rates were based on very limited expe-

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16 National employment statistics such as this provide only an approximate indication of employment site size distributions and almost certainly understate the prevalence of smaller-size establishments. Self-employed persons without payroll are excluded, and large employers may have secondary places of business which, from an employee transportation perspective, are similar to small businesses.
Empirical voluntary employer participation rates have been reported in the aggregate for the United Kingdom. Termed “level of travel plan take-up,” the observed rates apply to all degrees of travel plan scope and intensity. (The United States equivalent of a travel plan is a Transportation Management Plan, or TMP.) The concept of the travel plan arrived in the United Kingdom from the United States in the mid-1990s, after first being taken up by the Netherlands. The U.K. Department of Environment, Transport, and the Regions (DETR) is pursuing “widespread voluntary take-up of travel plans” according to a 1998 white paper.

The highest U.K. employer participation rates have been observed among local government entities. In 1997/1998, 3 percent had TMPs on a permanent basis and another 4 percent had TMPs on a pilot or trial basis, for a total of 7 percent participation. The total had risen to 24 percent by 2001 and 62 percent by 2006. Participation rates are observed to be much more modest in the U.K. private sector. Of firms with 100 or more employees, 4 percent had permanent TMPs in 1997/1998, with no data available on pilot or trial TMPs. The total of permanent and experimental TMPs equated to a 7 percent participation rate in 2001 and rose to 11 percent participation in 2006. Small businesses of less than 100 employees have been found to be relatively neglected. Circa 2000, only 19 percent of small businesses were even aware of the travel plan concept (Enoch and Zhang, 2008).
Table 19-34  Experience-Based Voluntary Employer TDM Participation Rates

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Voluntary Employer Participation Rate&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Basis of Value (Rates Observed)</th>
<th>Sources of Observed Participation Rate Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpool Programs</td>
<td>37% for firms with 100 or more employees</td>
<td>Average for firms in Atlanta, Cincinnati, Houston, and Seattle encompassed by Ridesharing Demonstration Program&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Transportation Research Center, Urban Mass Transportation Administration, “National Ridesharing Demonstration Program: Comparative Evaluation Report.” Cambridge, MA (1985).</td>
</tr>
<tr>
<td></td>
<td>4% for firms with less than 100 employees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable Work Hours</td>
<td>Same as carpool programs (deemed to fit logically with the observed values, which weren’t available by firm size)</td>
<td>Weighted average of 6% for six North American regions and 28% for six CBDs (16% weighted average overall)</td>
<td>Pratt and Copple (1981)</td>
</tr>
<tr>
<td>Other Non-Monetary TDM</td>
<td>Same as carpool programs</td>
<td>None available</td>
<td>None available</td>
</tr>
<tr>
<td>Transit Fare Incentives</td>
<td>7% for firms with 100 or more employees</td>
<td>Taken at 20% of carpool program rates based on comparisons available for Boston&lt;sup&gt;c, d&lt;/sup&gt;</td>
<td>Pratt and Copple (1981)</td>
</tr>
<tr>
<td></td>
<td>1% for firms with less than 100 employees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Monetary TDM</td>
<td>Same as transit fare incentives</td>
<td>None available</td>
<td>None available</td>
</tr>
</tbody>
</table>

Notes:  
<sup>a</sup> As utilized in the FHWA TDM Evaluation Model.

<sup>b</sup> The National Ridesharing Demonstration Program report indicated a higher overall voluntary employer participation rate for minimal-effort, low-impact carpool programs but without any breakout by firm size.

<sup>c</sup> Of Boston area firms selling transit passes to their employees, 7.6 percent subsidized them. This was 20 percent of the carpool program employer participation rate for firms with over 100 employees. The number of firms subsidizing transit passes (56) was also 20 percent of the number of firms with variable work hours programs (285).

<sup>d</sup> Programs such as Denver’s Eco Pass and Seattle’s FlexPass (see “Response by Type of Strategy” — “Changes in Fare Categories” — “Unlimited Travel Pass Partnerships” in Chapter 12, “Transit Pricing and Fares”) offer the potential for updated participation rate calculations but none such have been encountered.

Intermediate Effects of Dissipation

Continuing briefly with U.K. experience, it is of interest that two estimates have been prepared of national-level commute trip vehicle travel reductions attributable to travel plan implementation. DETR research published in 2004 produced estimates that commute trip vehicle kilometers of travel (VKT) reductions in the range of 0.4 to 3.3 percent had been achieved. This finding is complemented by a slightly earlier independent estimate that the travel-plan-attributable reduction in commute VKT had possibly been 1.143 billion kilometers per year, or 0.74 percent of the auto commute total (Enoch and Zhang, 2008). These U.K. estimates address the dissipation in Stages 1 and 2—and to a certain extent Stage 4—as described above, but not the Stage 3 intermixing of commute travel with travel for all other trip purposes.

In the United States, as of the early 1990s, results for a number of programs that had taken an area-wide approach to TDM were not suggestive that TDM was an effective broad-area strategy. Many of these efforts were associated with TMAs that had largely depended on voluntary cooperation by employers or developers and lacked the technical guidance and legal clout to move beyond a marketing-based approach. Lacking decisive actions, these programs had not proven to be instruments of significant change (Comsis and ITE, 1993).

During a somewhat longer contemporary time frame, California saw widespread adoption of mandatory employer-based trip reduction, implemented primarily through city and county ordinances and air quality district rules. The objectives were congestion mitigation or pollutant emission reduction. These programs were terminated or drastically altered by California legislation signed in January 1996 that prohibited mandatory programs. The reported results of these mandatory trip-reduction programs do not encompass the full sequence of employer-based TDM impact dissipation, but do provide a look at the work-commute-trip reduction averages achieved by all non-exempted firms across whole political jurisdictions (Stage 1 dissipation as identified earlier). Exempt firms were typically those with fewer than 100 employees (Dill, 1998).

Table 19-35 lists 13 such programs, including two from outside California, and indicates the drive-alone mode share and reduction averages achieved. Drive-alone rate reductions somewhat overstate vehicle trip reductions, since the carpooling alternative diminishes but does not fully erase vehicle trips. Nonetheless, they are a useful indicator. As can be seen by examination of the table, the average drive-alone work-commute reduction was 3-1/2 percentage points. The range, excluding the highest and lowest outliers, was from no effect to a 7 percentage-point drive-alone trip reduction among covered employees.

Results from SCAQMD for the 5-year period 1988–1993 provide additional information for the greater Los Angeles region. Employers with over 100 employees were required to submit plans and status annually, although somewhat longer times between plan submissions was not uncommon. Implementation of the mandatory program was gradual, and started with the region’s largest employers. Data for 817 sites with 4 or more plans give an indication of average vehicle ridership (AVR) progress over time. The aggregate (weighted average) AVR for these sites was 1.196 at the time of the first plan, 1.220 for the second plan, 1.271 for the third, and 1.288 for the fourth. This equates to a 7.7 percent improvement in AVR, over a span of 3-plus years, equivalent to slightly over a 7 percent reduction in journey-to-work vehicle trips per employee.
Looking at all 4,999 participating employment sites with valid information and two-or-more approved plans, the aggregate starting AVR was 1.205. The last reported AVRs, as of November 1993, aggregated to 1.257, up 4.3 percent. The corresponding trip reduction was 4.1 percent over the 1- to 3-plus-year time spans involved. The average commute-trip drive-alone share for the 4,999 sites decreased from 73.5 percent to 67.2 percent, a 6.3 percentage-point reduction. That shift translates into a 9.6 percent drive-alone share decline from the initial to the most current plan. It was largely attributable to increased carpooling, with the carpooling share increasing from 15.5 to 21.4 percent. Concurrently, vanpooling increased from 1.2 to 1.9 percent. The transit share increase was slight, from 4.0 to 4.3 percent. Walk and bike, together 3.0 percent, did not change. While the CWW day-off share increased from 1.3 to 1.9 percent, the telecommuting share dropped from 1.4 percent to 0.3 percent (Young and Luo, 1995).

Only 6 percent of regulated sites charged for parking. In their earlier plans, 69 percent of employers offered direct financial subsidies for alternative modes. This investment in vehicle trip reduction declined, however, to 53 percent in the last plans of the 5-year evaluation period. No more than a weak statistical relationship was found between AVR progress and site characteristics and between AVR progress and program duration. Location in the Los Angeles Central Business District (CBD) affected the mix of mode shifts, however. At the 188 CBD sites, carpool and transit shares started at

<table>
<thead>
<tr>
<th>Table 19-35  Drive-Alone Work-Commute Travel Mode Shares and Reductions with Mandatory TDM Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jurisdiction</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>Menlo Park, CA</td>
</tr>
<tr>
<td>Pleasanton, CA(^b)</td>
</tr>
<tr>
<td>Central Contra Costa Co., CA</td>
</tr>
<tr>
<td>West Contra Costa County</td>
</tr>
<tr>
<td>East Contra Costa County</td>
</tr>
<tr>
<td>Contra Costa Centre (BART)</td>
</tr>
<tr>
<td>Walnut Creek, CA</td>
</tr>
<tr>
<td>San Ramon, CA</td>
</tr>
<tr>
<td>Concord, CA</td>
</tr>
<tr>
<td>Southern CA (SCAQMD)</td>
</tr>
<tr>
<td>Phoenix/Maricopa Co., AZ</td>
</tr>
<tr>
<td>Washington State</td>
</tr>
</tbody>
</table>

Note: The source states: “Determining the actual impact of these programs is beyond the scope of this paper… the issue is to determine what is significant or worthwhile.”

\(^a\) Percentage-point change in drive-alone share.

\(^b\) The focus of the Pleasanton program was on peak-congestion mitigation, more than trip reduction per se, and the program relied heavily on variable work hours measures.

around 21 to 22 percent. Carpooling increased 4 percentage points and transit increased 3 percentage points from the first-reported to the last-reported shares.

A significant negative relationship was found between AVR progress, expressed as aggregate percent gain in AVR, and the initial AVR. Of particular note was the 14 percent average drop in AVR for the 582 sites starting with an initial AVR of 1.5 and above (Young and Luo, 1995). The research paper does not examine possible causes of the program failure affecting the group of sites with a high AVR to start with. Clearly overall average program results, though they remained positive, were dragged down by this outcome.

The case study, “Overall TDM Program Effects over Time—Bellevue, Washington,” (see this chapter’s “Case Studies” section), looks at impacts of the first two stages of dissipation on employee travel mode shares. While estimated employee vehicle trip reductions at key employers were on the order of 30 percent or more in response to TDM program implementation, the overall downtown employee drive-alone commute share reductions were on the order of 10 percent over a 20-year time span. (A second data source places the reduction at 2 percent.) In response to both employer TDM and extensive public improvements to bus transit services, the corresponding transit commute share doubled (see case study for sources).

End Results of Dissipation

Only two fully or partially empirical studies addressing all four stages of dissipation of TDM program effects, as identified above under “Overview of System-Level Impact Relationships,” have been encountered. In the fully empirical study, dissipation as one moves outward from the involved employment area—primarily through intermixing with other travel (Stages 3 and 4 dissipation)—was measured in the early 1970s for the introduction of variable work hours for Canadian government workers in Ottawa, Canada. The relative impacts are highly illustrative even though the specific traffic-peaking reductions obtained are uniquely large because of the single-employer dominance of the national government in downtown Ottawa.

The primary effectiveness measure in the Ottawa study, given that trip-reduction measures were not part of the variable work hours program, was percentage reduction in the peak-hour to peak-period traffic ratio. The construct of this measure was such that it was equal to the percentage reduction in peak-hour traffic in those instances where there was no change in peak-period traffic volumes. It was applied to both street traffic volumes and transit ridership.

The street traffic effect was measured in the PM peak period. The reduction in the peak-hour to peak-period auto traffic ratio was 21.6 percent as measured at parking lots. Non-work travel and other traffic intermixing effects were such that the corresponding reductions as measured at the central Ottawa Cordon and at the Ottawa River screenline dropped to 10.2 and 5.7 percent, respectively. Corresponding PM transit ridership peaking reductions were 23.7 percent for government employee transit riders, as measured at their workplace, down to 19.2 percent for all peak-direction transit riders at the central Ottawa Cordon. Peaking reductions for AM peak-period transit riders were 16.9 percent at the workplace and 8.4 percent at the central Ottawa Cordon (Safavian and McLean, 1975).

There is no other known fully empirical research on system-level effects of TDM. It is doubtful that broad-area traffic volume reduction impacts of typical site-level employee-trip-reduction programs are amenable to direct field measurement of traffic volume changes given the potential for confounding effects ranging from land development to shifts in economic conditions. Successful
empirical measurement requires rigorous surveys of person- and vehicle-trip making, planned sufficiently in advance of initial program implementation, and paired with good luck that brings minimal or reliably quantifiable exogenous impacts.

The partially empirical study encountered is particularly useful in that the methodology not only covers—in effect—all four stages of dissipation but goes further, estimating congestion and emissions reduction effects. By so doing, it addresses the importance of even modest traffic reductions to congestion mitigation.

The subject of the partially empirical study was an 8.6-mile north-south stretch of I-5, centered on downtown Seattle, along with the employers along the way and their CTR programs. Employers within an approximately 3.6-mile band were considered, including all located in the Seattle CBD. Coverage included 189 employers with CTR programs. The empirical component of the study included the before and after trip reduction strategies of each employer with a CTR program, participation rates for the nearly 63,000 employees involved, and commute trip origin-destination data. The modeled component started with the estimation of the corresponding VTRs, done using EPA’s COMMUTER Model (see “Additional Resources”—“Analytic Tools”). Non-participating employers were accounted for through the non-inclusion of any trip-reduction effects for employers without included CTR programs. The vehicle trips eliminated were then assigned to an already calibrated and evaluated current-conditions CORSIM microsimulation traffic representation of the corridor, to assess what conditions would be without CTR program TDM. For simplicity and considering their function, the analysis treated the I-5 reversible express lanes as ramps and otherwise excluded them from the analysis (Georggi et al., 2007).

Not all TDM strategies in place were credited in the analysis, again for simplicity. The included strategies were alternative work schedules, employer TDM support strategies, travel cost changes, and flexible work hours. The estimated VTR average for the employers with CTR programs was between 11.3 and 14.2 percent. The higher number assumed observed parking charges were all attributable to the CTR programs, while the lower number took into account that the basic charges might have existed anyway (but without carpool/vanpool discounts). The higher estimate was adopted for the extended analysis. Note that these average VTR estimates correspond to Stage 1 dissipation of the four stages outlined earlier.

The completed traffic analysis (corresponding to Stage 4 dissipation) found a difference in peak period traffic volume on study corridor I-5 on-and-off-ramps averaging about 4 percent. The largest peak-direction changes on any individual ramp were about 50 to 55 percent depending on the peak period (Georggi et al., 2007). Corresponding performance measure effects, more substantial than the volume changes might at first glance imply, are covered in the “Cost-Effectiveness” and “Energy and Environmental Relationships” subsections to follow.

In addition to these two empirically-based studies, a few forecasts or hypothetical estimates have been made of system-level effects inclusive of all four stages of impact dissipation. In the mid-1980s, for example, a precursor of the FHWA TDM Evaluation Model and traffic assignment (simulation) techniques was used to estimate the effect of potential Minneapolis airport-area TDM on adjacent I-494 traffic volumes. The “Low Scenario,” employing modest TDM measures in combination with assumption of mixed-use land development, was forecast to offer a 7 to 11 percent vehicle-trip reduction, compared to conventional development with no TDM, as measured at participating employer/land-development sites. After accounting for all types of impact dissipation, this was projected to equate to a 2 percent average workplace vehicle-trip reduction, including both new and old development, and a 1 percent reduction in peak traffic on the I-494 study-area segment. The “High Scenario,” employing mandatory TDM with strong parking management
along with mixed-use development, was estimated to offer an 8 to 27 percent VTR at participating sites, a 6 percent average workplace VTR, and a 2 percent peak-traffic reduction on the adjacent I-494 segment (Pratt, 1990).\footnote{The original estimates included effects of workplace-based variable work hours programs and facility-based TSM measures such as freeway metering/bypass lanes and HOV lanes. These effects are not included here for clarity of presentation.} Insofar as this study only looked at suburban freeway mainline volumes and the Seattle I-5 analysis described immediately above reported only urban freeway ramp volumes, direct comparison is not possible, but the estimated traffic outcomes appear to be generally compatible.

Note that the Minneapolis airport-area “High Scenario” key employer and average workplace impact estimates are in the same ballpark as the downtown Bellevue empirical results now available (see the Bellevue case study). On the other hand, the Bellevue program is a uniquely successful example and is outlying-downtown-oriented. Actual results for voluntary TDM programs in spread-out suburban employment areas would likely be in the realm of the Minneapolis I-494 “Low Scenario” estimates. It is also of interest to note that the Minneapolis I-494 “High Scenario” estimate for facility-level traffic reduction of 2 percent is of the same order of magnitude, although somewhat lower than, the estimates by Kenneth Orski of a theoretically achievable 2 to 3 percent decrease in regional vehicle trips and 3 to 4 percent decrease in regional vehicle miles of travel (VMT) (Orski, 1993). These estimates were presented earlier, at the end of the “Voluntary Versus Regulatory Employer Motivation” discussion within the “Underlying Traveler Response Factors” section.

As of this writing, Washington is one of very few states that currently have strong Commute Trip Reduction laws or the equivalent. State officials have noted that “Washington and Oregon are the only states where the percentage of people driving alone to work decreased between 1990 and 2000." Oregon has similar regulations plus urban growth boundaries. In Washington State the 1990–2000 drive-alone share reduction was 0.6 percentage points, from 73.9 percent to 73.3 percent, an 0.8 percent decline. Nationwide, the U.S. drive-alone share for commuting increased by 3.4 percent (Washington State Department of Transportation, 2007). Although these observations cannot demonstrate causality, they are suggestive of a broad-scale TDM, transportation investment and operations, and land use public policy impact. Comparing the Washington State 1990–2000 drive-alone share reduction with the national drive-alone share increase suggests that this combined impact may, over a decade, be on the order of a 4 percent drive-alone share reduction/dampening under favorable mandatory regulation conditions.

**Cost-Effectiveness**

Numerous studies in the 1990s investigated the cost-effectiveness of TDM approaches for reducing vehicle travel and also emissions. A major motivation in these studies was the outcry from employers in Southern California who complained about substantial costs to implement trip reduction programs under the requirement of Regulation XV, made in the context of growing evidence that the program was falling short of its goals in achieving trip-reduction targets. A 1993 study by Ernst & Young caused widespread controversy when it concluded that employers participating in Regulation XV were realizing an annual expense per employee of $105 for that participation, with a cost per trip reduced of $3,000 per year.

In a challenge of these findings, contrary evidence from other studies was presented, including Chicago ($31.42 per employee per year); San Diego ($26.15); Commuter Transportation Services...
($57); UCLA/USC ($31); TCRP ($14.70); Maricopa County, Arizona ($8); Pima County, Arizona ($18); and Washington State ($9). From these data it was concluded that a more appropriate estimate of cost per employee would be in the $8 to $57 range, with an average of $24 (Schreffler, 1996). An earlier study at University of California, Berkeley tended to reinforce the latter findings with an average cost of $31 per employee per year and a median cost of $20, although the objective of the University of California, Berkeley study had been to demonstrate that other transportation management measures—such as pricing, land use density, and a broader range of alternatives—would be generally more cost-effective than regulatory TDM (Wachs, 1993).

In Part III (Section 3.4) of the 1993 FHWA report, Implementing Effective Travel Demand Management Measures, an assessment is made in circa 1991–1992 dollars of the cost and cost-effectiveness of 22 employer programs researched for the study. Parking was charged for outright at 12 of these 22 organizations. These 12 plus another six of the programs included incentives and/or disincentives of some sort.

The analysis looked at direct costs associated with administering the program, plus any subsidies or costs of providing services, and then also estimated cost savings. Savings were determined as either revenues generated by the program (such as parking fees) or costs averted, particularly avoided costs related to employee parking. Only situations where the employer was paying a separate, definable cost for parking were considered to be avoidable.

Over the sample of 22 employers, the direct cost per daily one-way vehicle trip reduced ranged from $0 to $6.75, with an average of $1.22 (weighted by trips). Cost savings per trip reduced ranged from $0 to $6.21, with a weighted average of $1.94. Net cost per trip reduced, or direct cost minus cost savings, ranged from $4.99 to $3.32, with a weighted average of $0.72.18 If this net cost were presented in terms of the entire employee base (perhaps a better measure of the cost impact on an employer) the range was from $1.81 to $2.01 per employee, with an average of $0.24 for the overall sample.

The lesson taken from this analysis was that employer TDM programs that incorporate financial incentives and disincentives—most particularly including the availability and price of parking—are not only the most effective in reducing vehicle trips, but have the lowest cost per employee and per trip reduced of all programs. Indeed, as just presented, the net costs per trip and per employee were each found to be negative on average (Comsis and ITE, 1993). This finding may also partially explain the high cost per employee and per trip in the Ernst & Young study. The great majority of programs that were in place and examined in that study were support-type programs that did not use incentives and disincentives (Schreffler, 1996).

Similar findings about the effect of different program types were derived from the results of a survey of 49 employers in the TCRP Project B-4 study (Comsis, 1994). In this project, a framework was used that categorized employer programs into four groupings: programs that were essentially support measures, programs incorporating services, programs built on incentives and disincentives, and programs combining services with incentives/disincentives. Table 19-36 shows the cost-effectiveness results from this analysis.

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18 The trip cost data presented here in the first half of this paragraph are the only known instance in this chapter of performance data dimensioned in one-way trips. The findings should be multiplied by two before comparing with other information in the chapter on cost per trip reduced.
As the level of program intensity grows from support to full-fledged services-plus-incentives, the average VTR also increases. This increase runs from the seemingly odd result of an average computed gain in vehicle trips for the support programs of a −1.4 percent VTR (see Note b in Table 19-36) on up to a reduction of 24.5 percent for the service and incentive programs. Looking at costs, support programs cost the employer an average of $13.92 per employee per year, while service-based programs, which have a higher VTR impact, cost $29.16 per employee per year. Incentive/disincentive-based programs cost the employer $13.46 per employee per year, less than one-half the cost of the services programs but reducing twice the rate of trips. Service/incentive programs cost $92.94 per year per employee, the highest unit cost, attributable to the extensive nature of the programs—especially the services and subsidies. These programs, however, also achieve the highest average trip reduction, at 24.5 percent.

The picture changes sharply when avoided costs are factored in. When this is done, the support and the services programs change imperceptibly, since they haven’t reduced trips substantially, and because parking was not found to be a problem at these employers. However, the incentive/disincentive programs show an average net cost savings of $111.47 per employee per year. The service/incentive programs—comparatively expensive on a direct cost basis—become financially attractive with avoidable cost savings factored in, providing a net cost savings of $24.77 per employee per year.

The relationships change somewhat when costs are examined on a per-trip basis. Support programs average $0.62 in direct cost per daily vehicle trip reduced (a cost per trip was only calculated for those programs with a positive trip reduction). Service programs average $1.49 per daily vehicle trip reduced, again about double the cost of the support programs. Incentive programs realize a cost of $0.37 per trip, lower than the others, while service/incentive programs cost $1.35 per trip. The average direct cost per daily vehicle trip reduced is $0.75 for all programs, a surprisingly

<table>
<thead>
<tr>
<th>Type Program</th>
<th>Number</th>
<th>VTR</th>
<th>Annual Cost per Employee</th>
<th>Cost per Daily Trip Reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Direct</td>
<td>Net</td>
</tr>
<tr>
<td>Support</td>
<td>6</td>
<td>-1.4% b</td>
<td>$13.92</td>
<td>$13.92</td>
</tr>
<tr>
<td>Services</td>
<td>5</td>
<td>8.5%</td>
<td>$29.16</td>
<td>$29.16</td>
</tr>
<tr>
<td>Incentives</td>
<td>27</td>
<td>16.3%</td>
<td>$13.46</td>
<td>-$111.47</td>
</tr>
<tr>
<td>Services and</td>
<td>11</td>
<td>24.5%</td>
<td>$92.94</td>
<td>-$24.77</td>
</tr>
<tr>
<td>Incentives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>49</td>
<td>15.3%</td>
<td>$32.96</td>
<td>-$62.30</td>
</tr>
</tbody>
</table>

Notes: 

- a Computed only for programs with a positive trip reduction.
- b A negative VTR implies that the sample program(s) had vehicle trip rates that were actually greater than the average from the surrounding area with which they were compared.

Source: Comsis (1994), with table corrections by the Handbook authors, derived on the basis of the disaggregated data in the source document.
low number. When net costs are computed on a per-trip basis, the two high-yield program types, incentive and service/incentive, emerge as the most cost effective, with cost savings of $1.36 and $0.63 per daily vehicle trip reduced, respectively. In contrast, neither the support nor the services programs had avoidable costs to claim, and hence their net cost per trip reduced is the same as the direct cost per trip (Comsis, 1994).

A “Trip Reduction Performance Program” sponsored by the Washington State Department of Transportation (WSDOT) offers a window into 2005–2009 trip reduction costs under the state’s CTR regulations. Under this program entities ranging from employers to agencies contract with WSDOT to deliver specified trip reductions. WSDOT sets an upper limit of a $460 annual cost per average daily trip reduced, less than $2.00/day. Although many participants compete for funds at this limit, other projects come in substantially lower (Hillsman, 2009).

One of several effectiveness measures relevant to TDM is congestion reduction. The Seattle I-5 corridor TDM-impact analysis described in the previous subsection estimated that study area peak period ramp volumes would average about 4 percent higher without the existing CTR programs. Traffic flow theory and observation indicate that it is the last few percentage points of traffic growth that can move congestion from slowed traffic to traffic essentially at a standstill, and vehicle trip reduction should have the opposite effect, unless counterbalanced by induced traffic.

Theory and experience were backed up by the analysis, which (using the CORSIM traffic simulation model) determined that spatial congestion in the study area—measured in lane miles of congestion—would increase by 23 percent in the 4-hour AM peak period and 44 percent in the 4-hour PM peak period in the absence of current TDM programs. Similarly, it was determined that temporal congestion expressed as the timespan during which 20 percent or more of the network is congested would increase by 31 percent in the AM and 30 percent in the PM. With results such as these, it is possible to see how Washington State’s Commute Trip Reduction Task Force in 2005 estimated that Washington’s CTR programs were saving at least $24 million annually in reduced Puget Sound travel delay cost (based on 2003 data). Workers at CTR sites were estimated to be saving $13.7 million in fuel costs. The state’s CTR program investment in 2005 was $2.7 million. This leverage was combined with additional investment by local jurisdiction partners and participating employers (Georggi et al., 2007). The employer contribution is understood to be in the $30 to $40 million range (Hillsman, 2009). A full-scale cost-effectiveness evaluation would obviously fully quantify not only these additional cost contributions, but also additional societal and corporate/institutional costs and benefits.

Energy and Environmental Relationships

Because their purpose is to reduce vehicle trips and vehicle miles of travel, TDM strategies are frequently considered as mechanisms to reduce energy use and vehicle emissions. The outcome for both—energy used and pollutants emitted—is dependent not only on the number of vehicle trips and travel miles. It is also dependent on the operating conditions under which the trips and travel occur, as well as the state of engine and fuel technology. From the mid-1970s, as a result of concerns about foreign petroleum dependency and growing problems with air pollution in American cities, legislation has pushed vehicle manufacturers and petroleum companies to improve upon the performance of their products. Beginning with the 1978 model year, foreign and domestic vehicle manufacturers were obliged to meet federal standards and time schedules for corporate average fuel economy (CAFE standards) and rates of emissions (Hillsman, 2009). Hence, the domestic vehicle fleet (light duty much more than heavy duty) has seen fuel economy and emissions performance grow. Perhaps the biggest gains occurred in the 1990s following passage of the Clean Air Act Amendments, and more may now be anticipated in the future.
The purpose of this background is to convey the perspective that energy consumption and vehicle emissions are derived outcomes depending heavily on the state of technology and fuels, which have been evolving rapidly. Therefore, it can be potentially misleading to attempt comparisons of the capabilities and cost-effectiveness of particular TDM strategies in reducing emissions or fuel consumption using past data, given that there are so many context variables that contribute to the outcome.

In spite of the fuel conservation efforts of the 1970s, as the real cost of fuel softened in subsequent years, manufacturers lured consumers back to large, heavy, and high-horsepower vehicles. These included light trucks and SUVs, which faced much less restrictive fuel economy and emissions standards. Partially as a result, but also in response to increased driving overall, transportation energy consumption rose markedly and has returned as a major policy issue. As such, it is a key element of foreign petroleum dependency and global warming concerns.

Also, while vehicles have become less polluting of ozone-contributing gasses (VOC, NOx, and CO), the past focus has not been on greenhouse gas emissions. The greenhouse gas pollutants, primarily CO2, are directly tied to fossil fuel combustion. Conventional emissions control technology cannot effectively mitigate the greenhouse gas effects of high rates of motor vehicle use. Only fossil fuel consumption reduction—a function of fuel efficiency enhancement and VMT reduction—can lower CO2 emissions.

There have been many studies where TDM measures have been considered and analyzed for adoption as Transportation Control Measures (TCMs) to mitigate pollution impacts. In a Transportation Research Board study of the benefits of the U.S. government’s Congestion Mitigation and Air Quality (CMAQ) program published in TRB Special Report 264, a literature review examined scores of Metropolitan Planning Organization (MPO) and academic research studies that attempted to estimate the travel and emissions effects of TCMs. It was found, however, that virtually all of these studies were limited in that they were modeling efforts and not empirical studies. Consequently, only a small number of studies provided the basis for the CMAQ review. The selected studies had the characteristic that their travel impacts were based on empirical observation, though emissions models were necessary to estimate the travel impact effects on emissions.

Perhaps the most substantial resource used by the TRB/CMAQ study was a set of demonstration projects conducted in California under various sponsors in the 1990s. The common denominator of these studies was the way their impacts were determined. Each of the projects had been closely monitored through before-and-after data collection, accompanied by detailed tracking of costs and operating characteristics. The three different programs involved were the Los Angeles County Metropolitan Transportation Authority (MTA) TDM Demonstration program, which funded more than 170 TDM projects to test the costs and effectiveness of eight categories of projects in reducing vehicle trips, VMT, and emissions; California law/program AB2766, which provided $60 million in funding from vehicle registration revenues toward 250 projects aimed at reducing vehicle air pollution; and the San Diego-Coronado Bridge Toll Revenue Program, which used bridge toll revenue to finance projects to increase bridge capacity and reduce congestion and improve air quality (Committee for the Evaluation of the Congestion Mitigation and Air Quality Improvement Program, 2002). A summary covering these three programs has been presented in a 1998 TRB paper (Pansing, Schreffler, and Sillings, 1998). Results of this assessment are shown in Table 19-37.

The table shows the range of impacts on vehicle trips and travel, four key pollutants, and the corresponding cost associated with reducing each. Unfortunately, while overall travel impacts were measured, underlying modal shares were not reported for these projects. Predictably, the range of impacts across all strategy categories—both for travel and emissions—is so broad as to preclude
strong conclusions about relative cost-effectiveness, since the impact is substantially controlled by the scale (cost) of the project. Even when normalized in relation to cost, one still observes a considerable range in the cost-based performance for most of the strategies, likely related in part to ambient conditions. The biggest ranges in performance are associated with the alternative-fuel-vehicle measures and the transit improvements, while the core TDM measures (with the exception of telecommunications) seem more stable in their measured performance. Generally what can be observed from these data is the rather favorable performance of the TDM strategies (except telecommunications and to some extent vanpools) in reducing VMT and emissions.

Largely but not entirely similar conclusions were reached in the TRB/CMAQ evaluation itself. Table 19-38 offers a summary of the emissions cost-effectiveness taken from Table E-4 of the CMAQ study. The median values shown are also derived from a fairly wide range of impacts found in the representative projects (Committee for the Evaluation of the Congestion Mitigation and Air Quality Improvement Program, 2002).
<table>
<thead>
<tr>
<th>Project Category</th>
<th>Travel Impacts</th>
<th>Emissions Impacts (Lbs.)</th>
<th>Cost per Travel Impact</th>
<th>Cost per Emissions Reduction (per Lb.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VTR</td>
<td>VMTR</td>
<td>HC/ROG</td>
<td>NOx</td>
</tr>
<tr>
<td>Alternative Fuel Vehicles</td>
<td>441–</td>
<td>594,080</td>
<td>13,716–</td>
<td>12,806</td>
</tr>
<tr>
<td>Bicycle Facilities</td>
<td>3,480–</td>
<td>33,840</td>
<td>11,760–</td>
<td>864</td>
</tr>
<tr>
<td>Financial Incentives</td>
<td>40,858–</td>
<td>141,600</td>
<td>1,292,760–</td>
<td>8,865</td>
</tr>
<tr>
<td>Organizational TDM</td>
<td>53,760–</td>
<td>63,360</td>
<td>950,400–</td>
<td>1,678</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>0–</td>
<td>95,520</td>
<td>40,800–</td>
<td>9,120</td>
</tr>
<tr>
<td>Vanpools</td>
<td>14,227–</td>
<td>143,500</td>
<td>737,528–</td>
<td>9,420</td>
</tr>
<tr>
<td>Transit Improvements</td>
<td>Line Haul</td>
<td>1,344–</td>
<td>21,360–</td>
<td>137–</td>
</tr>
<tr>
<td></td>
<td>594,080</td>
<td>12,806</td>
<td>9,269</td>
<td>121,067</td>
</tr>
<tr>
<td>Shuttle</td>
<td>1,984–</td>
<td>35,713</td>
<td>9,950–</td>
<td>187–</td>
</tr>
</tbody>
</table>

Two important conclusions were reached by the TRB/CMAQ study:

- The success of any strategy depended greatly on its being applied in an appropriate context.

- Several of the strategy categories that had favorable cost-effectiveness in reducing emissions were of the TDM genre.

While inspection and maintenance ranked as the most cost-effective of all strategies, well above average cost-per-ton performance was found in the TDM categories of regional ridesharing programs, charges and fees, vanpool programs, miscellaneous TDM, and employer trip reduction. Conversely, among the least cost-effective TDM strategies were telework programs, transit shuttles or feeder lines, and bicycle/pedestrian facilities and programs. Also less cost-effective than the top 10 strategies for reducing emissions were such widely popular Transportation System Management (TSM) measures as park-and-ride lots, freeway/incident management programs, and HOV facilities (Committee for the Evaluation of the Congestion Mitigation and Air Quality Improvement Program, 2002).

The two areas where conclusions differed markedly between the California-based studies and the TRB/CMAQ study were with respect to vanpools and bicycle facilities. Note that while vanpooling exhibits a tendency toward disappointing cost-effectiveness in the summary of California studies (see Table 19-37), the cost spread is wide, and it places a respectable fourth out of 19 for

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**Table 19-38  Emissions Reduction Cost-Effectiveness of TDM and Other CMAQ-Funded Strategies**

<table>
<thead>
<tr>
<th>CMAQ Strategy</th>
<th>Median Cost per Ton</th>
<th>CMAQ Strategy</th>
<th>Median Cost per Ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspection and maintenance</td>
<td>$4,500</td>
<td>Modal subsidies and vouchers</td>
<td>$125,400</td>
</tr>
<tr>
<td>Regional rideshare programs</td>
<td>$18,500</td>
<td>Park-and-ride (transit and rideshare)</td>
<td>$127,500</td>
</tr>
<tr>
<td>Charges and fees</td>
<td>$27,900</td>
<td>Bicycle/pedestrian programs</td>
<td>$206,600</td>
</tr>
<tr>
<td>Vanpool programs</td>
<td>$30,400</td>
<td>New transit capital systems/vehicles</td>
<td>$208,000</td>
</tr>
<tr>
<td>Miscellaneous TDM</td>
<td>$34,100</td>
<td>Shuttles, feeder, paratransit</td>
<td>$214,700</td>
</tr>
<tr>
<td>Traffic signalization</td>
<td>$35,200</td>
<td>Freeway/incident management</td>
<td>$240,900</td>
</tr>
<tr>
<td>Alternative fuel vehicles</td>
<td>$53,000</td>
<td>HOV facilities</td>
<td>$316,200</td>
</tr>
<tr>
<td>Employer trip reduction</td>
<td>$56,900</td>
<td>Alternative fuel buses</td>
<td>$355,700</td>
</tr>
<tr>
<td>Conventional fuel bus replacement</td>
<td>$63,200</td>
<td>Telework</td>
<td>$743,200</td>
</tr>
<tr>
<td>Conventional transit service upgrades</td>
<td>$64,600</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Effectiveness measure is median cost per ton of emissions reduced (VOCs + NOx).

Source: Committee for the Evaluation of the Congestion Mitigation and Air Quality Improvement Program (2002).

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A significant limitation affecting single-objective/single-function cost-effectiveness (or cost-benefit) analyses such as these is that other benefits to individuals or society are not considered. This issue is expanded upon with respect to non-motorized transport (NMT) facilities in Chapter 16, “Pedestrian and Bicycle Facilities.” See “Economic and Equity Impacts” in that chapter’s “Related Information and Impacts” section.
cost-effectiveness in the TRB/CMAQ study. Conversely, bicycle facilities appear relatively cost-effective for emissions reductions in the California studies summary, while appearing 2/3 of the way down the TRB/CMAQ cost-effectiveness ranking.

Finally, referring back again to the previously described Seattle I-5 corridor TDM-impact analysis, the CORSIM traffic simulation of conditions in the 8.6-mile study corridor produced emissions impacts with and without the 2003 TDM programs at the 189 CTR-participant employers. It was estimated that, absent the CTR-based TDM programs, AM and PM peak-period HC emissions would increase by a total of 38.1 kilograms, representing a 10.3 percent increase in the AM period and a 13.1 percent increase in the PM period. Estimated peak-period CO emissions increases would total 2,654.3 kilograms, a 9.6 percent increase in the AM and a 12.7 percent increase in the PM. Similarly, NOx emissions would increase by a peak-periods total of 122.2 kilograms, an 8.9 percent increase in the AM period and a 10.9 percent increase in the PM period (Georggi et al., 2007).

**ADDITIONAL RESOURCES**

Many of the other chapters of this TCRP Report 95, “Traveler Response to Transportation System Changes” Handbook constitute additional resources for TDM. More specifics are provided in the introduction to this chapter’s “Overview and Summary” section. Additional resources external to TCRP Report 95 include the following materials.

*FHWA TDM Report, Practitioner Manuals, TDM Model, and Website Resources*

Perhaps the most comprehensive set of research and guidance materials on employee-focused TDM is still the report series titled Implementing Effective Travel Demand Management Measures, prepared by Comsis and the Institute of Transportation Engineers (ITE) in 1993 for the Federal Highway Administration, with support from the Federal Transit Administration. The set of materials in this series includes:

- A main report with the following three sections (Comsis and ITE, 1993):
  
  Part I—A basic “Introduction to Travel Demand Management,” including an overview of strategies, terminology, application environments, and expectations for impact.

  Part II—An “Inventory and Review of TDM Measures,” with detailed information on 11 categories of strategies, including improved alternatives (transit, carpool, vanpool, and bike/pedestrian improvements); incentives and disincentives (complementary support measures, HOV priority treatments, economic incentives, parking supply and pricing, and tolls and congestion pricing); and alternative work arrangements (variable work hours, compressed work weeks, and telecommuting). Included for each strategy is a description of its various forms, when and where it is most appropriately used, how it achieves its impact, other strategies with which it is or is not complementary, examples in application, ranges of potential impact, implementation issues, and additional references.

  Part III—A “Synthesis of Findings” that first introduces empirical findings from a sample of TDM programs, analyzing and discussing them in a manner to help reveal those features that are most critical to success. An analytic tool, the TDM Evaluation Model, is then presented as a means of estimating combined effects of TDM strategy packages applied in different travel
settings. The model is used to create tables and graphs that indicate ranges of impacts of each strategy across different levels and settings. Cost-effectiveness is then explored, and guidance is provided to assist in design and implementation of real-world TDM programs.

- A set of three Practitioner Guidance Manuals, also prepared for FHWA but published and distributed by the Institute of Transportation Engineers (ITE):

  *Implementing Effective Employer-Based Travel Demand Management Programs, A Guidance Manual.* For employers or professionals designing employer TDM programs, this manual provides an introduction to TDM, objectives, review of strategies, and recommended steps to take in designing and implementing a program. There is a worksheet section where the user is led through a program design, in which tables and charts are provided to ascertain the impact of the particular set of strategies selected (ITE, 1993).

  *Areawide Travel Demand Management Programs, A Guidance Manual.* This resource provides similar guidance in understanding and designing alternative TDM programs, but from the perspective of either a public agency or an area-wide organization such as a TMA or transportation district. This manual incorporates both employer-side measures and area-wide measures such as those that a public agency might initiate (ITE, 1992a).

  *Marketing Research for Transportation Demand Management Programs, A Guidance Manual.* Provides special guidance on how to obtain the appropriate data and conduct the proper analyses to better ensure that the right strategies are chosen in relation to characteristics of the particular market. Covered are market research methods, research questions and information needs, information gathering techniques, data analysis methods, and special calculation forms and a look-up table as aids for applying the marketing research results (ITE, 1992b).


  FHWA offers contemporary TDM information through its “Travel Demand Management” webpages at http://ops.fhwa.dot.gov/tdm/index.htm and the “Travel Demand Management Toolbox” found therein. The report, *Mitigating Traffic Congestion: The Role of Demand-Side Strategies*, linked through the “Publications and Reference Materials” section of the toolbox, places TDM in a broader context of demand-side strategies. This report provides an overview discussion of each type of demand-side strategy along with 26 case studies (Association for Commuter Transportation et al., 2004).

**Center for Urban Transportation Research Resources**

The National Center for Transit Research at the Center for Urban Transportation Research (CUTR) at the University of South Florida maintains a highly active program of research and analysis dedicated to Transportation Demand Management. The following is a list of reports, references, or services of interest.

**Economics of Travel Demand Management: Comparative Cost Effectiveness and Public Investment.** This 2007 project developed a methodology that combines academic and practitioner experiences within a theoretical framework that aims to capture consumers’ price responsiveness to diverse transportation options by embracing the most relevant tradeoffs faced under income, modal price and availability constraints. This work may be accessed at http://www.nctr.usf.edu/pdf/77704.pdf.
Development of the theoretical model led to the design and implementation of Trip Reduction Impacts for Mobility Management Strategies (TRIMMS), a practitioner-oriented, sketch-planning tool. The spreadsheet, which includes elements for estimating the effects of the “soft” marketing and support strategies, is available for download at http://www.nctr.usf.edu/spreadsheet/TRIMMS.zip.

Impact of Employer-based Programs on Transit System Ridership and Transportation System Performance. This is the full 2007 report on the Seattle I-5 TDM impact analysis covered in the “Related Information and Impacts” section under “Site- Versus System-Level Impacts”—“End Results of Dissipation.” It includes description of the analysis methodology and can be accessed at http://www.nctr.usf.edu/pdf/77605.pdf.

National Smart Transportation Archive Researcher. The National Smart Transportation Archive Researcher (NSTAR) was developed to make available an online, updatable, easily searchable database of case studies documenting effective use of TDM strategies to reduce VMT and SOV mode share. The database is intended for use by transportation professionals and worksite employee transportation coordinators to develop and improve the effectiveness of their own programs. The database is located on the Help Desk of the National TDM and Telework Clearinghouse at http://www.nctr.usf.edu/clearinghouse.

The accompanying Best Practices Guide features 12 in-depth case studies of some of the more effective worksite trip reduction programs. These particular worksites are located in Washington State and reflect a mandatory regulatory environment requiring employers to participate and produce results. The case studies were developed from data of the Washington State Department of Transportation’s Commute Trip Reduction Program along with interviews with worksite employee transportation coordinators. The Best Practices Guide is available at http://www.cutr.usf.edu/tdm/pdf/NSTAR.pdf. Over 100 employer case studies may be viewed at http://www.nctr.usf.edu/helpdesk/casestudies.htm.

State and Regional Program Reports

A series of evaluation reports developed for the Los Angeles County MTA TDM Demonstration Program provide not only information on the range of VMT, air quality, and cost impacts of a wide range of TDM strategies, but also serve as a practical guide in methods of empirical evaluation. While the vast majority of TDM or TCM measures are designed and implemented with little or no data gathered on their net effects, this study is exemplary in the careful application of before-and-after evaluation data collection methods, by far the most reliable way to assess travel and other impacts when many internal and external variables are at play. See in particular the MTA Transportation Demand Management Evaluation Final Report (Comsis and Pansing, 1997) and the MTA TDM Demonstration Program Third-Party Evaluation Final Report (Comsis et al., 1996)

The Washington State Legislature created a trip reduction performance program in 2003 to encourage entrepreneurs, private companies, transit systems, cities, non-profit organizations, developers, and property managers to provide services to employees that result in fewer vehicle trips arriving at worksites. The final report for 2003–2005 contains case studies with before-and-after data. It is found at http://www.wsdot.wa.gov/NR/rdonlyres/FF9220C9-EC49-46B7-A84D-B5103C63F0CA/0/20032005_CTR_ProgramReport.pdf.

The Washington State DOT Commute Trip Reduction (CTR) Program 2005 annual report notes that employee drive-alone rates, vehicle trips, and VMT to CTR worksites have decreased significantly. However, it also notes that progress toward the program’s statutory goals has been variable.
Other Information Sources

TCRP Report 87, “Strategies for Increasing the Effectiveness of Commuter Benefits Programs” (2003) may be accessed via http://144.171.11.107/Publications/Blurbs/Strategies_for_Increasing_the_Effectiveness_of_Com_152144.aspx. Marketing tactics and messages are suggested in the course of addressing means to promote effective programs. Appendix D, Table D-6, has a list of approximately 40 employers who offer commuter tax benefits to employees, along with their participation rates.

The Victoria Transport Policy Institute (VTPI) Online TDM Encyclopedia, developed and actively maintained by the VTPI, is a comprehensive resource on a wide range of transportation management strategies (Victoria Transport Policy Institute, 2009). The Encyclopedia is a truly “online” resource, accessible at http://www.vtpi.org/tdm/index.php, and offers a high degree of flexibility in searching for and extracting information on TDM. The Encyclopedia describes a large number of TDM applications and contains information on TDM planning, evaluation, and implementation. Hyperlinks provide access to more detailed information, including case studies and reference documents. The Online TDM Encyclopedia has an international perspective, with ideas and examples from across the world. VTPI, the creator and supporter of the Encyclopedia, is an independent research and consulting organization located in Victoria, British Columbia.

Canadian government resources include the Transportation Demand Management Database, found at http://www.tc.gc.ca/programs/environment/UTSP/tdm.htm. Included are profiles and results for 92 projects worldwide, focused on sustainable development, energy efficiency, accessibility, and increased productivity.

A good summary of TDM experience in the Netherlands and in the United Kingdom is provided by the British study Smarter Choices—Changing the Way We Travel, prepared for the Department for Transport (DfT) (Cairns et al., 2002).

Analytic Tools

One of the earliest tools still in use is the TDM Evaluation Model. It was developed by Comsis Corporation in the early 1990s from a combination of empirical TDM research studies and traditional transportation planning logit mode split models. The original purpose was to supplement the conventional “four-step” metropolitan travel forecasting process when performing corridor, subarea, or even regional transportation impact studies involving TDM alternatives. Voluntary and mandatory employer participation rates are taken into account.

The TDM model is generally applied to regional forecast trip tables (base year, present year, or future), and is used to estimate the impact on mode split, vehicle trip rate, and VMT for each origin-destination pairing. The revised trip tables may then be returned to the four-step (or other) travel demand model for traffic assignment. In this manner it is possible to interpret the effects of employer TDM programs on actual facility volumes and levels of service. Model outputs may then be used for air quality analysis. The model is also a reasonably convenient way of investi-
gating the traffic impact of new development projects and the benefits of applying development-level TDM mitigation. The Federal Highway Administration’s public version of the TDM model is available via the FHWA website at http://www.fhwa.dot.gov/environment/cmaqat/descriptions_tdm_evaluation_model.htm.

Subsequent TDM modeling tools have focused more narrowly on the design and impact of individual employer/institutional programs. In other words, the subject is an individual site, and not a population of employers such as might be targeted under an area-wide program initiative or ordinance. Examples of such tools include the Travel Demand Management Program software developed for the South Coast Air Quality Management District in Los Angeles by the California Air Resources Board (Comsis, 1993b). The research behind the development of this model was presented earlier in the “Related Information and Impacts” section under “Modeling Studies,” along with the more recent Worksite Trip Reduction Model developed by CUTR.20

Another fairly recent model, again with a single-employer focus, is the U.S. Environmental Protection Agency’s COMMUTER Model. It was developed under contract by Sierra Research, drawing heavily from the original TDM Evaluation Model. A major literature review was conducted to identify new sources of impact information for each of the strategies featured in the model (Sierra Research, 1999). There has been a model coefficient update as of 2002 (U.S. Environmental Protection Agency, 2005), supporting a version 2.0 of the model. Perhaps the biggest change over the TDM Evaluation Model, other than the convenience of a modern, menu-aided user interface, is the ability to calculate emissions. The model was created to support the introduction of voluntary emissions reduction programs for metropolitan nonattainment areas seeking credit for air quality conformity demonstrations. The model and version 2.0 manuals can be accessed and downloaded from the EPA site at http://www.epa.gov/otaq/stateresources/tools.htm.

CASE STUDIES

“Transportation Days” Marketing and Outreach Programs—Cross Westchester Expressway Corridor

Situation. In Westchester County, New York, the Cross Westchester Expressway linking Tarrytown, White Plains, and Port Chester with the New York State and New England Thruways attracted major development during the 1970s and ’80s. By 1980, the corridor had 100,000 jobs, and during the 1980s more than 20,000 new jobs were added. By 1985, congestion during peak travel periods was becoming routine, and long queues were occurring both morning and evening on the Tappan Zee Bridge. A major factor in bridge congestion was the crossing of Rockland County residents over the Hudson River to reach the jobs in Westchester County. Studies supported by Westchester County, New York State DOT, New York Metropolitan Transportation Council (NYMTC), and private groups identified a need for adding transportation capacity to the Tappan Zee Bridge and the Cross Westchester Expressway. However, it was also recognized that these improvements would be costly and take many years to accomplish. In the interim, attention was turned to making more

20 As noted in the “Related Information and Impacts” section under “Modeling Studies,” CUTR issued an update to the Worksite Trip Reduction model during the timeframe of the Chapter 19 review and publication process. The update is known as TRIMMS© Version 2.0 and provides parameter, user-interface, and benefit-analysis enhancements and revisions (Concas and Winters, 2009).
efficient use of existing facilities by encouraging commuters to switch from single occupant vehicle (SOV) commuting to transit and ridesharing.

**Actions.** In 1989, the New York State Energy Office awarded a grant to the Westchester County Department of Transportation to “develop, market, implement, operate, support and monitor Transportation Management Programs” for the purpose of saving energy, reducing congestion and air pollution, and providing transportation alternatives. A specific goal of removing 1,100 SOVs from daily commuting was established. The program developed to meet these objectives included bringing employers, developers, building managers, and local and state officials together in an ad hoc advisory group to support program activities; conducting a survey of workers to identify commuting patterns and needs; targeted transit service improvements; preparing a marketing and information package on commuting options; presenting the marketing and information materials in “Transportation Days” held at work places through the corridor; and evaluating the results of the program activities.

The employee survey was distributed to over 20,000 workers at 130 employers in the corridor in September 1990. From approximately 6,500 responses, results of the survey were used to fashion a set of transit service modifications for implementation in the fall of 1991. Concurrently, a marketing and information program was developed, including a slide show with presentation script and a Commuter Information Package. The slide show was later recorded on video for use at Employee Transportation Days, which were conducted throughout 1992 at the work sites of 79 employers in the corridor, representing almost 12,000 employees. Almost 3,000 information packages were distributed through these activities, with an additional 2,500 packages distributed through other agencies and meetings.

**Analysis.** In February 1993, a sample of workers who responded to the 1990 survey were recontacted to obtain information on their exposure to the marketing program and any changes in commuting patterns. This was made possible by having obtained the employee’s work phone number in the 1990 survey. Only employees whose employer participated in Employee Transportation Days or had received the Commuter Information Packages were contacted. Of roughly 1,300 names and phone numbers from the original survey, contact was made with 596 phone numbers. Because of employee turnover during the 2-year period since the initial survey, the individual answering the phone was often not the original respondent. This difference was noted and the survey was administered anyway, primarily attempting to determine whether the employee had changed modes and the factors behind that decision.

**Results.** Of the 596 persons participating in the follow-up survey, 356, or about 60 percent, were the same individual surveyed in the original survey. Thus 240, or 40 percent, were different and considered “new” employees since the 1990 survey. Of the 356 repeat respondents, 71 (18 percent) indicated that they had attended a Transportation Day event, compared to 31 (13 percent) of the 240 “new” respondents. Overall, 190 of the 596 total respondents changed commute mode between 1990 and 1993. Nevertheless, overall, the percentage of commuters driving alone remained at virtually the same level—68.6 percent before and 69.3 percent after. In terms of vehicle trip reduction (VTR), vehicle trips per 100 workers increased from 77.4 to 79.3 during the period, indicating that vehicle trips actually increased by 2.5 percent.

The subgroup of respondents classified as “new” employees (not in the 1990 survey) appear to have shown greater tendency to shift modes than those who were surveyed previously. Only 83 of the 356 “repeat” respondents, or 23.3 percent, indicated a change in mode in the second survey, compared to 107 of 240, or 44.6 percent, of the “new” respondents. Whereas that higher rate of mode shift might not be universally positive—commuters could have changed to or from driving alone—
the “new” group also logged a better trip reduction than the “repeat” group. Drive-alone rates for the “repeat” group increased from 66.9 percent to 69.4 percent during the program, representing an increase in vehicle trips of 5.1 percent (77.7 to 81.7). In the “new” group SOV use declined from 71.3 percent to 69.2 percent. Vehicle trips were reduced by 0.6 percent (down from 78.3 to 77.8 per 100). A possible explanation is that the new employees were more likely to be considering alternatives during their period of transition.

Looking at the entire sample of 596 respondents, of the 409 (69 percent) who drove alone prior to the program, 332 (81 percent) continued to drive alone after program efforts, while four (1 percent) chose to walk, 45 (11 percent) chose to rideshare, 24 (6 percent) shifted to transit, and the remaining four (1 percent) chose “other.” Of those 98 (16 percent) who originally were in ridesharing, only 37 (38 percent) continued to rideshare, 49 (50 percent) switched to driving alone, six (6 percent) switched to transit, and the remaining six (6 percent) walked or traveled by “other” means. Finally, of those 74 (12 percent) who previously commuted by transit, 39 (53 percent) continued to take transit, while 24 (32 percent) switched to SOV, six (8 percent) switched to ridesharing, and the remaining five (7 percent) walked or traveled by other means. So, in effect, rideshare commuters proved to be the least likely of all modal groups (not counting the 15 respondents originally reporting walk or other modes) to stay with their original mode (38 percent), while those who drove alone were the most likely to retain their original mode (81 percent)—a substantial margin of difference.

Closest to the primary focus of the evaluation was the extent to which the marketing and information program, and particularly the conduct of Transportation Days, was influential in triggering a mode shift. As shown in Table 19-39, a higher percentage of workers who attended a Transportation Day switched from driving alone (the share dropped from 68.6 percent to 63.7 percent) than did the workers who did not attend, where drive-alone rate actually increased from 68.9 percent to 70.8 percent. In general the group that attended also showed greater tendency to shift to vehicle-trip-saving modes, including transit and walking, while those who did not attend showed only a slight shift to transit and to “other.” (“Other” has been assumed to be driver-serve-passenger or taxi.) The shifts of the group that attended resulted in a vehicle trip reduction of 7.5 percent, while the shifts of those who did not attend resulted in a vehicle trip increase of 4.2 percent. The question to be asked is whether the Transportation Day strategy was responsible for the switch, or whether the persons interested enough to attend the event were more highly disposed to considering and seeking an alternative mode.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Attended Transportation Day</th>
<th>Did Not Attend Transportation Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1990</td>
<td>1993</td>
</tr>
<tr>
<td>Walk</td>
<td>0.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Drive Alone</td>
<td>68.6%</td>
<td>63.7%</td>
</tr>
<tr>
<td>Rideshare</td>
<td>13.7%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Transit</td>
<td>16.6%</td>
<td>21.6%</td>
</tr>
<tr>
<td>Other</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

| Vehicle Trips per 100 | 76.1 | 70.4 | 78.7 | 82.0 |

19-143
When asked to identify reasons for changing commute mode, no respondent cited attendance at a Transportation Day at the workplace as a primary reason for doing so. Rather, 10 percent said it was because their work schedule had changed, 12 percent attributed it to a change in residence, and another 12 percent linked it to buying or selling a car. Of those who specifically changed mode from driving alone, the top reasons were that a carpool/vanpool option opened (14 percent), driving alone was too expensive or hard on the vehicle (8 percent), the car became unavailable as an option due to mechanical condition or competing uses (5 percent), or the carpool/vanpool offered more convenience (5 percent). Meanwhile, those who shifted mode to driving alone cited loss of a carpool/vanpool member (11 percent); discovery that taking the bus was inconvenient/uncomfortable (9 percent); need for use of the car en route to, from, or while at work (5 percent); or that the company moved (2.4 percent), ridesharing was stressful (2.4 percent), or parking became available (1.6 percent).

In a very generic sense, however, being exposed to the marketing and informational materials—either at a Transportation Day or through receipt of the Commuter Information Package—influenced a somewhat higher percentage of commuters to change modes. Of the 292 survey respondents who saw the information, 100 (54 percent) changed modes, versus only 86 of 295 (46 percent) who did not see the information. Nevertheless, it appears that the only conclusion that can be reached from these findings is that some connection exists between exposure to the marketing materials and a shift in mode. Whether or not the persons who sought this information were also those who were actively looking for an alternative cannot be satisfactorily determined from the data.

More . . . Somewhat complicating results for this evaluation is the fact that an economic recession took place in 1991–92, which had a major effect on rates of hiring and termination. The downturn in activity was felt to diminish the perception and concern about traffic. However, at the same time the passage of the 1990 Clean Air Act Amendments brought new interest in employer trip reduction programs, the New York metropolitan area having received a “severe” nonattainment rating with respect to ozone. It is unclear to what extent these two potentially counterbalancing events impacted the study results or interacted with each other.


University of Washington’s U-PASS Program—Seattle, Washington

Situation. The University of Washington’s (UW) Seattle campus occupies 43 acres in the University District, about 3 miles north of downtown Seattle, across Lake Union and Portage Bay. As of 2005, student enrollment was about 39,000 and faculty and staff was about 22,000, compared to about 27,900 and 17,000 in 1991. The size of this operation, the demand it was placing on the local transportation system, the desire to grow, and the trends in demand for campus parking, led university officials to develop a Transportation Management Plan (TMP) in 1983. The purpose was to expand travel options for students, faculty, and staff and thus shift them away from single-occupant vehicle travel. Specific goals included maintaining 1983 traffic volumes to and from campus during peak periods and limiting on-campus parking supply to 12,300 spaces, while ensuring that spillover into the surrounding neighborhoods would not result. Subsequently, in the course of developing of a 1989 General Physical Development Plan for the campus, university officials realized that growth plans would result in a significant increase in vehicle trips, along with a loss of about 1,700 surface
parking spaces. A task force formed to develop a new TMP to address this concern seized on the importance of combining transportation incentives (mostly in the form of cheap and available transit) with complementary disincentives (higher parking fees) in the new plan.

**Actions.** The core strategy of the new TMP was the U-PASS, a universal pass providing cardholders with a range of transportation options and incentives. U-PASS began as a 3-year pilot program in 1991, and based on its proven success, has continued to this day. In 2005 the U-PASS could be purchased at a price of $41 per quarter by students and $57 per quarter by faculty and staff. The pass provides holders unlimited rides on any of the regional or local transit services, reduced carpool and free vanpool parking, vanpool subsidies (up to $40 monthly), discounted “occasional” parking permits, ridematching services, local merchant discounts (including bicycle equipment and services), emergency ride home (for employees), subsidized use of FlexCar carsharing services, and access to Night Ride evening neighborhood shuttle service. UW uses more than 90 percent of its annual U-PASS budget ($13 million in 2005) for the purchase of service through contracts with local public transportation providers. The large number of riders and consistency of revenue has led transit providers to greatly increase the amount and quality of transit service to the campus.

Managing parking is a key element of the TMP, and the pricing of parking is a major component of the U-PASS program. The introduction of U-PASS was accompanied by a 50 percent increase in the cost of parking. The University has maintained a policy of controlling the rise in U-PASS fees and keeping them significantly lower than the cost of parking. In 2005, the cost of a U-PASS for employees is about one-fourth the cost of a parking permit. The cost of quarterly parking permits has increased from $108 in 1991 to $233 in 2005 (116 percent), while gate-issued daily parking has increased from $4 to $10 (150 percent), and parking at the Montlake lot has gone up from $1.25 to $4 per day for cash payments (220 percent) and $2.62 for those who choose to debit the charge to their university Husky Card™. Meanwhile, the cost of a student U-PASS has only increased by 105 percent, from $20 to $41 per quarter, and for employees by 111 percent, from $27 to $57 per quarter.

Eligibility for U-PASS includes students registered in state-funded courses, or those taking degree-credit courses on the Seattle campus through UW Extension. Faculty and staff employed in permanent positions and working at least half-time, temporary and hourly employees working at least 3 days per week, Visiting Scholars, and retirees employed on campus 40-percent-time or at least 3 days per week, are also eligible for U-PASS. During 2005, the average number of U-PASSes in use was 44,156, an increase of 21 percent from the time the program was introduced in 1991. Eighty-six percent of students and 54 percent of employees participated in the program in 2005.

**Analysis.** Travel patterns of faculty, staff, and students are measured through a biennial survey, conducted in the fall of even-numbered years. The results are compiled into biennial U-PASS reports and related evaluations for use in university administration and by other interested parties.

**Results.** Despite a 22 percent growth in the employee and student population, university-related peak hour traffic remains below 1990 levels, and more than three-quarters of the campus population travels to campus in a mode other than driving alone. Commute mode shifts, especially the shift from driving alone to public transit, are given primary credit for the traffic mitigation. As seen in Figure 19-2, prior to the U-PASS program (survey in 1989), 33 percent reached the campus by driving alone, 21 percent by public transit, 23 percent by walking, 10 percent by carpool/vanpool, 8 percent by bicycle, and 4 percent by other means. By 2004, the drive-alone rate had dropped to 23 percent, while public transit increased to 38 percent. Carpool/vanpool remained the same at
10 percent, while bicycle (6 percent), walk (22 percent), and “other” (1 percent) dropped slightly. Assuming that “other” is either driver-serve-passenger or taxi, a vehicle trip rate in 2004 of 29 per 100 may be computed and compared with a rate of 42 in 1989. This gives a VTR of 31 percent.21

Figure 19-2  Commuting mode choices at the University of Washington before and after U-PASS program implementation

The effect of the parking pricing strategy, along with the other U-PASS elements, has meant a 41 percent reduction in the number of SOV parking permits since program inception. The number of parking spaces used has declined as faculty, staff, and students have shifted away from driving alone. Despite the university’s major growth, the total number of parking spaces has held about the same at roughly 11,500, while the average utilization rate has gone from 87 percent in 1990 to 72 percent in 2005.

More . . . Funding for U-PASS in 2005 totaled $12,955,500, of which 49 percent was derived from user fees, 41 percent from parking fees, 3 percent from parking fine revenue, and 7 percent from

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21 This computation conservatively uses an arbitrary 2.0 average carpool/vanpool occupancy for both 2004 and 1989. A less conservative assumption of 2.5 average carpool/vanpool occupancy in both years would give 2004 and 1989 vehicle trip rates of 28 and 41, respectively, and a VTR of 32 percent. In either case, the reduction is roughly one-half the 62 percent trip rate differential calculated in TCRP Project B-4, based on comparison of University travel data to the surrounding area’s work commute mode split as reflected in the 1990 CTPP. The 62 percent is what has been used, for consistency, in the various analyses involving the 82-program sample. However, the newer 31 or 32 percent VTR estimate, made with benefit of before-and-after survey data, is clearly the more applicable/reliable.
other university sources. The distribution of program expenditures, also totaling $12.95 million, was principally for transit service contracts (92 percent), accompanied by administration and monitoring (3 percent), marketing and public relations (2 percent), the Night Ride Shuttle (2 percent), ridesharing/ridematch elements (1 percent), and bike and pedestrian improvements (1 percent).

The success of the U-PASS program, and the idea of putting a transit pass into virtually everyone’s hands at a greatly reduced price, convinced Metro to extend the idea to employers. This widespread distribution encourages the occasional as well as the regular transit rider. As of the early 2000s, Metro’s FLEXPASS program served 130 employers and 118,000 commuters, of which some 44,000 were U-PASS customers. FLEXPASS is believed to have been the first employer-based program of its kind in the nation.


Staggered Work Hours in Manhattan—New York, New York

Situation. This case study is adapted from the Second Edition “Traveler Response to Transportation System Changes” Handbook because of its particular relevance to addressing transit usage peaks and associated crowding such as were occurring in mid-2008 in response to $4.00/gallon gasoline prices. On April 1, 1970, the Port Authority of New York and New Jersey (PATH: Trans-Hudson Transit), in cooperation with the Downtown-Lower Manhattan Association, initiated a staggered work hours program. The Lower Manhattan area had a worker population of 480,000, about 85 percent of whom used rail transportation for their work trip. A survey of 113 firms with 136,000 employees total indicated that 66 percent began their work day at 9:00 AM and that 64 percent ended it at 5:00 PM.

Actions. The program at first involved about 50,000 employees of 45 concerns. Some 46,000 had their beginning time shifted from 9:00 to 8:30 AM, and 4,000 to 9:30 AM. Within 2 years 250 offices with over 100,000 employees total were participating, and a similar program was being developed for Midtown Manhattan. Schedule shifts of at least 30 minutes were recommended to compel a definite change in commuting habits.

Analysis. Before and after counts were taken in February 1970 and 1972 at three of the area’s most heavily used subway stations. Vehicular volumes were also monitored at the Brooklyn Battery Tunnel and the Battery Parking Garage. The employees of 27 firms were surveyed to assess reaction.

Results. The counts showed a 26 percent decline in station usage (17,658 to 13,074) during the peak 9:00–9:15 AM period, and a 24 percent passenger volume increase (12,024 to 14,864) between 8:30 and 8:45 AM. At the PATH World Trade Center Terminal, passenger counts fell 18 percent (7,500 to 6,224) between 5:00 and 5:15 PM, and rose more than 50 percent (3,100 to 4,750) between 4:30 and 4:45 PM. In contrast, the monitoring of vehicular volumes showed little or no significant change attributable to the staggered hours.

About 85 percent of the participating employees sampled in the employee survey favored staggered hours over the previous arrangement. Some 45 percent reported they were experiencing less
congestion (50 percent reported no change), and 50 percent were more satisfied with their work trips under the staggered hours program (9.8 percent were less satisfied). Of the supervisors sampled, 24.6 percent reported improved employee punctuality. Only 11.6 percent reported increased tardiness. About 15 percent cited some operational communications problems, but none indicated any actual drop in efficiency.

Reasons for the improved employee punctuality were examined with a study of the distribution and length of all rail rapid transit and commuter rail AM peak-period delays recorded on 18 randomly selected days in 1970. The study indicated that a rapid transit commuter with a 9:00 AM reporting time at work, compared to a commuter with an 8:30 AM reporting time, had a 25 percent greater likelihood of encountering a delay, and that each delay averaged 40 percent longer in duration. Similarly, a commuter rail user starting work at 9:00 AM had a delay likelihood 67 percent greater and an average delay duration 50 percent longer. This equates to a 1 hour morning trip time reduction each month for rapid transit users on an 8:30 AM schedule, and a larger savings for commuter rail users. Interestingly, rapid transit service between 8:10 and 8:30 AM (2,369 trains scheduled) was found to be nearly equal to the service offered between 8:40 and 9:00 AM (2,427 trains scheduled), and train annulments (cancelled or out-of-service trains, which figure more heavily in passenger overcrowding than delay) were 17 percent more frequent for the 9:00 AM commuter than for the 8:30 AM commuter.

More . . . An unknown in considering programs such as this is the extent to which gradual adoption of flexible work hours in recent years may have reduced the remaining potential for alternative work arrangements peak spreading by shifting the baseline starting point. A survey of the present-day ambient traffic peaking on or at critical facilities, followed by comparison with a baseline of documented historical peaking data, would be a good beginning for addressing this question.


Lloyd District Travel Demand Management—Portland, Oregon

Situation. The Lloyd District is a medium-to-high-density commercial and residential area of Portland, Oregon, located just east of the Central Business District (CBD) across the Willamette River. Once predominately a low-rise residential area, its development into a mixed-use activity center on its own right accelerated in the late 1980s with the introduction of MAX light rail transit (LRT) service. In addition to the Lloyd Center Shopping Mall, the Lloyd District became home to high-density retail streets, as well as the Oregon Convention Center, the Rose Garden Arena, and the Memorial Coliseum. Shoppers, event goers, employees, and residents found themselves competing for increasingly scarce on- and off-street parking with commuters to downtown Portland, who were parking at free on-street spaces and then riding transit into the CBD. This situation was not only producing traffic and parking problems in the Lloyd District, but also undermining the region’s transportation goal of reducing SOV use for commuting to the downtown.

In 1990, the City of Portland, along with a coalition of downtown business interests, the Portland Development Commission, the regional transit agency (TriMet), and the regional planning organization (Metro), began development of the Central City Transportation Management Plan. This plan had as its goal providing for 75,000 new jobs and 15,000 new housing units in the central city by 2010. As part of its structure, the plan divided the city into eight districts. The Lloyd District
was one of these districts and, because of its proximity to the CBD, was expected to capture 20 per- cent of the new jobs and 13 percent of the new housing units.

**Actions.** In September of 1997 the City of Portland, in concert with TriMet and the Lloyd District’s Transportation Management Association (LDTMA), implemented the Lloyd District Partnership Plan (LDPP). The plan was specifically aimed at curbing SOV use for the commute to and from the Lloyd District. Adding further impetus to the plan was the establishment of the Employee Commute Options (ECO) Rule by the Oregon Department of Environmental Quality in 1996, requiring the implementation of trip reduction measures in order to maintain National Ambient Air Quality Standards. The ECO rule required any employer of 50 or more employees to develop a plan for achieving a 10 percent reduction in work-destined vehicle trips within a 3-year time frame. Participation in the LDPP lifted many of the ECO requirements for individual worksites in return for supporting district-wide measures such as limiting and charging for parking.

The LDPP included six major elements: (1) transit service improvements, including three direct express bus routes to the Lloyd District business core; (2) infrastructure improvements providing for a concentration of passengers and buses, convenience of transfers, and passenger amenities; (3) rideshare and bicycle improvements; (4) parking management strategies, including parking meters on most streets within the district, limitations on new parking supply, maximum parking ratios, and carpool metered spaces; (5) TDM strategies including the TriMet PASSport discount pass program, emergency ride home, and communication and promotion activities; and (6) program evaluation consistent with ECO rule requirements.

**Analysis.** A study was undertaken, as part of the City of Portland’s assessment obligation, by Portland State University. A survey was conducted involving 259 employers in the Lloyd District, inquiring as to whether the way they usually got to work changed since the parking meters were installed in August 1997. A retrospective approach was necessary because the evaluation project was not commissioned until 1998, 1 year after the LDPP was implemented. The sample of employers equated to 19 percent of Lloyd District’s 1,370 employers. A survey was mailed to all employees in the set of 233 employers having 49 or fewer employees, representing 545 employees total, and to a random sample of about 50 percent of the 26 employers with 50 or more employees. In all, 1,000 surveys were sent out, and 519 were returned and deemed valid for analysis. Out of the 519 total respondents, 400 answered the question of whether they had changed the way that they got to work, with 23 percent indicating that a change in mode had occurred.

**Results.** The survey returns were divided into three groups: all respondents, respondents whose employers participated in the PASSport program, and those whose employers did not participate in PASSport. (As presented earlier in this chapter, PASSport is a mechanism through which employers can help discount the cost of transit passes for their employees.) It was found that for all respondents, driving alone decreased by 7 percent (from 60 percent to 56 percent), with most of the shift going to carpooling, which increased by 38 percent (from 12 percent to 17 percent), while transit retained its existing share of about 19 percent. Walking, biking, and “other” showed insubstantial increases. For those respondents whose employer participated in PASSport, drive alone decreased by 19 percent and, again, a majority of those shifting went to carpooling, which increased by 41 percent. Transit share did see a 12 percent increase within this group, while walk/bike/other changed negligibly. Mode shares among the non-PASSport employees showed a 2 percent increase in drive-alone mode and a 36 percent decrease in transit, although carpooling still increased by 20 percent. The reason for this may have to do with the special carpool parking provisions discussed next.
When the parking meters were installed in the Lloyd District in the fall of 1997, the rate on most streets was $0.75 per hour for a 2-hour limit, 20 to 30 percent less than meter pricing in the CBD. Long-term (5-hour) meters were installed at the outer fringes of the District, reserved until 10:00 AM for carpoolers, who were required to display a special permit costing $30/month. Thereafter the cost was $0.35/hour.

A key finding was that most employees in the Lloyd District responded to the introduction of parking meters not by diverting to another mode, but by demonstrating a willingness to pay for what was once free. Use of the on-street carpool spaces remained low in terms of the proportion of all those who drove and parked (less than 1 percent for the entire sample). Of those who drove and parked, the percentage who parked in off-street parking—either employer-provided or commercial—increased. Data indicate that before the meters were introduced, 61 percent of employees who drove and parked in the District paid nothing to park. This percentage declined to 46 percent after the meters. However, the average price for those employees who paid something to park only increased from $0.34 to $0.37 per hour. Among the PASSport employees, 47 percent parked free before the meters versus 28 percent after, while the average cost for those who paid increased from $0.34 to $0.36 per hour.

The survey asked employees to rank the top three reasons for changes, if any, in travel behavior. The greatest share, 25 percent, indicated that their reason for shifting was unconnected to any TDM measure, but rather reflected a change in lifestyle. The next largest share, 22 percent, said that installation of the parking meters was their No. 1 reason for changing, followed by 19 percent who said that the PASSport program was their top reason. In ranking their No. 2 reasons for change, nearly 36 percent of employees who changed behavior cited the PASSport program, while about 7 percent cited parking meters as their second reason.

More . . . A policy of seeking Lloyd District employee input is credited with having enhanced TDM program impacts over time. As part of periodic LDTMA surveys, employees are queried about their perceived needs. This information is fed back to participating employers and also guides LDTMA prioritization of new bus service. Additional bus service is offered in direct response to Lloyd District transit ridership growth.

VTPI’s Online TDM Encyclopedia presents updated information on mode split in the Lloyd District, which suggests a deepening of impact both in SOV trip reduction and in a positive shift toward transit use as the preferred alternative. These 2005 data indicate a drive-alone share down to 43 percent from 60 percent in 1997, transit at 39 percent mode share versus 21 percent in 1997, and ridesharing at 11 percent compared to 16 percent in 1997. The 2005 statistics also indicate that biking and walking have stayed about the same, at around 3 percent and 2 percent, respectively, while telecommuting and compressed work week (CWW) use has increased from 0.5 percent or less to just under 1 percent each.

TDM was undoubtedly not the sole cause of the 1997–2005 shift toward transit use. In 1998, the MAX Blue Line (the east-west LRT service running through the Lloyd District) was extended into the west suburbs of Portland. In 2001, Lloyd District Blue Line service was augmented with MAX Red Line trains to the airport. In 2004, the connecting MAX Yellow Line serving Northeast Portland was opened through the western edge of the district.

Overall TDM Program Effects over Time—Bellevue, Washington

Situation. The City of Bellevue is located across Lake Washington from Seattle. It is a suburb that since the late 1970s has sought to foster TDM through its employers, undergirded by municipal and state development regulations, and with support of transit improvements. TDM-related case studies covering individual Bellevue employers are found in Chapter 13, “Parking Pricing and Fees” (see “US WEST Parking Pricing and Management”), and Chapter 18, “Parking Management and Supply” (see “CH2M Hill Employee Parking Management”). This Chapter 19 case study, as an adjunct to the “Site- Versus System-Level Impacts” discussion in the “Related Information and Impacts” section, seeks to ferret out the combined effects of employer TDM strategies and public strategies on overall commuting to downtown Bellevue.

Downtown Bellevue is relatively unique for a suburban activity center. The rectangle encompassing the downtown, approximately 3/4 of a mile on a side, had over 23,000 workers in 1986—60 percent of them office workers—and a 1.3 million square foot regional shopping center. The street system is an imperfect grid, with most streets forming superblocks 600 feet on a side. Building setbacks are reduced compared to the suburban norm. I-405, linking the Seattle area’s east-side suburbs, is on the east side of downtown Bellevue.

Actions. Bellevue operated between 1981 and 1986 under an incentive agreement between Seattle Metro (now King County Metro) and the City of Bellevue whereby Bellevue was rewarded with additional transit services in return for increasing employer densities and obtaining lower parking ratios in the downtown. The city continues to incorporate transportation demand management programs (TMPs) into new development approval conditions. Employment density has increased, with 34,250 downtown jobs in 2000, up almost 50 percent in 14 years. The ratio of parking to floor space allowed in new buildings is roughly one-half the minimum that applied prior to 1979, and individual employers have made parking pricing a part of their TMPs (see the case studies noted above in Chapters 13 and 18). During the 1987–1989 period, a Transportation Management Association (TMA) was established and HOV marketing, vanpool incentive, and guaranteed ride home (GRH) programs were tested, enhanced, and incorporated into the overall program. Over time the HOV and transit use incentives/subsidies have evolved regionally into Metro’s heavily marketed FlexPass program of partnerships with employers (see “Response by Type of Strategy”—“Changes in Fare Categories”—“Unlimited Travel Pass Partnerships” in Chapter 12, “Transit Pricing and Fares”). Passage of Washington State’s Commute Trip Reduction (CTR) Law, and the implementation of mandatory elements specific to Bellevue, further undergirds the Bellevue program.

Specific bus service improvements have included restructuring and expansion over the years. The Bellevue Transit Center was opened in 1985. In the 1987–1989 time frame, almost one-half the bus services in the Eastside area including Bellevue were reorganized with the objective of establishing

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22 Many downtown Bellevue statistics, particularly the newer ones, are for a slightly larger area, either a 1- × 3/4-mile rectangle that encompasses I-405 and the Bellevue interchange on the east, or an in-between-sized area covering the westerly half of I-405 and the interchange.
a true Eastside Transit System. (One service approach tried and discarded was the provision of a Downtown Bellevue bus circulator, as described in Chapter 10, “Bus Routing and Coverage,” under “Response by Type of Service and Strategy”—“Circulator/Distributor Routes”—“Workplace to Retail and Restaurants Circulators.”) In the late 1990s, the suburban bus services of King County Metro overall were reorganized into a multi-centered “hub and spoke” system that more comprehensively focused on selected non-Downtown Seattle employment areas while still serving the Seattle CBD. Core route frequencies and service hours were enhanced. Bellevue was the largest of the suburban employment center hubs where essentially all routes were brought through or terminated at the central transit center. The Bellevue/Seattle-CBD and Bellevue/University-District core routes were among those extensively improved for all-day bi-directional service with multi-destination connections (see the case study, “Service Restructuring and New Services in Metropolitan Seattle,” in Chapter 10).

**Analysis.** The primary measure of downtown Bellevue TDM impact available over a 20-plus-year time period is downtown employee commute mode shares. Those presented under “Results” in Table 19-40 have been obtained from periodic survey efforts which, in contrast to the more frequent CTR reportings, cover essentially all downtown Bellevue employers rather than just those large enough to be under CTR reporting requirements. (The more recent comprehensive surveys have made use of CTR reportings, combining them with supplemental surveys to obtain the broader picture.) The surveys have differences among them in methodology, highlighted in the Table 19-40 footnotes. These differences produce inconsistencies that make mode share comparisons between surveys somewhat problematical, requiring extra caution in results interpretation. The downtown survey mode share data has been supplemented by U.S. Census “usual” commute mode results, along with additional information assembled to support a descriptive analysis, most particularly data specially developed by King County Metro on Bellevue transit service levels and ridership over the 1994–2005 period.

**Results.** Table 19-40 presents the 1984–2005 downtown Bellevue comprehensive mode share survey results discussed above. The U.S. Census Transportation Planning Package (CTPP) provides similar data, but for fewer years. Downtown Bellevue “usual” commute mode shares from the CTPP for 1980, 1990, and 2000, respectively, were 79, 82, and 77 percent drive alone, 4.7, 5.1, and 8.0 percent transit, and 14, 12, and 13 percent carpool. All other modes were individually less than 0.5 percent, except walk. The reported 1980, 1990, and 2000 walk shares were 2.2, 0.4, and 1.5 percent, respectively.23

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23 The walk shares pattern suggests that variations related to CTPP procedures, including sample size, may well be overwhelming trends or indications of stability. Also, the pattern of CTPP transit shares does not seem to track ridership data presented below in Table 19-41 as well as the downtown Bellevue survey transit shares in Table 19-40.
The downtown Bellevue survey results seem to suggest moderately consistent trends for both the drive-alone and transit commute modes, downward over time in the case of drive alone, and upward for transit. The CTPP results seem to exhibit a lack of strong, consistent trends for all modes except transit. Together, the two data sources suggest a 20-year drive-alone commute share reduction—over somewhat different time spans—of somewhere between 10 percent (downtown surveys) and 2 percent (CTPP). Corresponding transit share increases are in the range of 133 percent (downtown surveys) to 70 percent (CTPP), roughly a doubling. (As noted in Footnote 23, the downtown survey findings are better supported by transit ridership data than the CTPP findings.) Carpool use shows no consistency over time in the mode share data. Despite efforts to improve the pedestrian environment, rendered less than optimal by busy streets, walking to work has shown no upward (or downward) trend.

More . . . It is useful, in interpreting the mode share results over time, to examine how effective the overall Bellevue TDM program has been in achieving public transit improvement and parking management. Measures of bus service improvement and usage are illustrated in Table 19-41 for the 1996–2005 time period. Table 19-42 provides downtown Bellevue off-street parking inventory information for the 1987–2006 period. The parking inventory encompasses more than just employee parking—motor pool and customer parking are included—but provides at least an indication of parking supply and pricing trends.

### Table 19-40 Surveyed Commute Mode Shares (Percent) to Downtown Bellevue over Time

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Drive Alone</td>
<td>79%</td>
<td>80%</td>
<td>76%</td>
<td>68%</td>
<td>68%</td>
<td>71%</td>
</tr>
<tr>
<td>Bus</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>13</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Carpool</td>
<td>13</td>
<td>10</td>
<td>14</td>
<td>17</td>
<td>12</td>
<td>10</td>
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<tr>
<td>Vanpool</td>
<td>&lt;1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Walk</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Bike</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Compressed</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>2</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Telework</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes: Changes in methodology from survey to survey render mode share comparisons problematical, especially among the 1984–2000 surveys.

Workers in 1984 were asked to list all commute modes used. In 1990 they were asked their typical commute mode, as is done in the U.S. Census. The procedures documentation for 1996 was not available. Mode shares for 2000–2005 were based on worker reporting of modes used for each commute during the previous week.

The 1984 all-commute mode shares provided here have been approximated by the Handbook authors — starting with the 1984 multiple-responses-allowed office-commute shares of 77.7 percent drive alone, 7.4 percent bus, 16.2 percent carpool, and 2.1 percent other — by normalizing to 100 percent to compensate for the multiple-responses-allowed survey procedure and then factoring by the 1990 mode-by-mode all-commute to office-commute share ratios.

Where vanpool shares are not provided, vanpools were included with carpools. Where walk, bike, CWW, and telework shares are not provided, they may be assumed to be included within “other.” For 1990, “Multi-mode” and “No typical mode” have been added to “other.”
Table 19-41  Downtown Bellevue AM Peak-Period Transit Service and Ridership

<table>
<thead>
<tr>
<th>Measure</th>
<th>1996</th>
<th>2000</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB Bus Arrivals – King County Routes</td>
<td>106</td>
<td>113</td>
<td>151</td>
</tr>
<tr>
<td>DB Bus Arrivals – Snohomish County Routes</td>
<td>4</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>DB Passenger Alightings – King County Routes</td>
<td>982</td>
<td>1,678</td>
<td>1,805</td>
</tr>
<tr>
<td>DB Passenger Alightings – Snohomish Co. Routes</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Notes: AM peak defined as 6:00 AM to 9:00 AM.

DB = Downtown Bellevue.

Passenger alightings include transfer passengers.

Downtown Bellevue passenger alightings on King County routes grew to 2,219 in 2007. A possible contributing factor (and example of exogenous influences) is an improvement in the Bellevue CBD office vacancy rate from 9.12 percent in 2005 (11.07 percent in 2004) to 6.00 percent in 2007.

Table 19-42  Downtown Bellevue Off-Street Parking Inventory Findings

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DB Total Spaces</td>
<td>26,943</td>
<td>29,447</td>
<td>31,093</td>
<td>32,623</td>
<td>34,075</td>
</tr>
<tr>
<td>DB Occupancy Rate</td>
<td>54.3%</td>
<td>61.0%</td>
<td>61.1%</td>
<td>56.6%</td>
<td>55.3%</td>
</tr>
<tr>
<td>DB Average Daily Fee</td>
<td>$6.06</td>
<td>$6.58</td>
<td>$6.90</td>
<td>$11.30</td>
<td>$12.66</td>
</tr>
<tr>
<td>Same, Seattle CBD</td>
<td>$7.50</td>
<td>$10.00</td>
<td>$12.12</td>
<td>$14.52</td>
<td>$21.33</td>
</tr>
</tbody>
</table>

Notes: Space count includes employee and customer, motor pool, free and pay, and public and private off-street parking.

DB = Downtown Bellevue.

Average Daily Fee is a weighted average for pay parking only, in current (not constant) dollars. At least up through 1996, 80 percent of downtown Bellevue parking spaces were free.

The 1996–2005 transit service and ridership data in Table 19-41 illustrate that transit service improvement intentions have been followed through on and have been accompanied by increased ridership. The fact that AM bus arrivals in downtown Bellevue—a measure of bus service intensity—increased most between 2000 and 2005, while ridership increased most between 1996 and 2000, stands out as an apparent anomaly. However, the Chapter 10 case study, “Service Restructuring and New Services in Metropolitan Seattle,” presents evidence that the jump in ridership was strongly related to a well-received late 1990s service restructuring into a fully formed “hub and spoke” operating pattern that allowed a major focus on serving suburban employment centers. For example, key trunk-line bus routes serving downtown Bellevue achieved 6 to 30 percent productivity increases (weekday passengers per hour of bus service) between 1994 and 1998.
The 1987–2006 off-street parking data in Table 19-42 are a little harder to relate to employer responses to TDM, given that substantial non-employer parking is not separately identified. Nevertheless, the fact that an almost 50 percent increase in employment between 1986 and 2000 was accompanied by only a 21 percent increase in downtown parking spaces between 1987 and 2002 is strongly suggestive of a tightening parking supply. The doubling of all-day parking fees between 1987 and 2006, even though it is less than the near-tripling of fees in the Seattle CBD (provided for comparison), is also suggestive of demand management progress. The major post-1996 jump in all-day parking fees and its correspondence with the sharpest transit ridership and transit share increases, and the sharpest drive-alone share decrease, gives added credence to the apparent importance of parking-related employer TDM actions along with the public transit improvements in achieving vehicle trip reduction.

Table 19-42 gives only a hint of parking price plateauing in the 2002–2006 period. Both the amount and cost of priced employee parking tended to decrease at employers with building leases negotiated in the 2001–2003 period following the “dot-com bust,” which resulted in a period of high downtown Bellevue office vacancy rates. CTR survey results (not reported here) suggest a corresponding lagged response in the form of higher drive-alone mode shares and diminished carpooling. The 2005 surveyed commute mode shares in Table 19-41 are thus likely not a survey anomaly but instead a true reflection of mode shift “backsliding” traceable back through parking pricing to economic conditions.

The overall downtown 20-year drive-alone commute reduction of 10 percent (or 2 percent per the CTPP results) represents a diffusion of higher reductions obtained at individual employment sites. Bellevue City Hall, CH2M Hill, and US WEST are examples of individual sites achieving estimated employee VTRs on the order of 30 percent or more. Performance at other involved employers was for the most part less dramatic. Throughout the 1980s, at least, gains in transit and ridesharing use in the downtown were limited primarily to those employers that located in Bellevue post-1980, suggesting the critical importance of the TMP-mandated parking management. Only post-1980 employers were compelled by formal city requirements to constrain parking supply. The TMA successfully gained broad membership, financing, and recognition, but not a broad commitment toward substantive TDM program actions. The municipal TMP and more recent state CTR requirements have served as the primary impetus for stronger TDM actions.


24 These site-specific vehicle trip reductions are calculated not from time-series data, but instead by comparison with neighboring employment areas.

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Wold, M., King County Metro. Email to the Handbook authors with attached BelDTZones.xls file containing fall 1994, 2000, and 2004 downtown Bellevue AM Peak Period passenger alighting counts (January 18, 2008).


APPENDIX A—TABLE 19-A—82-PROGRAM SAMPLE

Introduced in the “Analytical Considerations” subsection of the “Overview and Summary,” the 82-program sample is drawn upon extensively in this chapter. The introduction to the “Response by Type of TDM Strategy” section further expands upon the use of the 82-program sample in the chapter. This appendix, specifically Table 19-A, provides details on each employer program included. The first column identifies the employer and site for each of the 82 programs. The second column identifies the source of the information, according to the following code:


The “Type,” “Location,” and “Setting” columns should be largely self-explanatory, with “CBD” standing for Central Business District and “Sub CBD” standing for suburban CBD. It may be inferred that “Campus” and “Office Park” settings are essentially suburban.

The “Near Transit” column gives the transit availability, either “High,” “Medium,” or “Low.” “Transit availability” is a simplified transit accessibility measure where higher transit availability infers service by more scheduled buses/trains on more transit routes. Employers with no nearby transit stop are assigned to the “Low” transit availability ranking. The next five columns describe each employer’s TDM program as of the early 1990s, when this data was collected. Program elements are listed according to the four-type TDM categorization used in this chapter, except that parking conditions are identified separately in their own column.

The first two “Vehicle Trip Rate” columns give the project average number of commute round trips per employee for the employer in question (“Project”) along with a corresponding baseline average rate against which to gauge the given program’s effectiveness (“Control”). For more on the derivation of these baseline rates, see especially Footnote 3 in the “Analytical Considerations” discussion of the “Overview and Summary.”

The final “Vehicle Trip Rate” column provides a calculation of the difference between the project vehicle trip rate and the control rate, expressed as a percentage of the control rate (“Difference”). Here the negative values represent an employer program project rate less than the control rate. In contrast, in the tables and text of the main body of this chapter, it is a positive Vehicle Trip Reduction (VTR) rate that implies program success at trip reduction relative to the norm.
Table 19-A  Characteristics of 82 Sample Employer and Institutional TDM Programs

<table>
<thead>
<tr>
<th>Employer/ Location</th>
<th>Source Type</th>
<th>Location</th>
<th>Setting</th>
<th>Size</th>
<th>Near Transit Support Measures</th>
<th>Transportation Services Support Measures</th>
<th>Parking</th>
<th>Incentives</th>
<th>Work Hours</th>
<th>Project Differences</th>
</tr>
</thead>
</table>
| Aetna (Hartford, CT) | Insurance | Hartford, CT | CBD | 2,450 | High Rideshare Matching; Transit Info Center and On-site Pass Sales; Preferential Parking; Bike Racks; Guaranteed Ride Home; Promotions | Subsidized Vanpool Program | Limited but Unpriced | Vanpool Subsidy; $21/mo Transit Subsidy (in exchange for parking space) | Flextime | 0.77 0.77 0%
| Allergan (Irvine, CA) | Manufacturing | Irvine, CA | Campus | 1,425 | Low Vanpool meetings; On-site Services; Transportation Fairs; Bike Racks & Shower Facilities; Preferential Parking | Vanpool Program; Use of vans for mid-day travel | Plentiful, Free | 50% Transit Subsidy; 100% Vanpool Subsidy; Rideshare Days Off; Quarterly Drawings | Flextime; Compressed Work Week; Telecommuting | 0.75 0.87 -13.8%
| Arlington Hts., IL | Local Govt. | Arlington Hts., IL | Sub CBD | 250 | Low Rideshare Matching; Guaranteed Ride Home; Bike Racks; Transit Info Center; Promotions; Preferential Parking | None | Adequate, Free | Maximum $500/yr Alternate Mode Subsidy (or time off) | Flextime; Telecommuting | 0.80 0.91 -12.1%
| AT&T (Pleasanton, CA) | Telecom | Pleasanton, CA | Campus | 3,980 | Low Relocation Assistance; Rideshare Promotion and Matching; Preferential Parking | None | Restricted but Free | None | Flexible Work Hours (to travel outside peak) | 0.81 0.93 -13.4%
| AT&T (Silver Spring, MD) | Telecom | Silver Spring, MD | Sub CBD | 950 | High ETC; Rideshare Matching | None | Restricted, Priced | Transit Subsidies | None | 0.57 0.75 -24.0%
| Atlantic Richfield (Los Angeles) | Petroleum Co. | Los Angeles, CA | CBD | 2,000 | High ETC; Rideshare Matching; Guaranteed Ride Home | Subsidized Vanpool Program | Restricted, Priced; SOVs get 1/3 discount, 2-Person CPs get 2/3 discount, HOVs of 3+ Free | Transportation Allowance ($15/mo if use transit or rideshare) | None | 0.55 0.84 -34.5%
| Baxter Healthcare (Deerfield, IL) | Med Inst | Deerfield, IL | Exurban | 1,000 | Low Rideshare Matching, Guaranteed Ride Home | None | Adequate, Free | Up to $60/mo Alternate Mode Subsidies | Compressed Work Week; Telecommuting | 0.93 0.90 3.3%
| Bellevue City Hall, WA | Local Govt. | Bellevue, WA | Office Park | 650 | Med ETCs; Transit Info Center; On-site Pass Sales; Preferential Parking; Guaranteed Ride Home | Use of City Vehicles for Commuting if 3+ Employees | Restricted, Priced; HOV Discounts | Alternate Mode Subsidies; Annual Pass for Transit or Vanpool | Flextime | 0.63 0.90 -30.0%
| Boeing Corp (Seattle, WA) | Manufacturing | Seattle, WA | Suburban | 85,000 | Low ETCs; Promotions; On-site Pass Sales; Rideshare Matching | Vanpool Program through provider | Unrestricted, Free | Alternate Mode Subsidies | None | 0.80 0.89 -10.1%
| Bonneville Power Adm (Seattle) | Elec Utility | Seattle, WA | CBD Fringe | 100 | Med Part-time ETC; Computerized On-site Ridematching; Bike Racks & Showers | Vanpools | Tight; $25-$40/mo Parking Charge | $21/mo Transit Subsidy | Flextime; Compressed Work Week | 0.58 0.78 -25.6%
| Boulder Hosp. (Boulder, CO) | Hospital | Boulder, CO | CBD Fringe | 1,000 | Med Rideshare Matching; Transit Info Center; Guaranteed Ride Home; Bike Repair Clinics | Shuttle | Adequate, Free | Alternate Mode Subsidies | None | 0.67 0.78 -14.1%

(continued on next page)
<table>
<thead>
<tr>
<th>Vehicle Trip Rate</th>
<th>Project</th>
<th>Control</th>
<th>Difference</th>
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</thead>
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<td><strong>Employer/ Location</strong></td>
<td><strong>Source</strong></td>
<td><strong>Type</strong></td>
<td><strong>Location</strong></td>
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<tr>
<td>Broadway Plaza 1</td>
<td>4</td>
<td>Prof/Office</td>
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<tr>
<td>Broadway Plaza 2</td>
<td>4</td>
<td>Prof/Office</td>
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<tr>
<td>Brown &amp; Blain, PA (Phoenix)</td>
<td>3</td>
<td>Law Office</td>
<td>Phoenix, AZ</td>
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<td>California Franchise Tax Board (Sacramento, CA)</td>
<td>1</td>
<td>Non-Profit</td>
<td>Sacramento, CA</td>
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<td>Cedars Sinai Hosp (Los Angeles)</td>
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<td>Hospital</td>
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<td>CH2M Hill (Bellevue, WA)</td>
<td>1,2,3</td>
<td>Eng/Prof</td>
<td>Bellevue, WA</td>
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<tr>
<td>Chevron (Concord, CA)</td>
<td>2</td>
<td>Petroleum Co</td>
<td>Concord, CA</td>
</tr>
<tr>
<td>Childress Bauck (Phoenix)</td>
<td>3</td>
<td>Vehicle Sales</td>
<td>Phoenix, AZ</td>
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<td>Chubb Insurance (Warren, NJ)</td>
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<td>Insurance</td>
<td>Warren, NJ</td>
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<td>City of La Habra, CA</td>
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<td>Local Govt.</td>
<td>La Habra, CA</td>
</tr>
<tr>
<td>City of Pleasanton, CA</td>
<td>1</td>
<td>Local Govt.</td>
<td>Pleasanton, CA</td>
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<tr>
<td>Employer/Location</td>
<td>Source</td>
<td>Type</td>
<td>Location</td>
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<td>------</td>
<td>----------</td>
</tr>
<tr>
<td>City of Simi Valley, CA</td>
<td>3</td>
<td>Loc Govt</td>
<td>Simi Valley, CA</td>
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<td>City Place Mall (Silver Spring, MD)</td>
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<td>Mall</td>
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<tr>
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<td>Commuter Transportation Services (Los Angeles)</td>
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<td>Non-Profit</td>
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<td>COMSIS Corp. (Silver Spring, MD)</td>
<td>2</td>
<td>Eng/Prof</td>
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<td>Cornell Univ (Ithaca, NY)</td>
<td>1</td>
<td>University</td>
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<td>Dean Witter (Riverwoods, IL)</td>
<td>1</td>
<td>Financial Svcs</td>
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<td>Net2Tel (Friendship Hts, MD)</td>
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<td>Insurance</td>
<td>Bethesda, MD</td>
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<td>Elec Utility</td>
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<td>Gotcha Sportswear (Irvine, CA)</td>
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<td>Manufacturing</td>
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<td>K Street Fabrics (Rockville, MD)</td>
<td>1</td>
<td>Fabric Store</td>
<td>Rockville, MD</td>
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(continued on next page)
<table>
<thead>
<tr>
<th>Employer/Location</th>
<th>Source</th>
<th>Type</th>
<th>Location</th>
<th>Setting</th>
<th>Size</th>
<th>Near Transit</th>
<th>Support Measures</th>
<th>Transportation Services</th>
<th>Parking</th>
<th>Incentives</th>
<th>Work Hours</th>
<th>Project</th>
<th>Control</th>
<th>Difference</th>
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</thead>
<tbody>
<tr>
<td>GTE Gov. Systems</td>
<td>1</td>
<td>Telecom</td>
<td>Chantilly, VA</td>
<td>Office Park</td>
<td>1,350</td>
<td>Low</td>
<td>ETC; Transportation Newsletter; On-site Services; Preferential Parking; Bike Racks &amp; Showers/Changing Facilities; Guaranteed Ride Home; Heated/Lighted Bus Shelter; Teleconference Center</td>
<td>None</td>
<td>Adequate, Free</td>
<td>Transit Subsidies</td>
<td>Flextime; Compressed Work Week</td>
<td>0.94</td>
<td>0.91</td>
<td>0.3%</td>
</tr>
<tr>
<td>Hartford Steam</td>
<td>1.2</td>
<td>Insurance</td>
<td>Hartford, CT</td>
<td>CBD</td>
<td>300</td>
<td>High</td>
<td>Carpool Program</td>
<td>None</td>
<td>Restricted and Priced; Carpool Parking Subsidies</td>
<td>50% Transit Subsidy</td>
<td>Free parking for Carpools of 3+; Time Off With Pay related to Mode Use</td>
<td>0.49</td>
<td>0.77</td>
<td>-36.4%</td>
</tr>
<tr>
<td>Travel Financial</td>
<td>3</td>
<td>Financial Svcs</td>
<td>Glendale, CA</td>
<td>Sub CBD</td>
<td>253</td>
<td>Mod</td>
<td>Part-time ETC; Computerized Ridematching; Guaranteed Ride Home; Bike Racks &amp; Showers</td>
<td>None</td>
<td>Plentiful but priced: $55/mo.</td>
<td>None</td>
<td>Flextime for Alternative Mode Users Only</td>
<td>0.76</td>
<td>0.99</td>
<td>-15.5%</td>
</tr>
<tr>
<td>Hewlett-Packard</td>
<td>1</td>
<td>Manufacturing</td>
<td>Sacramento, CA</td>
<td>Exurban</td>
<td>3,000</td>
<td>Low</td>
<td>ETC; Rideshare Matching; TMA Membership; Promotions; On-site Pass Sales; Preferential Parking; Bike Racks &amp; Showers; Guaranteed Ride Home</td>
<td>On-site bike use</td>
<td>Adequate, Free</td>
<td>None</td>
<td>Flextime; Compressed Work Week; Telecommuting</td>
<td>0.86</td>
<td>0.91</td>
<td>-5.5%</td>
</tr>
<tr>
<td>Hillsboro Co.</td>
<td>1</td>
<td>Local Govt.</td>
<td>Tampa, FL</td>
<td>CBD</td>
<td>2,050</td>
<td>Mod</td>
<td>ETC &amp; Bike Coordinator; Rideshare Matching; Guaranteed Ride Home; Bike Racks; Pedestrian Enhancements; Vanpool Promotion; TMA Membership</td>
<td>None</td>
<td>Adequate, Free</td>
<td>50% Transit Subsidy</td>
<td>None</td>
<td>0.85</td>
<td>0.88</td>
<td>-3.4%</td>
</tr>
<tr>
<td>Hughes Aircraft</td>
<td>1</td>
<td>Manufacturing</td>
<td>Tucson, AZ</td>
<td>Exurban</td>
<td>5,000</td>
<td>Low</td>
<td>ETCs; Rideshare Matching; Vanpools; Subsidized Bus Service; On-site Pass Sales; Preferential Parking</td>
<td>Vanpools; Subsidized Bus Service</td>
<td>Plentiful, Free</td>
<td>None</td>
<td>Flextime</td>
<td>0.75</td>
<td>0.87</td>
<td>-13.6%</td>
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<tr>
<td>IT Corp. (Irvine,</td>
<td>3</td>
<td>Eng/Prof</td>
<td>Irvine, CA</td>
<td>Suburban</td>
<td>145</td>
<td>Med</td>
<td>Part-time ETC; Personalized Ridematching; Guaranteed Ride Home; Onsite Parking</td>
<td>None</td>
<td>Plentiful, Free</td>
<td>100% Bus Subsidy (after 50 trips); $50 pedestrian subsidy (50 trips); annual cash drawing for all mode users</td>
<td>Flextime; Compressed Work Week (&gt;50% usage)</td>
<td>0.80</td>
<td>0.91</td>
<td>-12.1%</td>
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<tr>
<td>Johnson &amp; Higgins</td>
<td>3</td>
<td>Financial Svcs</td>
<td>Seattle, WA</td>
<td>CBD</td>
<td>182</td>
<td>High</td>
<td>Part-time ETC; Guaranteed Ride Home; Parking Charge</td>
<td>Company cars for business trips</td>
<td>Tight: $180/mo Parking Charge</td>
<td>$10/mo Transit Subsidy</td>
<td>Flextime</td>
<td>0.24</td>
<td>0.43</td>
<td>-44.2%</td>
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<tr>
<td>Kinetic’s Service</td>
<td>3</td>
<td>Prof/Office</td>
<td>Ventura, CA</td>
<td>Suburban</td>
<td>283</td>
<td>Mod</td>
<td>Part-time ETC; Computerized On-site Ridematching; Guaranteed Ride Home; On-site Services; Bike Racks &amp; Showers</td>
<td>None</td>
<td>Plentiful, Free</td>
<td>None</td>
<td>None</td>
<td>0.70</td>
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<tr>
<td>Kirkland City Hall</td>
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<td>Kirkland, WA</td>
<td>Sub CBD</td>
<td>287</td>
<td>Low</td>
<td>Part-time ETC; Rideshare Postings; Guaranteed Ride Home; Bike Racks &amp; Showers</td>
<td>None</td>
<td>Adequate, Free</td>
<td>None</td>
<td>Flextime for Alt Mode Users only; Telecommuting</td>
<td>0.77</td>
<td>0.92</td>
<td>-16.3%</td>
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<td>K-Mart Valencia</td>
<td>1</td>
<td>Retail</td>
<td>Tucson, AZ</td>
<td>Suburban</td>
<td>112</td>
<td>Low</td>
<td>Guaranteed Ride Home; Bike Racks &amp; Lockers; Rideshare and Walking Workshops</td>
<td>None</td>
<td>Plentiful, Free</td>
<td>Raffles</td>
<td>Flextime</td>
<td>0.91</td>
<td>0.87</td>
<td>4.6%</td>
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### Table 19-A (Continued)

<table>
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<th>Employer/Location</th>
<th>Source</th>
<th>Type</th>
<th>Location</th>
<th>Setting</th>
<th>Size</th>
<th>Near Transit</th>
<th>Support Measures</th>
<th>Transportation Services</th>
<th>Incentives</th>
<th>Work Hours</th>
<th>Different Project</th>
<th>Vehicle Trip Rate</th>
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<tbody>
<tr>
<td>Lawrence Livermore Labs (Alameda City, CA)</td>
<td>1</td>
<td>Research</td>
<td>Alameda City, CA</td>
<td>Exurban</td>
<td>9,300</td>
<td>Low</td>
<td>ETC; Rideshare Matching; FMA Membership; Promotions; Preferential Parking; Bike Lockers; Guaranteed Ride Home</td>
<td>None</td>
<td>Adequate, Free</td>
<td>62/50 Trans Subsidy; Purchased Computers for Telecommuters</td>
<td>0.71</td>
<td>0.86</td>
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<tr>
<td>Master Magnetics (Castle Rock, CO)</td>
<td>1</td>
<td>Manufacturing</td>
<td>Castle Rock, CO</td>
<td>Exurban</td>
<td>50</td>
<td>Low</td>
<td>Rideshare &amp; Bike Promotion; Bike Racks</td>
<td>None</td>
<td>Plentiful, Free</td>
<td>None</td>
<td>None</td>
<td>0.86</td>
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<tr>
<td>McGeehan AFB (Sacramento, CA)</td>
<td>1</td>
<td>Military</td>
<td>Sacramento, CA</td>
<td>Exurban</td>
<td>12,000</td>
<td>Low</td>
<td>Full-time ETC; Rideshare Matching; Transportation Fairs; On-site Pass Sales; Video Telecom System; Preferential Parking; Bike Racks and Change Facilities</td>
<td>On-site transit shuttle; 65 Electric Vehicles for use on base; Bikes for on-site use</td>
<td>Plentiful, Free</td>
<td>None</td>
<td>Compressed Work Week</td>
<td>0.91</td>
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<tr>
<td>Mercy Home Care (San Diego)</td>
<td>1</td>
<td>Service</td>
<td>San Diego, CA</td>
<td>Office Park</td>
<td>270</td>
<td>Low</td>
<td>Transportation Fares; Preferential HOV Parking; Guaranteed Ride Home</td>
<td>None</td>
<td>Adequate, Free</td>
<td>Small Gifts &amp; Prizes</td>
<td>None</td>
<td>0.90</td>
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<td>National Oceanic &amp; Atmospheric Agency (Silver Spring, MD)</td>
<td>1</td>
<td>Scientific</td>
<td>Silver Spring, MD</td>
<td>Sub CBD</td>
<td>5,000</td>
<td>High</td>
<td>ETC; On-site Pass Sales; Preferential Parking; Guaranteed Ride Home</td>
<td>None</td>
<td>Restricted, Priced</td>
<td>Transit Subsidies</td>
<td>Flextime; Staggered Hours; Compressed Work Week</td>
<td>0.48</td>
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<tr>
<td>National Optical Observatory (Tucson, AZ)</td>
<td>1</td>
<td>Scientific</td>
<td>Tucson, AZ</td>
<td>Campus</td>
<td>250</td>
<td>Low</td>
<td>Alternate Mode Information; On-site Pass Sales; Rideshare Matching; Showers &amp; Change Facilities</td>
<td>None</td>
<td>Adequate, Free</td>
<td>50% Transit Subsidy</td>
<td>Flextime; Compressed Work Week</td>
<td>0.50</td>
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<tr>
<td>Nike (Beaverton, OR)</td>
<td>1</td>
<td>Manufacturing</td>
<td>Beaverton, OR</td>
<td>Campus</td>
<td>2,200</td>
<td>Low</td>
<td>Preferential Parking</td>
<td>None</td>
<td>Limited but Unpriced</td>
<td>45% Transit Subsidy; 1/1 day to All Others</td>
<td>None</td>
<td>0.83</td>
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<tr>
<td>Nuclear Reg Comm (Mont. Co., MD)</td>
<td>1,2</td>
<td>Reg. Agency</td>
<td>Rockville, MD</td>
<td>Suburban</td>
<td>1,400</td>
<td>High</td>
<td>ETCs; Rideshare Matching; Preferential Parking; Marketing and Promotion</td>
<td>None</td>
<td>Restricted, Priced</td>
<td>Transit Subsidies</td>
<td>Flextime; Staggered Work Hours; Compressed Work Week</td>
<td>0.59</td>
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<tr>
<td>P.L. Porter (Woodland Hills, CA)</td>
<td>1</td>
<td>Manufacturing</td>
<td>Woodland Hills, CA</td>
<td>Campus</td>
<td>250</td>
<td>Low</td>
<td>Rideshare Matching; Transit Information; Preferential Parking; Guaranteed Ride Home</td>
<td>Van Shuttle; Vanpool Assistance Program</td>
<td>Plentiful, Free</td>
<td>85/50 Transit Subsidy</td>
<td>None</td>
<td>0.67</td>
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<tr>
<td>Pacific Bell (San Ramon, CA)</td>
<td>2</td>
<td>Telecom</td>
<td>San Ramon, CA</td>
<td>Office Park</td>
<td>6,900</td>
<td>Low</td>
<td>Relocation Assistance; Full Time ETC; Rideshare Matching</td>
<td>Contract Shuttle to Rail Transit; Vanpool Program</td>
<td>Restricted but Free</td>
<td>None</td>
<td>Flexible Hours (to travel outside peak)</td>
<td>0.72</td>
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<tr>
<td>Pacific Pipeline (Kent, WA)</td>
<td>3</td>
<td>Manufacturing</td>
<td>Kent, WA</td>
<td>Office Park</td>
<td>138</td>
<td>Low</td>
<td>Part-time ETC; Rideshare Postings; Guaranteed Ride Home; Preferential HOV Parking</td>
<td>None</td>
<td>Tight but Free</td>
<td>62/50 Travel Allowance (if use all mode at least 60% of time)</td>
<td>None</td>
<td>0.79</td>
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<tr>
<td>Pasadena, CA City Hall</td>
<td>1,2</td>
<td>Local Govt.</td>
<td>Pasadena, CA</td>
<td>Sub CBD</td>
<td>2,000</td>
<td>High</td>
<td>Rideshare Matching; Guaranteed Ride Home; Bike Racks &amp; Lockers; Promotions</td>
<td>None</td>
<td>Restricted and Priced; HOV Parking Discounts</td>
<td>Alternate Mode Subsidies</td>
<td>Flextime; Mandatory 9/80 Compressed Work Week</td>
<td>0.66</td>
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<tr>
<td>Payroll One (Denver)</td>
<td>1</td>
<td>Financial Svcs</td>
<td>Denver, CO</td>
<td>Sub CBD</td>
<td>21</td>
<td>Low</td>
<td>Transit Info Center; Darpool Into; Bike Racks &amp; Changing Facilities; On-site Pass Sales</td>
<td>None</td>
<td>Adequate, Free</td>
<td>None</td>
<td>None</td>
<td>0.80</td>
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<tr>
<td>Prudential (Jacksonville)</td>
<td>1</td>
<td>Insurance</td>
<td>Jacksonville, FL</td>
<td>CBD Fringe</td>
<td>3,420</td>
<td>Low</td>
<td>Minimal</td>
<td>Vanpool Program</td>
<td>Limited, Free</td>
<td>None</td>
<td>None</td>
<td>0.82</td>
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(continued on next page)
Table 19-A (Continued)

<table>
<thead>
<tr>
<th>Employer/Location</th>
<th>Source</th>
<th>Type</th>
<th>Location</th>
<th>Setting</th>
<th>Size</th>
<th>Near Transit Support Measures</th>
<th>Transportation Services</th>
<th>Parking Support Measures</th>
<th>Incentives</th>
<th>Work Hours</th>
<th>Project</th>
<th>Control</th>
<th>Difference</th>
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<tbody>
<tr>
<td>Puget Sound Blood Center (Seattle)</td>
<td>3</td>
<td>Med Inst</td>
<td>Seattle, WA</td>
<td>CBD Fringe</td>
<td>200</td>
<td>High: Part-time ETC; Guaranteed Ride Home; Area employers cooperate to provide additional transit service</td>
<td>Very Tight; $50/mo Parking Charge (7-year wait list);</td>
<td>$25/mo HOV Parking Discount; 1 day/mo. Free Parking if use All Mode; 50% Transit Subsidy</td>
<td>Flextime; Compressed Work Week</td>
<td>0.34</td>
<td>0.59</td>
<td>-46.4%</td>
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<tr>
<td>Rick Engineering (San Diego)</td>
<td>1</td>
<td>Eng/Prof</td>
<td>San Diego, CA</td>
<td>Office Park</td>
<td>120</td>
<td>Low: Preferential HOV Parking; Bike Lockers; Guaranteed Ride Home</td>
<td>None</td>
<td>Adequate, Free</td>
<td>$25/mo Alternate Mode Subsidy</td>
<td>Compressed Work Week</td>
<td>0.77</td>
<td>0.85</td>
<td>-9.4%</td>
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<tr>
<td>Rockhous (E. Granby, CT)</td>
<td>1</td>
<td>Manu-facturing</td>
<td>Hartford, CT</td>
<td>Exurban</td>
<td>400</td>
<td>Low: Guaranteed Ride Home; Subsidized Vanpool Program</td>
<td>None</td>
<td>Plentiful, Free</td>
<td>Vanpool Subsidy</td>
<td>None</td>
<td>0.66</td>
<td>0.93</td>
<td>-29.0%</td>
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<td>Rosetta Foods (Mesa, AZ)</td>
<td>3</td>
<td>Food Proc</td>
<td>Mesa, AZ</td>
<td>Suburban</td>
<td>229</td>
<td>Low: Part-time ETC; Rideshare Postings; Bike Racks &amp; Showers; Preferential HOV Parking</td>
<td>None</td>
<td>Adequate, Free</td>
<td>None</td>
<td>Compressed Work Week</td>
<td>0.74</td>
<td>0.91</td>
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<td>San Diego Trust &amp; Savings</td>
<td>2</td>
<td>Financial Svcs</td>
<td>San Diego, CA</td>
<td>CBD</td>
<td>500</td>
<td>High: Ridesharing</td>
<td>None</td>
<td>Restricted, Priced; Subsidized for SOV and HOV and (progressive by occupancy)</td>
<td>$60/mo Transit Subsidy</td>
<td>Flextime (limited)</td>
<td>0.51</td>
<td>0.66</td>
<td>-22.7%</td>
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<tr>
<td>Sears (Hoffman Estates, IL)</td>
<td>1</td>
<td>Service</td>
<td>Hoffman Estates, IL</td>
<td>Exurban</td>
<td>5,400</td>
<td>Low: Rideshare Matching; Dependent Care; Guaranteed Ride Home; Bike Racks &amp; Showers; Preferential Parking</td>
<td>Contract Transit Services; Vanpool Program &amp; Facility</td>
<td>Adequate, Free</td>
<td>Transit Subsidy (through employee to contract transit provider)</td>
<td>Flextime; Compressed Work Week</td>
<td>0.53</td>
<td>0.92</td>
<td>-42.4%</td>
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<tr>
<td>Shure Bros. (Evanston, IL)</td>
<td>1</td>
<td>Manu-facturing</td>
<td>Evanston, IL</td>
<td>Exurban</td>
<td>500</td>
<td>Low: Rideshare Matching (Regional); Promotions; Preferential Parking; Guaranteed Ride Home; Bike Racks &amp; Showers; Preferential Parking; Contract Transit Services; Vanpool Program &amp; Facility</td>
<td>None</td>
<td>Adequate, Free</td>
<td>None</td>
<td>None</td>
<td>0.81</td>
<td>0.81</td>
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<tr>
<td>Shur Lok Corp. (Irvine, CA)</td>
<td>2</td>
<td>Manu-facturing</td>
<td>Irvine, CA</td>
<td>Suburb</td>
<td>174</td>
<td>Med: Part-time ETC; Regional Computerized Ridesharing; Guaranteed Ride Home; Bike Racks and Showers; On-site Services</td>
<td>None</td>
<td>Plentiful, Free</td>
<td>$21/mo bus pass subsidy; $10-20/mo Carpool Subsidy (linked to use); 50% or $25/wk Vanpool Subsidy; Bike/Walk subsidy (linked to use)</td>
<td>Flextime (All Mode Users only)</td>
<td>0.80</td>
<td>0.91</td>
<td>-12.1%</td>
</tr>
<tr>
<td>Southern CA Gas (Brea, CA)</td>
<td>1</td>
<td>Nat Gas</td>
<td>Brea, CA</td>
<td>Exurban</td>
<td>1,800</td>
<td>Low: ETCs; Rideshare Matching; Bike Racks and Showers; On-site Services</td>
<td>Vanpool Program; Use of Company Vehicles; Parking Fees; HOV Parking Discounts</td>
<td>Restricted; Parking Fees; HOV Parking Discounts</td>
<td>$50 Commuter Mobility; $60 Transit Subsidy</td>
<td>Flextime; Compressed Work Week</td>
<td>0.41</td>
<td>0.78</td>
<td>-47.4%</td>
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<tr>
<td>State Farm (Orange Co., CA)</td>
<td>2</td>
<td>Insurance</td>
<td>Orange Co., CA</td>
<td>Office Park</td>
<td>380</td>
<td>Low: ETC; Carpool and Vanpool Promotion; Construction of Park &amp; Ride Facility</td>
<td>None</td>
<td>Adequate, Free</td>
<td>Alternate Mode Subsidies (100% transit subsidy)</td>
<td>Free</td>
<td>None</td>
<td>-30.4%</td>
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<tr>
<td>Swedish Hosp. (Seattle)</td>
<td>1,2</td>
<td>Hospital</td>
<td>Seattle, WA</td>
<td>CBD Fringe</td>
<td>2,250</td>
<td>High: Guaranteed Ride Home; Construction of Park &amp; Ride Facility; Special Contract Arrangement with Transit Provider for Express Services</td>
<td>Restricted, Priced; HOV Discounts</td>
<td>Flextime (limited); Staggered Work Hours (shifts); Compressed Work Week; Telecommuting</td>
<td>0.51</td>
<td>0.71</td>
<td>-28.2%</td>
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<td>3M Corp. (St. Paul, MN)</td>
<td>2</td>
<td>Manu-facturing</td>
<td>St. Paul, MN</td>
<td>Campus</td>
<td>12,700</td>
<td>Low: Broad-Based Alternate Mode Support; Subscription Bus; Vanpool Program; Restricted but Free</td>
<td>Implicit through support of modes</td>
<td>Staggered Hours (shifts)</td>
<td>0.83</td>
<td>0.92</td>
<td>-9.7%</td>
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### Table 19-A (Continued)

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<th>Employer/Loc.</th>
<th>Source</th>
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<th>Location</th>
<th>Setting</th>
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<th>Near Transit</th>
<th>Support Measures</th>
<th>Transportation Services</th>
<th>Parking</th>
<th>Incentives</th>
<th>Work Hours</th>
<th>Vehicle Trip Rate</th>
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<tbody>
<tr>
<td><strong>TransAmerica (Los Angeles)</strong></td>
<td>2</td>
<td>Insurance</td>
<td>Los Angeles, CA</td>
<td>CBD</td>
<td>3,000</td>
<td>High</td>
<td>ETC; Guaranteed Ride Home; Bike Racks and Showers; Preferential Parking</td>
<td>Subsidized Vanpool Program &amp; Facility</td>
<td>Restricted, Priced; Subsidized for All Employees (progressive by occupancy)</td>
<td>$15/mo Transit Subsidy</td>
<td>None</td>
<td>Flextime</td>
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<tr>
<td><strong>Travelers (Hartford, CT)</strong></td>
<td>2</td>
<td>Insurance</td>
<td>Hartford, CT</td>
<td>CBD</td>
<td>10,000</td>
<td>High</td>
<td>Minimal</td>
<td>Subsidized Vanpool Program</td>
<td>Restricted, Priced; HOV Discounts</td>
<td>$15/mo Transit Subsidy</td>
<td>None</td>
<td>None</td>
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<tr>
<td><strong>UCLA (Los Angeles)</strong></td>
<td>2</td>
<td>University</td>
<td>Los Angeles, CA</td>
<td>Campus</td>
<td>18,000</td>
<td>High</td>
<td>Comprehensive</td>
<td>Park and Ride, and Shuttle</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>0.79</td>
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<td><strong>Univ. of Central Florida (Orlando)</strong></td>
<td>1</td>
<td>University</td>
<td>Orlando, FL</td>
<td>Campus</td>
<td>5,000</td>
<td>Low</td>
<td>Rideshare Matching (local and area-wide); Bike Path and Lighted Walkways</td>
<td>Vanpool Program; Campus Shuttle/ Circulator</td>
<td>Limited but Unpriced</td>
<td>None</td>
<td>None</td>
<td>0.96</td>
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<tr>
<td><strong>Univ. of Wash (Seattle)</strong></td>
<td>1</td>
<td>University</td>
<td>Seattle, WA</td>
<td>Campus</td>
<td>17,400</td>
<td>High</td>
<td>ETC; Rideshare Matching; Info and Promotions; On-site Pass Sales; Bike Racks; Changing Facilities; TMA Membership; Preferential Parking; Guaranteed Ride Home</td>
<td>Vanpool Program Facilitation; Reimbursement to Transit Operator for up to 6,000 extra hours of campus service per year</td>
<td>Restricted, Priced; HOV Discounts</td>
<td>Alternate Mode Subsidies (primary focus on UPass Program)</td>
<td>None</td>
<td>0.27</td>
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<tr>
<td><strong>US WEST (Bellevue, WA)</strong></td>
<td>1.2</td>
<td>Telecom</td>
<td>Bellevue, WA</td>
<td>Sub CBD</td>
<td>1,100</td>
<td>High</td>
<td>ETC; Rideshare Matching; On-site Pass Sales; Guaranteed Ride Home; Preferential Parking</td>
<td>None</td>
<td>Restricted, Priced; HOV Discounts</td>
<td>Transit Subsidy; Bike Equipment Rebates</td>
<td>None</td>
<td>0.57</td>
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<tr>
<td><strong>Varian (Palo Alto, CA)</strong></td>
<td>2</td>
<td>Prof/Office</td>
<td>Palo Alto, CA</td>
<td>Campus</td>
<td>3,200</td>
<td>Med</td>
<td>ETC; Bike &amp; Shower Facilities; Rideshare Matching; Promotion; On-site Pass Sales; New Employee Orientation; Commuter Fairs</td>
<td>None</td>
<td>None</td>
<td>25% Transit Pass Discount; Award Program</td>
<td>None</td>
<td>0.71</td>
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<tr>
<td><strong>Ventura Co., CA</strong></td>
<td>2</td>
<td>Local Govt.</td>
<td>Los Angeles, CA</td>
<td>Campus</td>
<td>1,850</td>
<td>Low</td>
<td>Guaranteed Ride Home; Bike/Walk Facilities; Preferential Parking</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Walker, Richer &amp; Quinn (Eastlake, WA)</strong></td>
<td>3</td>
<td>Software</td>
<td>Eastlake, WA</td>
<td>Suburban</td>
<td>206</td>
<td>Med</td>
<td>Part-time ETC; Computerized On-site Ridematching</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Warner Center Hilton (Woodland Hills, CA)</strong></td>
<td>1</td>
<td>Hotel</td>
<td>Woodland Hills, CA</td>
<td>Office Park</td>
<td>165</td>
<td>Low</td>
<td>Preferential Parking; Bike Racks &amp; Showers</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Flextime, Compressed Work Week</td>
</tr>
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Table 19-A  (Continued)

<table>
<thead>
<tr>
<th>Employer/ Location</th>
<th>Source Type</th>
<th>Location</th>
<th>Setting</th>
<th>Size</th>
<th>Near Transit</th>
<th>Support Measures</th>
<th>Transportation Services</th>
<th>Parking</th>
<th>Incentives</th>
<th>Work Hours</th>
<th>Project</th>
<th>Control</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash Adventist Hosp (Takoma Pk., MD)</td>
<td>1 Hospital</td>
<td>Takoma Park, MD</td>
<td>Campus</td>
<td>1,800</td>
<td>Med</td>
<td>ETC, Preferential Parking</td>
<td>None</td>
<td>Restricted but Free</td>
<td>50% Transit Subsidy</td>
<td>Staggered Work Hours (shifts); Compressed Work Week</td>
<td>0.80</td>
<td>0.71</td>
<td>12.7%</td>
</tr>
<tr>
<td>Wm. H. Mercer (Seattle)</td>
<td>3 Financial Svcs</td>
<td>Seattle, WA CBD</td>
<td>High</td>
<td>120</td>
<td>Part-time ETC; Guaranteed Ride Home; Preferential HOV Parking</td>
<td>Company cars for business trips</td>
<td>Adequate but Priced: $130/mo Parking Charge; $39/mo HOV Parking Discount</td>
<td>100% Bus &amp; Ferry Subsidy</td>
<td>Flextime</td>
<td>0.34</td>
<td>0.44</td>
<td>-22.7%</td>
<td></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>AAAE</td>
<td>American Association of Airport Executives</td>
</tr>
<tr>
<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
</tr>
<tr>
<td>ACI–NA</td>
<td>Airports Council International–North America</td>
</tr>
<tr>
<td>ACRP</td>
<td>Airport Cooperative Research Program</td>
</tr>
<tr>
<td>ADA</td>
<td>Americans with Disabilities Act</td>
</tr>
<tr>
<td>APTA</td>
<td>American Public Transportation Association</td>
</tr>
<tr>
<td>ASCE</td>
<td>American Society of Civil Engineers</td>
</tr>
<tr>
<td>ASME</td>
<td>American Society of Mechanical Engineers</td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
</tr>
<tr>
<td>ATA</td>
<td>Air Transport Association</td>
</tr>
<tr>
<td>ATIA</td>
<td>American Trucking Associations</td>
</tr>
<tr>
<td>CTAA</td>
<td>Community Transportation Association of America</td>
</tr>
<tr>
<td>CTBSSP</td>
<td>Commercial Truck and Bus Safety Synthesis Program</td>
</tr>
<tr>
<td>DHS</td>
<td>Department of Homeland Security</td>
</tr>
<tr>
<td>DOE</td>
<td>Department of Energy</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
</tr>
<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
</tr>
<tr>
<td>FMCSA</td>
<td>Federal Motor Carrier Safety Administration</td>
</tr>
<tr>
<td>FRA</td>
<td>Federal Railroad Administration</td>
</tr>
<tr>
<td>FTA</td>
<td>Federal Transit Administration</td>
</tr>
<tr>
<td>HMCRP</td>
<td>Hazardous Materials Cooperative Research Program</td>
</tr>
<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers</td>
</tr>
<tr>
<td>ITEA</td>
<td>Intermodal Surface Transportation Efficiency Act of 1991</td>
</tr>
<tr>
<td>ITE</td>
<td>Institute of Transportation Engineers</td>
</tr>
<tr>
<td>NASA</td>
<td>National Aeronautics and Space Administration</td>
</tr>
<tr>
<td>NASAO</td>
<td>National Association of State Aviation Officials</td>
</tr>
<tr>
<td>NCFRP</td>
<td>National Cooperative Freight Research Program</td>
</tr>
<tr>
<td>NCHRP</td>
<td>National Cooperative Highway Research Program</td>
</tr>
<tr>
<td>NHTSA</td>
<td>National Highway Traffic Safety Administration</td>
</tr>
<tr>
<td>NTSB</td>
<td>National Transportation Safety Board</td>
</tr>
<tr>
<td>PHMSA</td>
<td>Pipeline and Hazardous Materials Safety Administration</td>
</tr>
<tr>
<td>RITA</td>
<td>Research and Innovative Technology Administration</td>
</tr>
<tr>
<td>SAE</td>
<td>Society of Automotive Engineers</td>
</tr>
<tr>
<td>SAFETEA-LU</td>
<td>Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)</td>
</tr>
<tr>
<td>TCRP</td>
<td>Transit Cooperative Research Program</td>
</tr>
<tr>
<td>TRB</td>
<td>Transportation Research Board</td>
</tr>
<tr>
<td>TSA</td>
<td>Transportation Security Administration</td>
</tr>
<tr>
<td>U.S.DOT</td>
<td>United States Department of Transportation</td>
</tr>
</tbody>
</table>
Summary

This report investigates the optimal (best overall, taking into account all benefits and costs) transportation emission reduction strategies. Current evaluation methods tend to undervalue mobility management (also called Transportation Demand Management or TDM) strategies that increase transport system efficiency by changing travel behavior, due to biases that include (1) ignorance about these strategies; (2) failure to consider co-benefits; (3) failure to consider rebound effects of increased fuel economy; (4) belief that mobility management impacts are difficult to predict; (5) belief that mobility management programs are difficult to implement; and (6) belief that vehicle travel reductions harm consumers and the economy. More comprehensive and objective analysis tends to rank mobility management strategies among the most cost-effective emission reduction options. This report describes ways to correct current planning bias so mobility management solutions can be implemented to the degree optimal.
Introduction
Imagine two neighbors with different transportation profiles. One walks, bikes and rides public transit for most local travel, but drives a fuel inefficient sport utility vehicle 4,500 annual miles for out-of-town trips, consuming 300 gallons of fuel and producing three tons of CO₂. Another drives a fuel efficient hybrid 100 daily miles, consuming 600 gallons of fuel and producing six tons of CO₂ annually. Which travel pattern is best overall?

The lower mileage driver not only consumes less fuel and produces less pollution, she also imposes less traffic congestion and accident risk, reduces road and parking costs, and gets more exercise through walking and cycling. As a result, her transport pattern is best for society overall.

However, most current transportation emission reduction programs focus on changing vehicle and fuel type rather than the amount people drive. Such programs generally ignore the additional external costs that result when increased fuel efficiency stimulates additional vehicle travel, and the additional benefits (besides energy conservation and emission reductions) resulting from travel reductions. This is inefficient and unfair.

Mileage reduction strategies tend to be ignored because people often assume they are difficult to implement and harm consumers. That is not necessarily true. Many motorists would prefer to drive somewhat less and rely more on alternative modes, provided those alternatives are convenient, comfortable and affordable. Improving travel options and rewarding mileage reductions can benefit consumers directly, as well as reduce emissions and other transport problems.

This report identifies optimal (i.e., overall best, taking into account all factors) ways to reduce transport energy consumption and pollution emissions. It explores the process used to evaluate emission reduction strategies and identifies common biases that favor efficient vehicle solutions (which change what people drive) over efficient transport systems solutions (which change how much people drive). It complements related reports that describe cost-effective emission reduction strategies (Litman 2007).

This has important implications because transportation activity has many economic, social and environmental impacts. It is a mistake to ignore any significant impacts when evaluating potential emission reduction options, yet this is commonly done, resulting in solutions to one problem (such as air pollution) that exacerbate other important problems (such as traffic congestion, accident risk or consumer costs), and undervaluing solutions that provide multiple benefits. This is good news overall, because it means that by applying more comprehensive analysis it is possible to identify truly optimal emission reduction strategies that maximize overall benefits to society.
Effectiveness and Scope

There are many possible ways to conserve energy and reduce emissions. They differ widely in terms of their effectiveness (amount of energy consumption and emissions reduced) and impacts (total costs and benefits), as illustrated in Figure 1.

*Figure 1  Effectiveness and Scope of Emission Reduction Strategies*

Cap-and-trade programs generally only support industrial emission reductions. LEED standards support building energy conservation. Efficient vehicle incentives reduce transport energy consumption but provide few other benefits, and by stimulating more driving can exacerbate traffic problems. Transportation pricing reforms (fuel taxes, distance-based insurance and registration fees, parking pricing, etc), and carbon taxes, reduce energy consumption and traffic impacts. Public transit and nonmotorized improvements provide modest energy savings but many additional benefits.

Cap-and-trade programs generally focus on industrial emissions and some building emissions, due to administrative convenience (it is easier to contract with a few large emitters than numerous small companies and households). Incentives to purchase fuel efficient vehicles, such as CAFE standards and feebates, can reduce motor vehicle energy consumption per vehicle-mile but provide few other benefits, and by reducing per-mile vehicle operating costs they tend to increase total vehicle traffic (a rebound effect) which increases problems such as congestion, roadway costs and accidents (Litman 2005; Morrow, et al. 2010). Transport pricing reforms (fuel taxes, distance-based insurance and registration fees, parking pricing, etc) reduce energy consumption and traffic impacts. Carbon taxes encourage energy conservation in all sectors. Improving travel options, such as public transit and nonmotorized travel, individually provide relatively modest energy savings but by reducing vehicle traffic provide many additional benefits.

Strategies that help achieve multiple planning objectives (congestion reductions, road and parking cost savings, accident reductions, improved mobility for non-drivers, improved public fitness and health, etc.), rather than just energy conservation and emission reductions, represent true sustainable transportation policies (Litman and Burwell 2006).
Current Emission Reduction Evaluation Activities

Numerous current efforts implicitly or explicitly evaluate the cost effectiveness of emission reduction strategies:

- Various studies and catalogues provide information on the effectiveness, costs and benefits of various emission reduction strategies (CCAP 2005; Dalkmann and Brannigan 2007; VTPI 2007; Gallagher, et al. 2007; Bomberg, et al. 2008; Mayors Climate Protection Center).
- Studies provide an emission reduction supply curve (strategies ranked from lowest to increasing cost per ton of emissions reduced), so decision-makers can select the set of policies and programs that achieve emission reduction targets at the lowest total cost (Jansen and Denis 1999; McKinsey 2007; NAO 2007).
- Legislation that implements emission reduction policies, regulations, taxes and trading programs (CAB 2006; RFF 2007).
- Emission markets allocate or auction emission rights that participants can buy or sell, to help implement the most cost-effective strategies (WRI 2007).
- Carbon offset programs through which consumers and businesses finance emission reductions, which often emphasize cost effectiveness (www.carbonfund.org).

These efforts use various analysis methods to evaluate potential strategies. How options are analyzed affects results. A strategy that ranks high by one methodology may be ignored or undervalued by another. To identify truly optimal solutions analyses should consider all potentially significant emission reduction options and their impacts.

Table 1 lists various transportation emission reduction strategies. These fall into two major categories: cleaner vehicles (more efficient and alternative fuel vehicles which reduce per-mile emission rates), and mobility management (strategies that reduce total vehicle travel).

<table>
<thead>
<tr>
<th>Cleaner Vehicles More Efficient and Alternative Fuel Vehicles</th>
<th>Mobility Management</th>
<th>Land Use Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficient vehicle technology development</td>
<td>Transit improvements</td>
<td>Congestion pricing</td>
</tr>
<tr>
<td>Fuel efficiency standards (such as CAFE)</td>
<td>Walking &amp; cycling improvements</td>
<td>Distance-based fees</td>
</tr>
<tr>
<td>Alternative fuel requirements and incentives.</td>
<td>Rideshare programs</td>
<td>Commuter financial incentives</td>
</tr>
<tr>
<td>Feebates (financial rewards for purchasing efficient and alternative fuel vehicles)</td>
<td>HOV priority</td>
<td>Parking pricing</td>
</tr>
<tr>
<td>Fuel tax increases</td>
<td>Carsharing</td>
<td>Parking regulations</td>
</tr>
<tr>
<td></td>
<td>Telework &amp; flextime</td>
<td>Fuel tax increases</td>
</tr>
<tr>
<td></td>
<td>Taxi service improvements</td>
<td>Transit encouragement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Smart growth policies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transit oriented development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Location-efficient development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parking management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carfree planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic calming</td>
</tr>
</tbody>
</table>
Most comprehensive studies indicate that both cleaner vehicles and mobility management strategies are needed to achieve energy conservation and emission reduction targets (Robèrt and Jonsson 2006; Burbank 2008; Leather 2009), but most current emission reduction analyses are biased against mobility management because they:

- **Ignore mobility management or only considers a few strategies.** Emission reduction planning sometimes ignores mobility management altogether, or only considers a limited number of potential strategies.

- **Ignore co-benefits.** Current analysis gives little consideration to benefits such as congestion reduction, road and parking facility cost savings, consumer savings, reduced traffic accidents, and improved mobility for non-drivers, although these benefits are often larger in total value than emission reduction benefits.

- **Ignore induced travel impacts.** Current analysis generally ignores the additional external costs that result when increased vehicle fuel efficiency and subsidized alternative fuels stimulates additional vehicle travel, called a *rebound effect*.

- **Considers mobility management emission reductions difficult to predict.** Although case studies and models exist for many of these strategies, this information is not widely applied to energy planning.

- **Considers mobility management programs difficult to implement.** Such programs often involve multiple stakeholders, such as regional and local governments, employers and developers, and various special interest groups. As a result, they tend to seem difficult and risky compared with other emission reduction strategies that only require changes to utility operations, fuel production or vehicle designs.

- **Assumes vehicle travel reductions harm consumers and the economy.** In fact, many mobility management strategies benefit consumers directly and increase economic productivity. There is plenty of evidence that, with improved travel options and efficient incentives, consumers would choose to drive less, rely more on alternative modes, and be better off overall as a result.

For these reasons, many current emission reduction planning efforts ignore mobility management altogether (Gallagher, et al. 2007; CBO 2009) or only mention them incidentally (McKinsey 2007). As a result, currently proposed emission reduction efforts will fail to implement mobility management as much as optimal and so will miss an opportunity to help address other planning objectives, such as congestion reduction, traffic safety, consumer savings and improved mobility for non-drivers. More comprehensive analysis will give mobility management strategies the support they deserve.

The next section of this report examines these biases in more detail.
Biases Against Mobility Management

This section discusses in more detail various biases in current emission reduction evaluation.

Mobility Management Overlooked

Many energy analysts are unfamiliar with mobility management, are only aware of a small portion of total potential strategies, or significantly underestimate mobility management’s potential emission reductions. There is often confusion over what it is called and how it is defined; efforts to reduce vehicle travel are sometimes referred to as demand management or transportation demand management, or described as driving disincentives, road pricing, commute reduction, transit improvements, or land use management. As a result, analyses often consider only a limited set of mobility management strategies.

Fortunately, this problem is relatively easy to correct. A variety of resources now exist which identify potential mobility management strategies and provide information on their costs, benefits and implementation requirements (CCAP 2005; Dalkmann and Brannigan 2007; VTPI 2007; European Program for Mobility Management).

Co-benefits Ignored

Conventional analysis often gives little consideration to additional (besides emission reduction) benefits provided by mobility management, such as congestion reductions, road and parking cost savings, consumer cost savings, increased traffic safety, improved mobility options for nondrivers, and improved physical fitness and health, although they are often significant in value. Economists increasingly recognize the value of comprehensive analysis that considers these impacts (Castillo et al. 2007; Creutzig et al. 2009; Kendra et al. 2007; Litman 2007; Leather 2009).

Induced Travel Impacts Ignored

Current analysis generally ignores the additional external costs that result when increased vehicle fuel efficiency or alternative fuel subsidies stimulate additional vehicle travel, called a rebound effect (Rebound Effects,” VTPI 2007). Long-term rebound effects typically range from 15-30% (Small and Van Dender 2007; UKERC 2007). For example, with a 20% rebound effect, a 50% increase in fuel economy will cause mileage to increase 10%, resulting in 40% net energy savings. Some recent analysis acknowledge that rebound effects will reduce net energy savings, but other induced travel impacts, such as increased congestion, accidents and facility costs are seldom considered or quantified (CBO 2003).

Table 2 compares different types of transportation emission reduction strategies, taking into account co-benefits and rebound effects. More efficient or alternative fuel vehicles conserve energy, reduce air pollution, and may save consumers money (if fuel savings offset any additional vehicle costs), but because they tend to increase total annual mileage they tend to exacerbate other problems such as traffic congestion, road and parking facility costs, accidents and sprawl. By reducing total vehicle travel, mobility management strategies provide a wider range of benefits.
### Table 2: Comparing Benefits (Litman 2007)

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Efficient And Alternative Fuel Vehicles</th>
<th>Mobility Management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increased</td>
<td>Reduced</td>
</tr>
<tr>
<td>Congestion reduction</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Road and parking cost savings</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Consumer cost savings</td>
<td>✓/x</td>
<td>✓</td>
</tr>
<tr>
<td>Reduced traffic accidents</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Improved mobility options for nondrivers</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Energy conservation</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Pollution reduction</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Improved physical fitness &amp; health (exercise)</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Land use objectives (reduced sprawl)</td>
<td>x</td>
<td>✓</td>
</tr>
</tbody>
</table>

Efficient and alternative fuel vehicles only provide a few benefits, and by increasing total vehicle travel tend to exacerbate problems such as congestion, accidents and sprawl. Mobility management provides far more benefits. (✓ = achieves benefits; * = reduces benefits)

Figure 2 indicates estimates of various transportation costs, measured per vehicle-mile. The largest category is vehicle ownership (fixed costs, including vehicle purchase, financing, depreciation and registration fees), totaling about $2,700 per year or 21¢ per vehicle-mile, followed by other costs such as travel time, vehicle operation, crash damages, roadway costs, vehicle parking, congestion, air pollution, resource externalities (economic costs of importing petroleum), traffic services, water and noise pollution.

**Figure 2: Per-Mile Automobile Costs (Litman 2006a)**

![Per-Mile Automobile Costs](image)

This figure illustrates estimated automobile costs averaged per vehicle-mile.
Air pollution is a moderate-size cost, typically estimated at 2-4¢ per vehicle-mile for an average automobile, with higher values for dirty vehicles in urban areas and lower values for cleaner vehicles in rural areas (EDRG 2007). Adding climate change emission costs does not significantly change air pollution’s ranking. For example, $100 per metric tonne of carbon equals about $27 per ton of carbon dioxide equivalent, which equals about 25¢ per gallon of gasoline or about 2.2¢ per average vehicle-mile. This represents the upper range of carbon price estimates. Although damage costs may be higher, control costs (the marginal cost of reducing or sequestering a tonne of carbon) is likely to stay below this level and rational prices reflect whichever is cheapest (Litman 2006a). Incorporating upper-bound carbon values increases average automobile air pollution costs from 2-4¢ to 4-6¢ per vehicle-mile. This is not to ignore vehicle emission costs, but indicates the importance of considering other impacts too. An emission reduction strategy is worth much less if it increases other costs and worth much more if it reduces other costs.

Figure 3  Efficient Automobile Use (Litman 2006a)

This figure illustrates estimated impacts of reduced emissions per vehicle-mile. (Light blue indicates reduced costs, red indicates increased costs)

For example, if pollution and resource externalities total 6¢ per vehicle-mile, a strategy that halves per-mile energy consumption and emissions by raising fuel economy from 20 to 40 mpg provides benefits worth 3¢ per vehicle-mile, or $375 per year for a vehicle driven 12,500 annual miles. However, if motorists respond by driving 10% more miles (a typical rebound effect), energy and emission reduction benefits decline 10% to $338, and mileage-related costs increase (Figure 3). A 10% increase in congestion, crash, road and parking externalities totals 2.7¢ per vehicle-mile or $338 per year, offsetting the energy and emission reduction benefits. On the other hand, a mobility management strategy that reduces vehicle travel 20% provides energy conservation and emission reduction benefits worth 6¢ per vehicle-mile reduced, or $150 annually, plus 20% reductions in mileage-related costs, totaling $675, or $825 in total annual benefits (Figure 4).
**Figure 4** Reduced Mileage Automobile Costs (Litman 2006a)

This figure illustrates estimated impacts of reduced vehicle-milage. (Light blue indicates reduced costs)

**Emission Reductions Considered Difficult to Predict**

Mobility management emission reduction effects are considered difficult to predict since they rely on behavior change, as opposed to technological changes. This perceived uncertainty makes it difficult for mobility management strategies to qualify for emission trading credits. These problems can be overcome (Donoso, Martinez and Zegras 2006). Case studies and models can be used to predict mobility management travel impacts and emission reductions (Pratt 2007; VTPI 2007; CCAP 2008). Different types of mobility management strategies require different prediction methods.

- Conventional travel models can predict the effects of some mobility management strategies, such as transit service improvements, transit fare reductions, and increases in road or parking prices, and newer models can predict the impacts of other strategies such as transit service quality improvements (“Travel Model Improvements,” VTPI 2007).
- Catalogues of mobility management strategies often include case studies that indicate their travel impacts and emission reductions (CCAP 2005; VTPI 2007)
- Specialized models predict the effects of specific combinations of incentives in a particular trip reduction program (USF 2006).
- Price elasticity models predict the effects of price changes on travel behavior (“Transportation Elasticities,” VTPI 2007).
- Models and case studies predict the effects that land use changes have on travel behavior and per capita emissions (Ewing, et al. 2007; DKS Associates 2007; “Land Use Impacts On Travel,” VTPI 2007; Glaeser and Kahn 2008).
**Mobility Management Programs Considered Difficult To Implement**

Mobility management strategies often involve multiple stakeholders and new organization relationships, such as various levels of government, employers, developers, various special interest groups, and transportation management associations, and so often seem difficult and risky compared with changes to vehicle designs or fuel (Wright and Fulton 2005). Energy analysts sometimes assume incorrectly that these strategies require new technologies, such as GPS-based pricing or high-speed rail (Lash 2007). These perceived difficulties often make it difficult for mobility management strategies to qualify for emission trading credits.

However, there is now extensive experience with various mobility management strategies (CCAP 2005; VTPI 2006; Association for Commuter Transportation; European Program for Mobility Management). Mainstream transportation organizations now recognize the value of mobility management (often under the name of transportation systems operations) and increasingly implement it as a way to solve problems such as traffic congestion and inadequate mobility for non-drivers (CUTR 2007; Poorman 2005).

**Vehicle Travel Reductions Considered Harmful**

People often assume mobility reduction harms consumers and the economy, and so should be avoided (CAB 2006). However, this assumption is not necessarily true (Litman 2009a). Many mobility management strategies directly benefit consumers by improving their travel options or providing positive incentives. For example, if people drive less due to improvements in alternative modes or in response to positive incentives such as parking cash out (commuters who use alternative modes receive the cash equivalent of parking subsidies), they must be better off overall since they could otherwise continue driving. Similarly, many consumers will choose more accessible, walkable communities, and drive fewer miles, if such communities have other attributes they value such as security, affordability and prestige. Even strategies that apply negative incentives, such as higher prices, can benefit consumers overall, if communities use revenues to reduce other taxes or provide new services they value.

Several current trends increase the value of alternative modes, including aging population, rising fuel prices and increasing traffic congestion (Litman 2006b). Although few motorists want to give up driving altogether, at the margin (compared with their current travel patterns) many people would prefer to drive less, and rely more on other forms of transport, provided that they are convenient, comfortable and affordable. As a result, mobility management strategies are increasingly justified to meet consumer demands.

Accurate mobility management evaluation requires consumer surplus analysis to measure the value consumers place on a change in the price or quality of their consumption (in this case, of vehicle travel). These methods are well established and widely used in economic evaluation (Small 1999; “Evaluating TDM,” VTPI 2007).
Regulations: Necessary and Effective

Advocates often claim that fuel efficiency regulations are necessary to overcome market resistance to more efficient and alternative fuel vehicles and are the most efficient way to achieve energy savings. Their arguments have some merit.

Consumers tend to require very short paybacks on energy saving investments. Vehicles are durable goods and the vehicles purchased now by higher-income motorists will be driven by lower-income motorists many years in the future. To the degree that future consumers will prefer more fuel efficient vehicles than what is currently being purchased, regulations may be justified to achieve equity as well as environmental objectives.

Advocates of regulation argue that fuel is inelastic: large price changes have relatively little impact on fuel consumption. They often cite analysis by Small and Van Dender (2007) which indicated that gasoline price elasticities were -0.09 in the short run and -0.40% in the long run during the 1997 to 2001 period, about half the values observed from 1966 to 1996. They implied that these trends will continue, resulting in ever declining price sensitivity. However, those results likely reflect unique factors during those years, including declining real fuel prices, demographics (peak Baby Boom driving years), and sprawl-encouraging development policies. Recent studies suggest that fuel price elasticities increased after 2006 (CERA 2006). Komanoff (2008) estimates that the short-run U.S. fuel price elasticity reached a low of -0.04 in 2004, but this increased to -0.08 in 2005, -0.12 in 2006 and -0.16 in 2007.

This suggests that regulations may be justified to help shift the vehicle market toward more efficient and alternative fuel vehicles to reduce emissions and anticipate future consumer demands, but these should be implemented in conjunction with complementary policies such as consumer education about fossil fuel external costs and future price increases, gradual and predictable fuel tax increases, and mobility management strategies to avoid unintended consequences from increased vehicle travel rebound effects.
Improving Emission Reduction Evaluation

This analysis indicates that, in various ways, current emission reduction planning tends to overlook and undervalue mobility management solutions. Fortunately, all of these biases can be corrected. Although this involves overcoming various obstacles, the potential benefits are very large, making the effort worthwhile. More comprehensive analysis allows planners to identify the truly optimal emission reduction strategies, which provide far greater benefits than what would be selected by current, biased evaluations.

Table 3 summarizes the various types of biases against mobility management emission reduction strategies, and ways to correct them for more comprehensive and objective analysis.

<table>
<thead>
<tr>
<th>Type of Bias</th>
<th>Corrections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility management ignored</td>
<td>Become more familiar with potential mobility management strategies and their impacts.</td>
</tr>
<tr>
<td>Co-benefits ignored</td>
<td>Learn about the full benefits of vehicle travel reductions, including reduced congestion, road and parking facility costs, consumer costs, accidents, noise and water pollution, and sprawl, as well as improved mobility options for non-drivers, and improved public fitness and health. Develop methods to quantify these benefits for economic evaluation.</td>
</tr>
<tr>
<td>Induced travel impacts ignored</td>
<td>Study the rebound effects and develop methods to quantify these impacts for economic evaluation.</td>
</tr>
<tr>
<td>Mobility management impacts considered difficult to predict</td>
<td>Review various models and case studies available for predicting the impacts of mobility management strategies. Improve these models so they are more flexible, accurate and easier to use.</td>
</tr>
<tr>
<td>Mobility management programs considered difficult to implement.</td>
<td>Read case studies of mobility management implementation. Improve access to these resources.</td>
</tr>
<tr>
<td>Vehicle travel reductions considered harm consumers and the economy.</td>
<td>Explore methods used to evaluate the impacts of mobility management on consumer welfare. Develop better tools for applying this analysis for transport policy evaluation.</td>
</tr>
<tr>
<td>Regulations necessary and effective</td>
<td>Implement regulations in conjunction with complementary policies to maximize benefits and avoid unintended consequences from increased vehicle travel rebound effects.</td>
</tr>
</tbody>
</table>

This table indicates how existing biases can be corrected for more comprehensive and accurate analysis of optimal transportation emission reduction policies.
### Optimal Emission Reduction Strategies

Although there are many possible ways to reduce energy consumption and pollution emissions, some are much better overall than others because they provide additional benefits (Cambridge Systematics; Leotta 2007). Table 4 summarizes examples of these “win-win” strategies.

**Table 4  Win-Win Transportation Solutions** (Litman 2007)

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Transport Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning Reforms</td>
<td>More comprehensive and neutral planning and investment practices.</td>
<td>Increases support for alternative modes and mobility management, improving options.</td>
</tr>
<tr>
<td>Transportation Demand Management Programs</td>
<td>Local and regional programs that support and encourage use of alternative modes.</td>
<td>Increased use of alternative modes.</td>
</tr>
<tr>
<td>Road Pricing</td>
<td>Charges users directly for road use, with rates that reflect costs imposed.</td>
<td>Reduces vehicle mileage, particularly under congested conditions.</td>
</tr>
<tr>
<td>Parking Pricing</td>
<td>Charges users directly for parking facility use, often with variable rates.</td>
<td>Reduces parking demand and facility costs, and encourages use of alternative modes.</td>
</tr>
<tr>
<td>Pay-As-You-Drive Pricing</td>
<td>Converts fixed vehicle charges into mileage-based fees.</td>
<td>Reduces vehicle mileage.</td>
</tr>
<tr>
<td>Fuel Taxes- Tax Shifting</td>
<td>Increases fuel taxes and other vehicle taxes.</td>
<td>Reduces vehicle fuel consumption and mileage.</td>
</tr>
<tr>
<td>Transit and Rideshare Improvements</td>
<td>Improves transit and rideshare services.</td>
<td>Increases transit use, vanpooling and carpooling.</td>
</tr>
<tr>
<td>Walking and Cycling Improvements</td>
<td>Improves walking and cycling conditions.</td>
<td>Encourages use of nonmotorized modes, and supports transit and smart growth.</td>
</tr>
<tr>
<td>Carsharing</td>
<td>Vehicle rental services that substitute for private automobile ownership.</td>
<td>Reduced automobile ownership and use.</td>
</tr>
<tr>
<td>Smart Growth Policies</td>
<td>More accessible, multi-modal land use development patterns.</td>
<td>Reduces automobile use and trip distances, and increases use of alternative modes.</td>
</tr>
<tr>
<td>Freight Transport Management</td>
<td>Encourage businesses to use more efficient transportation options.</td>
<td>Reduced truck transport.</td>
</tr>
</tbody>
</table>

*This table summarizes various Win-Win strategies that encourage more efficient transportation.*

Frank, et al. (2010) and found that “smart growth” urban form factors (transit accessibility, residential density, and street connectivity) tend to increase per capita walking activity and reduce per capita motor vehicle fuel consumption, providing both health and environmental benefits.

One of the most appropriate emission reduction strategies is to eliminate current fuel subsidies (Koplow 2010; Metschies, Thielmann and Wagner 2007), and gradually and predictably increase fuel taxes, at least to reflect all public expenditures on roadways and...
traffic services, or to apply a carbon tax on all fossil fuels (“Fuel Tax Increases,” VTPI 2006; Sterner 2006; Metschies 2005; Carbon Tax Center; Litman 2009c).

Policies that encourage fuel efficient vehicle purchases are justified now to prepare for higher future fuel prices, and to reduce the relative disadvantage of driving efficient vehicles (if the entire fleet becomes more efficient there is less stigma and risk to smaller vehicle users). These include vehicle fuel efficiency standards (or carbon emission limits), feebates (surcharges on less efficient vehicles with revenues used to rebate efficient vehicle purchases), and efficiency-based vehicle taxes and fees. To minimize rebound effects and maximize total benefits it will be important to implement fuel tax increases and mobility management strategies in conjunction with efficient vehicle policies.

Alternative fuels should be encouraged primarily by higher gasoline and diesel prices, particularly with carbon taxes (Toman, Griffin and Lempert 2008). Some alternative fuels may deserve public support for basic development, but these should be evaluated critically to insure they are justified, taking into account all economic, social and environmental costs. Electric vehicle development should be encouraged but their production and use should not be subsidized since their overall benefits are modest; they reduce tailpipe emissions but increase electric generation emissions and already receive about 2.5¢ per vehicle-mile subsidy because they pay no road use taxes. Propane and LPG also provide only modest benefits and so deserve only modest support.
Conclusions

There are many potential energy conservation and emission reduction strategies. Which are best? Which deserve the greatest support? Some provide significant co-benefits and avoid undesirable, unintended consequences and so provide greater total benefits. In general, a gallon of fuel conserved by reducing vehicle travel provides an order of magnitude more benefit than the same energy savings provided by shifts to more efficient or alternative fuel vehicles. This occurs because mileage reductions provide other economic, social and environmental benefits, such as reduced traffic congestion, facility costs, accidents and sprawl. Many mobility management programs are justified for their economic benefits and so provide essentially free environmental benefits. In contrast, increased vehicle fuel efficiency tends to stimulate more total vehicle travel, which exacerbates other transportation problems: emissions decline but congestion, parking costs, accidents and sprawl increase.

Mobility management helps communities prepare for future demands. Current demographic and economic trends (aging population, rising fuel prices, increased traffic congestion and changing consumer preferences) are increasing the value of alternative modes and smart growth development.

This is not to suggest that energy conservation is unimportant or that efforts to improve vehicle fuel efficiency or develop alternative fuels is harmful. On the contrary, petroleum consumption and pollution emissions are urgent problems to solve. However, emission reduction efforts should consider all options and impacts in order to implement those that are overall most beneficial. Although some regulations may be justified to overcome market impediments to more efficient and alternative fueled vehicles, these should be implemented in conjunction with complementary policies such as consumer education about fossil fuel external costs and future price increases, gradual and predictable fuel tax increases, and mobility management strategies to avoid unintended consequences from increased vehicle travel rebound effects.

Most current evaluation tends to overlook and undervalue mobility management benefits. More comprehensive analysis allows mobility management strategies to be implemented to the degree justified. Mobility management is often excluded from emission trading altogether or bears an unreasonably high burden of proof. We need better tools to predict mobility management emission reduction impacts and co-benefits, and protocols to implement mobility management programs within emission markets. This paper identifies specific biases in most current emission reduction analyses and provides recommendations for correcting these errors. The result can provide a framework for identifying truly optimal solutions.

The strategies recommended in this paper are “win-win” solutions that provide multiple benefits. They are justified on economic efficiency grounds and so can provide essentially free emission reductions.
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Incorporation of Transportation Demand Management (TDM) into the Development Review Process

Final Report and Recommendations

July 2010

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District Department of Transportation
Transportation Policy and Planning Administration

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July 2010
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1.0 Executive Summary

The District of Columbia is attracting new residential, commercial, and retail development and redevelopment at an unprecedented pace. This activity, while highly beneficial in many respects, generates significant additional vehicular traffic to, from, and within the District. The current redevelopment permit process lacks a systematic approach and process within DDOT and among all District agencies for integrating Transportation Demand Management (TDM) policies as a way of meeting the District’s goals of reducing auto trips and accommodating travel through the complete transportation network.

TDM is now handled on a project-by-project basis, with limited opportunities for coordination among agencies or implementation of sub-area TDM goals. Current practice applies a one-size-fits-all framework to development, with limited differentiation across diverse geographic areas, development types, development sizes, or other aspects. This approach does not allow maximization of TDM opportunities or provide a process for consistently applying TDM analyses, nor does it apply TDM expectations specific to the anticipated traffic impacts of various types and scales of proposed development.

To address these issues, DDOT initiated this analysis of TDM in the development review process. The project included three primary tasks:

Review of Best Practices and Standards:
National best practices were researched to identify examples of effective systematic approaches to TDM. Through the research it became evident that TDM in the development process tended to be addressed in two general ways:

- Addressing TDM directly through the development approval process and in particular through parking ordinances. By limiting parking or encouraging denser development, developers need to consider TDM early on and must participate in ongoing programs to provide alternative access options to ensure the viability of their projects.

- Developing TDM participation ordinances that require ongoing financial contributions (proffers) from the developer, include enforceable penalties, and generally entail submission of a TDM plan prior to the occupancy of the development.

Evaluate the Potential for TDM under the Existing District of Columbia Development Review Process:
District stakeholders (including the development community, advocacy groups, District agencies, and agencies from other local municipalities) were interviewed to analyze the existing development review process and inconsistencies in how the development review process is perceived by different user groups. Stakeholders were also asked about potential strategies for amending the existing process based on the needs of their constituents. Staff members from peer municipalities throughout the region were interviewed for informational purposes, to further assist in identifying successful practices and highlighting potential pitfalls.
**Recommend Improvements and Changes to the Development Review Process:**

Based on the national best practices and input received from stakeholders, the Project Team developed recommendations to more fully integrate TDM into the District’s development review process. The recommendations represent both near-term priorities (implementation within six months) and long-term direction for DDOT’s consideration (implementation within three years). These recommendations are summarized in Table 1 and are fully described in this report.

To assist DDOT and developers in the formulation of TDM plans, a comprehensive listing of TDM measures for consideration is provided as an attachment to this document. This table separates developments into different categories based on the amount of peak hour traffic generated by the site and whether the application is by-right, a Planned Unit Development (PUD), or one that requires a variance.

Any final TDM planning and guidance documentation will require close coordination between DDOT and the DC Office of Planning (DCOP), the DC Office of Zoning (DCOZ), other departments within the District and, possibly, developers themselves to produce a workable procedure that will be acceptable to the Planning Board and can lead to development of reasonable ordinances in the future. It was evident in the review of best practices that a legislated solution, unique to the region involved, was necessary for a TDM program to be fully successful. As such it is recommended that a workgroup of district stakeholders, possibly by DDOT, be formed to investigate the best way to require that TDM considerations be included in the development process. Political realities and legal considerations will figure predominately in this discussion and more parties will need to be involved than were interviewed for this study. However, to assist DDOT staff in envisioning what a TDM plan might consist of, a draft plan has been provided as an appendix to this document. This generic plan is based on the project team’s experience in developing similar plans for other locations in the country and has been modified to better reflect the District’s needs. The intent of this document is to spearhead the use and application of TDM strategies into the District’s planning process, noting that the final document may be modified by input from all of the interested parties and stakeholders.

Ultimately if TDM impacts are to be quantified it will need to be within a broader context. Currently DDOT does not have a preferred quantitative methodology for assessing the impacts of various planning issues such as project level trip generation, parking policy, land use/development patterns and TDM. Attempting to quantify any single one of these elements in isolation, either for a particular site or district-wide, is not advisable as the interaction between them is a fundamental consideration. The transportation impacts of a development can only be quantified if synergetic relations are implicitly considered care is taken not to double count any benefits. Failure to do so will likely result in underestimation the impact of any one of these element, as is often the case with TDM measures. An understanding of all these factors is vital since ultimately all of them are necessary if the district is to meet its quality of life, economic and environmental goals. Further investigation and development of a cohesive analytic framework that is inclusive of all these elements is warranted.
Table 1: Summary of Recommendations

<table>
<thead>
<tr>
<th>Near-Term (Implementation within six months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• DDOT should make it standard practice that all development plans, regardless of size, address all applicable DDOT land use, bicycle, pedestrian, transit, and corridor plans as well as make reasonable allowances for future TDM requirements, particularly sidewalk and bicycle accommodation and transit right of way. Small-scale developments/redevelopments should support all District and neighborhood plans, but should be exempt from the requirement for a formal TDM package.</td>
</tr>
<tr>
<td>• DDOT should expand its current outreach and advocacy efforts to encourage voluntary adoption of TDM measures by developers and building management companies in the District.</td>
</tr>
<tr>
<td>• DDOT should develop written guidance explaining the agency’s interpretation of the Comprehensive Plan. DDOT may choose to include TDM goals or targets as part of this effort.</td>
</tr>
<tr>
<td>• Create a directory of DDOT recognized TDM planners. Require development applications to include a TDM Plan, preferably drafted by a DDOT recognized planner or one with demonstrated credentials. Track TDM plan submissions and base ongoing consultant recognition on submitted TDM plans.</td>
</tr>
<tr>
<td>• As the District’s requirements for TDM measures increase, additional resources within DDOT will need to be allocated to implement and administer the program.</td>
</tr>
<tr>
<td>• All new developments should support the District’s TDM policies as per the District’s Comprehensive Plan. The elements do not need to be onerous, particularly for smaller developments; however, all developments have a role to play in reinforcing the District’s commitment to transit, alternative transportation programs and services, and vehicle trip reduction.</td>
</tr>
<tr>
<td>• The formation of Transportation Management Associations (TMAs) within the District is a goal of the Comprehensive Plan. DDOT will need address this recommendation and/or develop a functional equivalent to administer and monitor any TDM requirements implemented in the District. (Near-Term (Process), Long-Term (Operational))</td>
</tr>
<tr>
<td>• DDOT should judiciously enforce existing Zoning Regulations to demonstrate the agency’s commitment to furthering TDM measures in the District.</td>
</tr>
<tr>
<td>• DDOT should encourage developers seeking LEED certification to adopt as many of the Alternative Transportation related credits as possible.</td>
</tr>
</tbody>
</table>
Table 1 Continued: Summary of Recommendations

<table>
<thead>
<tr>
<th>Long-Term (Implementation within three years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Until there is an established process for ongoing surveying to demonstrate success, quantification of site-level TDM impacts for the purposes of mitigation is not appropriate.</td>
</tr>
<tr>
<td>- DDOT, DC Office of Planning (DCOP), other relevant district agencies and officials should formalize TDM considerations into the current DDOT/OP development review process.</td>
</tr>
<tr>
<td>- DDOT will need to spearhead an effort to formalize TDM as a regulatory requirement for new developments and as an ordinance in the Zoning Regulations for the District. This ordinance will need to address not only physical elements at the time of design and construction, but also ongoing survey requirements and the ability to assess fines when violations are identified or program goals are consistently not met. Funding of specific TDM programs will also need to be addressed.</td>
</tr>
<tr>
<td>- Measures of Effectiveness for TDM programs should be two-fold: a reduction in peak period vehicle trips and a reduction in overall weekly vehicle trips.</td>
</tr>
<tr>
<td>- Rather than calculating the potential impact of any specific elements of a TDM plan, DDOT should set overall vehicle trip goals and allow the developer to address the specific goals accordingly, with success determined via ongoing surveys and reporting back to DDOT.</td>
</tr>
</tbody>
</table>
2.0 Existing Conditions

2.1 Introduction to Transportation Demand Management

Transportation Demand Management (TDM) is a set of strategies, programs, services, and physical elements that influence travel behavior by mode, frequency, time, route, or trip length in order to help achieve highly efficient and sustainable use of transportation facilities. To effect meaningful travel behavior change and encourage the widespread utilization of alternatives to Single Occupant Vehicles (SOV), residents and other travelers must first understand the options available in the multimodal transportation system – how they work, how to use them, and the benefits they offer. This requires a level of information and support that demystifies travel options and makes them rational and desirable alternatives to the car.

TDM policies are the mechanisms for reducing SOV trips by focusing the demand for transportation services on alternative modes and providing the public with the incentives as well as information to use these alternatives. This is TDM in the active sense of services and programs. At the same time, to maintain high-quality transportation services, programs must cater to the needs of all residents, regardless of age, income, or physical ability. Without these characteristics, travel demand will not be fully addressed and travelers will be encouraged to use SOV’s or not travel at all. The goal of TDM is essentially to nurture a sustainable community that embraces alternatives to the car while enhancing mobility.

2.2 The Benefits of TDM

TDM Benefits for Individuals
TDM services help residents and workers make better use of the many available transportation options. Assistance in finding and using these can be a very valuable lifestyle and economic benefit. For those who do not or cannot drive, non-SOV travel options provide the mobility needed to hold employment, go to the doctor, shop, and otherwise lead a fulfilling lifestyle. For others, travel options can relieve the stress, time, or cost of a commute, or allow for more productive use of the time they travel. The monetary savings in fuel, vehicle wear and tear, or owning fewer vehicles in the household can be substantial.

Moreover, the ancillary health benefits can be extensive; public transportation is many times safer than the private automobile and the simple exercises of walking or bicycling, whether to one’s destination or to access public transit, can reduce obesity, lower the risk of heart disease and reduce myriad of other illnesses. In sum, TDM can be support an improved quality of life on many levels.

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1 A synopsis of select studies substantiating the observed benefits of TDM can be found on the Victoria Transportation Policy Institute website: http://www.vtpi.org/tdm/tdm58.htm
TDM Benefits for Businesses
By managing or lessening the number of vehicles accessing and parking at the worksite, TDM can save companies substantial capital associated both directly and indirectly with parking costs. They can also provide even more important, though less visible, business advantages by virtue of the benefits to employees. The benefits to individual employees can also accrue to the company in the form of less stressed, more satisfied, and productive workers, easier recruitment, an expanded labor pool, expanded service hours, improved morale, better retention of employees, and less tardiness and absenteeism due to traffic, stress, or health issues.

TDM Benefits for the Community
The combined benefits of TDM to individuals and to companies also aggregate to benefit the community as a whole. Less traffic, improved access, greater mobility, and many choices in travel modes will add up to an enhanced quality of life for District citizens, workers, and visitors. Less vehicular traffic also means less air pollution, and less contribution to water pollution from urban storm water runoff.

TDM Can Be Cost Effective
One of TDM’s advantages is that it is more cost-effective and more environmentally sustainable than providing additional transportation infrastructure. In one investigation of community-based programs that promote travel behavior change, the Victoria, Australia Department of Infrastructure found that such programs can be highly-effective in both increasing use of public transit as well as use of other alternatives to the private car. The Victoria study concluded that marketing-based TDM programs have resulted in financial benefits of $3.09 to $4.70 for every dollar invested in the program. Additionally, businesses may form partnerships with other businesses to share costs for implementing TDM programs and services, such as shuttle services to and from transit stations and shared ride programs, such as vanpooling and fleet management for carpools increasing the return on investment even further.

2.3 Washington, D.C.’s TDM Policy
Washington, D.C.’s municipal government provides TDM measures by balancing the transportation supply with pedestrian, bicycle, and transit facilities in roadway rights-of-way, reducing the cost to ride transit (Metrocheck), and sponsoring alternative modal options (including the DC Circulator and SmartBike DC). The District has also affirmed the prioritization of TDM with specific policies and actions in its Comprehensive Plan:

- **Policy T-3.1.1:** Transportation Demand Management (TDM) Programs: Provide, support, and promote programs and strategies aimed at reducing the number of car trips and miles driven (for work and non-work purposes) to increase the efficiency of the transportation system.

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2 Travel Demand Management: Public Transport Business Case, Ker for Department of Infrastructure, Victoria, June 2003.

• **Policy T-3.1.2:** Regional TDM Efforts: Continue to pursue TDM strategies at the regional level and work with regional and federal partners to promote a coordinated, integrated transportation system.

• **Action T-3.1.A:** TDM Strategies: Develop strategies and requirements that reduce rush hour traffic by promoting flextime, carpooling, transit use; encouraging the formation of Transportation Management Associations; and undertaking other measures that reduce vehicular trips, particularly during peak travel periods. Identify TDM measures and plans as appropriate conditions for large development approval. Transportation Management Plans should identify quantifiable reductions in vehicle trips and commit to measures to achieve those reductions. Encourage the federal and District governments to explore the creation of a staggered workday for particular departments and agencies in an effort to reduce congestion.

### 2.4 District Development Application Process

Beyond sponsoring and funding public TDM initiatives, many municipalities have established TDM programs as the responsibility of developers, since private developments generate many of the person trips that the transportation system must accommodate. Private TDM requirements are often incorporated into the development application review process, as there is a rational nexus between potential transportation impact and providing TDM measures that mitigate those impacts.

The Development Review Division of the Office of Planning (OP) assesses plans that are generally large, complex, and precedent-setting in their potential to change the character of an area. While development is viewed as the economic engine of the District, protecting the integrity of neighborhoods is equally important. The Development Review Division encourages growth in a way that is sensitive to the needs and values of neighborhoods. In Washington DC, there are three types of development applications: Matter of Right, Planned Unit Development (PUD), and Special/Variance.

Matter of Right applications meet the use and form requirements within the Zoning Regulations, and are not anticipated to significantly affect the District’s transportation system. Therefore, the District does not usually request TDM measures from Matter of Right applications. The exception to this is the Zoning Regulations’ requirements to provide bicycle parking, though this is considered a parking requirement, not a TDM measure.

A PUD is a planning tool which allows a developer greater flexibility in site planning and building design. This flexibility permits the developer to incorporate amenities in the project that exceed those that could have been achieved under the general provisions of the Zoning Regulations. When a project is designated as a PUD, standards are specifically tailored to the project, including TDM measures. Similarly, when a development application includes a request for a variance, TDM measures are frequently attached to balance the value of the project and mitigate potential impacts.

While the District has not codified TDM requirements as part of the development review process for any development application category, the policy statements in the Comprehensive Plan have served as the impetus for creation of a list of voluntary strategies that are recommended in the review process. The “Transportation Demand Management Strategies for Site Plan Review” (Department of Transportation, September 2008), offer 11 TDM elements including bicycle parking and changing facilities, preferential...
parking for car/vanpools and carsharing vehicles, complimentary transit fare media for new tenants, and provision of information to simplify trip planning by alternative modes. These TDM strategies are recommended to applicants seeking approval of PUDs or variances, though the District cannot require these elements. While many developers have agreed to provide combinations of these strategies, there is currently no process for long-term monitoring or enforcement; and as such the implementation and going maintenance of these strategies in the District is unclear.

2.5 Federal Government and Military Facilities

One of the challenges facing District planners is that federal facilities and military installations are not necessarily bound by decisions of the planning council or DDOT. Traditionally both of these stakeholders have worked closely with DDOT and others to help advance the goals of the local agencies. In terms of TDM, The Federal Government has an aggressive program based on the Federal Executive Order for Ridesharing, authored by President Jimmy Carter, February 1, 1980. The language in the order was based on a program he created for the state of Georgia to address the challenges of the oil embargo in 1979. The order was written into law to increase ridesharing as a means to conserve petroleum, reduce congestion, improve air quality, and provide an economical way for Federal employees to commute to work. Each Federal agency is responsible for promoting and providing oversight for their individual programs with reporting requirements submitted to the Office of Management and Budget (OMB). The following text from the Executive Order lists some of the requirements:

*Executive Order 12191--Federal Facility Ridesharing Program*

Agencies shall establish an annual ridesharing goal tailored to each facility, and expressed as a percentage of fulltime personnel working at that facility who use ridesharing in the commute between home and work. Agencies that share facilities or that are within easy walking distance of one another should coordinate their efforts to develop and implement ridesharing opportunities.

Agencies shall designate, in accordance with OMB, an employee transportation coordinator. Agencies that share facilities may designate a single transportation coordinator. The coordinator shall assist employees in forming carpools or vanpools (employee-owned or leased) and facilitate employee participation in ridesharing matching programs. The coordinator shall publicize within the facility the availability of public transportation. The coordinator shall also communicate employee needs for new or improved transportation service to the appropriate local public transit authorities or other organizations furnishing multi-passenger modes of travel.

Agencies shall report to the Administrator of General Services, hereinafter referred to as the Administrator, the goals established, the means developed to achieve those goals, and the progress achieved. These reports shall be in such form and frequency as the Administrator may require.

Like other federal facilities, military installations are largely not legally bound incorporate DDOT recommendations into site plans. However the military does have a history of working closely with the local communities to minimize impacts of their facilities. TDM has taken on renewed importance with
the military (including the NSA) as a result of the 2005 Base Relocation And Closure (BRAC) study and resulting in a migration of employees underway across the greater DC region. TDM has figured prominently in the plans for growing bases in Virginia and Maryland, and as the military embraces TDM, opportunities will exist for DDOT to endorse and possibly participate in these activities.

3.0 Lessons Learned and Input

3.1 Best Practices

As part of the ongoing effort to identify ways of better integrating TDM into the District’s overall development process, a research effort was undertaken to locate TDM programs across the country and summarize some of the best practices and approaches. Candidate programs were identified by online sources, suggestions by DDOT staff, and practitioners in the field (see Appendix A for the complete summary of best practices). From the initial review, six locations were chosen for more in-depth study:

- Cambridge, MA
- Montgomery County, MD
- Arlington, VA
- Alexandria, VA
- Contra Costa (Bay Area), CA
- Seattle, WA Metropolitan Region

The research into these programs revealed that including TDM in the development process tends to be addressed by one of the following three generalized approaches:

- By directly specifying TDM requirements in the development approval process.
- Through the use of TDM ordinances that require long-term commitment by developers, property managers, and owners, which influences the development process early on and throughout the planning stages.
- A combination of the two options above.

Review of the various ordinances, regulations, and planning policies identified during the research effort revealed a vast array of specific approaches to implementation. Goals varied widely, with some agencies looking at TDM as a traffic mitigation tool, others setting goals for alternative modes of transportation, and still others using TDM to complement and reinforce their urban planning vision. However, a number of general themes were identified that are relevant to the District’s initiative to incorporate TDM in the development review process:

- The more successful TDM programs rely on continuing, enforceable ordinances. Stand alone programs relying on voluntary measures, while somewhat successful in reducing auto trips, tended to have less influence on the nature or type of the development in a region. This is specifically applicable to Washington, D.C.’s existing voluntary TDM strategies, which are inconsistently incorporated into development applications and are not verified to ensure they were implemented as proposed.
While regulation and requirements are included in the most successful TDM programs, education about the benefits of TDM is an integral component to maximizing TDM’s success. Providing developers with research into the value of TDM (as described in Chapter 2), as well as assisting in the marketing of these programs to prospective tenants and owners helps convert the interest in quality of life improvements into an economic incentive for developers to provide TDM programs.

Approaches to “elevate TDM” in the development process are unique to how each particular region operates from a political perspective. As such, few “one size fits all” practices are recommended for wholesale application elsewhere.

TDM Ordinances take on many forms and may tie into zoning, the building/site approval process, or specific parking requirements.

The existence of an agency with enforcement authority appeared to be a necessary element for TDM to have a significant impact.

Monitoring is a major requirement for TDM programs to be successful, with the vast majority of programs requiring annual reporting. The most effective survey programs are those tied to other survey requirements in the region in order to limit the time commitment required of property managers and/or employers/residents.

In order to have TDM considered early in the development process, most locations make the submission of a TDM plan a requirement for the certificate of occupancy. The degree to which these plans are scrutinized varied widely, with many plans only making up a small section of the overall traffic impact study.

The metric by which the success of a program will be evaluated has a direct impact on how TDM is approached. Metrics are generally a reflection of the underlying policy goals of the TDM program. For example, a metric based on transit use might be part of a broader goal to focus development at major transit stations, while a parking-oriented TDM ordinance might attempt to focus development along corridors.

The most successful TDM programs generally set low thresholds (size of development, number of employees, number of parking spaces, etc.) when TDM requirements become mandatory. However, these choices were made based on a broad range of thresholds, and in some cases programs focused solely on larger employers and/or developments. Successful integration across all sizes and types of development generally entailed a graduated introduction of TDM requirements.

Significant TDM program support funded at least in part by the city/regional agency was a common theme in the more successful examples. This generally took the form of a significant staff commitment at the regional government office to TDM efforts (including an area-wide coordinator with either extensive staff managing support internally or through consultant agreements) or an active Transportation Management Association (TMA).

While difficult to measure, TDM efforts appear to be greatly affected by the local culture or mindset. San Francisco, Seattle and Cambridge are all examples of areas that have aggressive trip reduction goals, thus developers in these areas tend to address TDM early on as a selling feature. Anecdotally, businesses attracted to these locations also appear to place a high value on quality of life issues addressed by TDM either in response to customers or as a benefit to staff.
• Locations with limitations on parking and roadway capacity (physically, as in San Francisco, or self-imposed, as in Arlington) also tended to have the strongest programs. In these locations TDM directly influences accessibility and the ultimate viability of projects, resulting in a development process where TDM is a fundamental consideration.

• The difficulty of implementing TDM in a residential setting was noted in a number of locations, with only the most active programs addressing this type of development in a significant way.

### 3.2 Focus Group Input

Representatives from District organizations (including the development community, advocacy groups, District agencies, and agencies from other local municipalities) were interviewed to analyze the existing development review process and inconsistencies in how the development review process is perceived by different groups. Stakeholders were also asked about potential strategies for amending the existing process based on the needs of their constituents. Staff members from peer municipalities throughout the region were interviewed for informational purposes, to further assist in identifying successful practices and highlight potential pitfalls. The following summarizes the key inputs provided by stakeholders at the focus group meetings (see Appendix B for complete documentation of focus group meetings):

• There is support from Washington, D.C.’s Zoning Commission to require TDM elements as part of development applications.

• The level of frustration with the current, overall District development process was palpable. Most of the groups, both public and private, talked of systemic problems in the system to the point where it was labeled nonexistent by some. It cannot be stressed strongly enough that this is fundamental issue.

• Legal requirements for TDM elements should be formalized to ensure maximum effectiveness. Requirements should include elements to be provided in the development application, as well as mechanisms for ongoing funding, monitoring, and enforcement of TDM requirements.

• Currently there is no enforcement process or mechanism to impose fines. Even if fines were collected there is no way to direct funds to TDM projects.

• TDM requirements should be predictable and based on an easily replicated format. This will provide TDM benefits, by encouraging developers to include TDM in applications while minimizing the additional workload on District staff.

• Different processes may be required to ensure TDM is included in the process for Matter of Right, PUD, and Variance developments.

• TDM elements should be considered equivalent to other transportation mitigations (roadways, intersections, signals) and not as amenities.

• Education on the value of TDM should be provided to developers, Advisory Neighborhood Commissions (ANCs), community members, and the Zoning Commission.
4.0 Recommendations

The District’s Comprehensive Plan established a specific policy objective of reducing the number of car trips and miles driven (for work and non-work purposes) as a way to increase the efficiency of the transportation system. Incorporating TDM strategies into the development review process is a direct mechanism for supporting this goal.

Based on the national best practices and input received from stakeholders, a list of actions were developed to more fully integrate TDM into the District’s development review process. The recommendations represent both near-term priorities (implementation within six months) and long-term direction for DDOT’s consideration (implementation within three years).

A comprehensive listing of TDM measures for implementation is provided in Table 2. This table details a menu of TDM measures that can be applied in different combinations, allowing applicants to formulate a TDM program that best addresses their project’s specific characteristics. The table separates developments into different categories based on the amount of peak hour traffic generated by the site and whether the application is Matter of Right, a Planned Unit Development (PUD), or one that requires a variance. While all PUD and Variance applications would require a TDM program developed from the elements described in Table 2, Matter of Right applications (which are considered “Consistent with the Zoning Regulations”) would only require a TDM program if it is projected to generate at least 25 person trips in the peak hour or entails renovation of more than 25 percent of the total property value.

4.1 Maximizing TDM with the Current Process (Near Term: Implementation within 6 months)

A) DDOT should expand its current outreach and advocacy efforts to encourage voluntary adoption of TDM measures by developers and building management companies in the District.

Until such time that TDM plans and programs become officially mandated in the District, DDOT should expand its current efforts to promote and help fund voluntary TDM programs. Programs might include conducting TDM workshops with District Council, Zoning Commission, ANCs, and the public to educate them about opportunities and develop a District-wide TDM vision. This represents a sizable increase over DDOT’s current TDM efforts and as such additional staffing, funding and/or consultant resources would be required. It is anticipated that this effort would target substantive developments; expansion of the current outreach effort to the general public is also recommended.

Once TDM programs are officially mandated in the District, DDOT should maintain an education campaign that emphasizes how TDM supports the community’s quality of life and how District agencies can assist developers and neighborhoods in designing TDM programs appropriate to each site’s context. Also this will allow developers to become more accustom to incorporating TDM considerations into their site plans, laying the groundwork for mandatory requirements should the district move in that direction.
B) **DDOT should develop written guidance explaining the agency’s interpretation of the Comprehensive Plan. DDOT may choose to include TDM goals or targets as part of this effort.**

The District’s Comprehensive Plan is a legal document with both federal and District elements. As such, it is appropriate that DDOT provide official written documentation summarizing the agency’s interpretation of the plan as it applies to those elements under DDOT’s purview.

By setting out exactly what DDOT expects of developers that are seeking project approval, DDOT can help steer design in a direction that speaks to the agency’s goals. This document should not be limited to TDM, but encompass DDOT’s entire development process. This document should:

- Reiterate the scope and general tone of the Comprehensive Plan;
- State the specific impact the plan has on transportation planning policy;
- List agency-specific goals (in a broad sense);
- State the future direction of DDOT, specifically addressing the anticipated rules and regulations that the department will be advocating for TDM; and
- Specify the extent that TDM will play a role in the granting of project approval requests in the development evaluation process.
- While it is beyond the scope of this project, other transportation elements of the plan under the purview of DDOT should also be addressed more fully that is provided in the Plan itself.

The intent of this recommendation is to address the sentiment that DDOT has been inconsistent in its approach and to build credibility regarding the agency’s commitment to TDM. DDOT may also choose to establish goals for the TDM program in the district as part of this effort. In the near term goals may simply serve as notice to the development community that consideration of TDM in transportation plans is important to DDOT as an agency. In the longer term reporting and monitoring of TDM effectiveness at the project level could become standard practice in the district (see recommendation L below.) Formalization of the above elements may be appropriate for incorporation into future updates of the Comprehensive Plan or provided as a complementary document.

C) **DDOT should encourage developers seeking LEED certification to adopt as many of the Alternative Transportation related credits as possible.**

The Leadership in Energy and Environmental Design (LEED) represents an opportunity for DDOT in regards to TDM. Fourteen points currently fall under the category of Sustainable Sites, four of which are assigned to Alternative Transportation: Public Transportation Access, Bicycle Storage & Changing Rooms, Alternative Fuel Vehicles, Parking Capacity and Carpooling. DCOP regularly presses for high levels of LEED accomplishment in PUD applications, and many District buildings are required to meet LEED standards under the Green Building Act. DDOT and DCOP should encourage developers to seek the full alternative transportation credit for developments in suitable locations. LEED certification includes inspection after one year of occupancy to verify that programs are adopted, which offers at
least some follow-up that DDOT/DCOZ currently cannot provide. While this may have a limited overall impact in regards to TDM and would only apply to developments seeking LEED certification, it again sends a message to developers regarding the District’s commitment towards advancing TDM.

**D) DDOT should judiciously enforce existing Zoning Regulations to demonstrate the agency’s commitment to furthering TDM measures in the District.**

Currently, bicycle parking and signage are the only TDM elements enforceable under the Zoning Regulations. Anecdotally, these requirements appear to be often ignored. As a show of intent, DDOT through the Department of Consumer & Regulatory Affairs (DCRA) should coordinate an ongoing effort to identify and address TDM commitments that have not been fulfilled. In the very near term, a compliance review could be undertaken to identify deficiencies in any current bicycle parking and signage requirements, as well as any TDM commitments included in PUD, variance, campus plan, and special exception approval orders. Responsible parties would be alerted as to any issues noted and follow-up action taken as is possible under current regulatory authority. In the longer-term, any enforceable TDM requirement could be pursued. In both the short and the long term a two-phase approach is recommended. In the first phase a wide area review will be staged. Building operators will be informed of what is being done and if any shortcomings that were noted. Deficiencies should be used as an opportunity for education on the value of TDM, as well as a reminder of applicants’ commitments. Follow-ups can then be completed three months later, and at that point corrective action can be taken as deemed appropriate. It is anticipated that actively working with the responsible parties to address problem areas will be sufficient. At some time in the future when TDM requirements become more entrenched, more aggressive actions could potentially be taken including fines, press announcements, and theoretically nullifying Certificates of Occupancy (rescinding of approvals is not a recommended course of action). None of these stronger actions is considered preferable and given the potential ramifications should only be pursued where inaction is blatant and negative impacts are both evident and indisputable.

**E) DDOT should make it standard practice that all development plans, regardless of size, address all applicable DDOT land use, bicycle, pedestrian, transit, and corridor plans as well as make reasonable allowances for future TDM requirements, particularly sidewalk and bicycle accommodation and transit right of way. Small-scale developments/redevelopments should support all District and neighborhood plans, but should be exempt from the requirement for a formal TDM package.**

Through the building code and the project approval process, DDOT has the ability to request, and in some cases require, that infrastructure for TDM, be incorporated into current and future project designs. Sidewalks, bicycle accommodations (lanes, trails, parking, shower facilities), and right-of-way set-asides for transit improvements (bus lanes, room for shelters) are all examples of design considerations that would be difficult, if not impossible, to implement after a project is built. It is also appropriate for DDOT to request certain infrastructure improvements as part of a new development that go above and beyond the needs of the development itself.
To ensure that TDM programs are supportive and not onerous, smaller scale developments should be exempt from TDM requirements. These projects should still be consistent with other Zoning Regulations and District-and neighborhood plans.

The intent of this recommendation is to make TDM a matter-of-fact in the district. It is recognized that small reconstruction and redevelopment projects, particularly residential developments, should not be disproportionately impacted by new regulatory requirements. In these cases wider efforts to inform and educate developers, business owners and residents of the larger TDM goals for the district may be sufficient.

F) All new developments should support the District’s TDM policies as per the District’s Comprehensive Plan. The elements do not need to be onerous, particularly for smaller developments; however, all developments have a role to play in reinforcing the District’s commitment to transit, alternative transportation programs and services, and vehicle trip reduction. (Near-Term (Voluntary), Long-Term (Required))

TDM considerations are often limited to larger developments. In the long term, this will result in a patchwork approach and may give developers a valid complaint regarding inconsistent treatment. There are design-based TDM measures that all developments can integrate as a matter of fact without requiring ongoing investment or operation. These include:

- Leaving space in lobbies for information and telephones to taxi/transit/ridesharing services;
- Ensuring that designs reflect the Bicycle and Pedestrian Master Plans;
- Ensuring adequate pedestrian and bicycle facilities under current codes as well as any anticipated requirements above and beyond the master plan;
- Orienting development to the street and allowing for a clear path from the front door to transit facilities;
- Managing parking in a way that reflects the urban nature of the District; and
- Participation in neighborhood programs/promotions.

Efforts could be as simple as acknowledging receipt of an information packet describing the District’s alternative transportation programs when a building permit is approved (the person obtaining the permit would be responsible for supplying the materials to the building occupants.) These and other low or no-cost options are items that all developments, regardless of size, could incorporate. Having near-term voluntary goals will help the development community adjust and adapt prior to the requirements becoming mandatory.

G) Create a directory of DDOT recognized TDM planners. Require development applications to include a TDM Plan, preferably drafted by a DDOT recognized planner or one with demonstrated credentials. Track TDM plan submissions and base ongoing consultant recognition on these submitted TDM plans.

DDOT should begin to review TDM plans submitted by consultants and identify samples it considers to be adequate for developments of a given size and scope. DDOT can then provide these examples to developers, applicants, and consultants as needed. Once a consultant has provided two or more
documents found to be sufficient, that organization or individual can ask to be placed on a list of recognized TDM planners maintained by DDOT. Individuals may also be allowed to submit two or more TDM plans from other areas or otherwise demonstrate their credentials for review. DDOT would maintain a list that can be supplied to interested parties as needed, preferably on the DDOT website. DDOT should review the TDM plans submitted by recognized consultants or other individuals to ensure that they continue to provide sufficiently detailed analysis. The purpose of this list would not be to exclude practitioners; qualified individuals could continue to submit plans for other parties as appropriate. Successful implementation of this element however would reduce DDOT staff time spent reviewing and commenting on plans submitted by recognized consultants. DDOT’s legal counsel should investigate District-wide certification processes, as well as liability and fairness issues.

**H) As the District’s requirements for TDM measures increase, additional resources within DDOT will need to be allocated to implement and administer the program.**

Based on the input received during the stakeholder interview process, the project team agrees that DDOT’s current staffing levels would be unable to fully accommodate all of the department’s desired TDM efforts, the additional administration associated with the proposed program, and coordinating efforts with OP and other district agencies. The capacity of current staff would need to be reviewed and additional resources considered (increased staffing, consultant assistance, outsourcing to other agencies, etc.) if the review and implementation of TDM is to be implemented as envisioned. TDM requirements should only be increased in conjunction with DDOT’s staffing being comparably expanded. Additional TDM requirements for developers without follow-up by DDOT will only result in unmet commitments and disenfranchisement of the public and development communities.

**I) The formation of Transportation Management Associations (TMAs) within the District is a goal of the Comprehensive Plan. DDOT will need address this recommendation and/or develop a functional equivalent to administer and monitor any TDM requirements implemented in the District. (Near-Term (Process), Long-Term (Operational))**

Both the current version and proposed update to the Comprehensive Plan envision the formation of TMAs or functionally equivalent organizations as a way to administer, oversee, support and enforce TDM requirements. TMAs would not represent a separate “level of government,” but instead would be an extension of DDOT’s ongoing efforts to reduce the impact of vehicular transportation. If TMAs are not feasible, DDOT should propose a different approach for inclusion of TDM oversight in future comprehensive plan updates. TMA’s, as a semi or fully independent entity, may also be able to act as a conduit for funding from outside sources, addressing some of the constraints DDOT has regarding dedicated funding.

Regardless of the eventual organizational title or structure, a body responsible for planning, supporting, following through, and enforcing TDM requirements will need to be developed. A funding commitment would be required by the District as part of this effort, since these types of organizations are typically not self-sustaining. A portion of the funding could come from members (funding formulas vary); however DDOT would need to address the issue of how outside funding could remain targeted to TDM projects and not end up in the general fund. Having TDM programs administered by a separate entity
may address this issue. A three-year timeframe for developing an approach is reasonable and should be
defined prior to the next update to the District’s Comprehensive Plan.

The primary role of the agency/organization will be to coordinate and promote TDM and alternative
transportation as well as to review and assist larger developments with their independent programs.
This organization might also assist DDOT by review the annual TDM reports submitted by larger
developments. Depending on funding mechanism, this group might also be responsible for producing
an annual report summarizing the effectiveness of its efforts. Some of the roles the organization would
fill include:

- Hiring a coordinator and support staff who will attend, and become part of, DDOT’s broader
  TMA network;
- Be the neighborhood champion of TDM and alternative transportation. Be a clearinghouse for
  local and regional TDM programs and opportunities;
- Develop a strategic marketing plan, with detailed schedules and budget, based on the outcome
  of meetings with the ANC/local community;
- Coordinate efforts with local ANC groups assigning transportation representatives or
  coordinators for each organization/association;
- Provide oversight of TDM programs of individual developers within the region;
- Possibly manage and host a local TDM Web site;
- Review the TDM annual reports from larger developments;
- Create (and potentially oversee) a monitoring and evaluation plan;
- Represent the TDM concerns of residents, employers and employees;
- Schedule transportation events;
- Open a Commuter Store in the neighborhood;
- Coordinate with leasing agents and building management companies to promote TDM and help
  them meet TDM commitments/requirements;
- Provide personalized transportation assistance to local residents and employees; and
- Distribute fare media and other transportation incentives.

An operational role may also be involved, such as working with several developments to pool resources
and implement more extensive measures. As an example, individual developments might not be able to
facilitate the creation of a shuttle service, but a larger agency might be able to coordinate such a service.
Such an expanded role for the organization would be at the discretion of DDOT. TMAs, however, are not
typically invested with authority over physical infrastructure (responsibility of which remains with either
DDOT or the property owner).
4.2 Long Term Changes to Maximize TDM Benefits (Implementation within three years)

**J) Until there is an established process for ongoing surveying to demonstrating success, quantification of site-level TDM impacts for the purposes of mitigation is not appropriate.**

There is a general desire in the district to quantify reductions in traffic and travel demand which can be attributed directly to project or development level TDM measures. However, credit for TDM benefits should only be taken if the program is reliably implemented, monitored (i.e. surveys taken regularly), and enforced (through fines or other actions that require an ongoing commitment). Unfortunately, the District is unable to accommodate or require any of these prerequisites at this time. Without such a process and the means to follow up on TDM commitments, one could potentially take advantage of the situation by promising to implement certain programs, taking credit for them in the planning approval process, and then ultimately failing to provide the promised items. Conversely, may developers need TDM to implement specific projects if their developments are to be successful. Failure on the part of DDOT or other agencies to fulfill their role in the TDM process might also be identified in the survey effort. It is premature at this time to formally and quantitatively consider the impacts of any program that is not enforceable or sustainable. As a result, in the near-term the District will need to encourage voluntary actions, formalize policy and begin the process of creating a regulatory framework to incorporate TDM in the District. Until the regulatory framework is established, DDOT should establish a pilot self-monitoring program for property owners who voluntarily agree to participate. Volunteers who submit evidence of TDM program implementation should be rewarded with ongoing agency support and positive press announcements.

**K) DDOT, DC Office of Planning (DCOP), other relevant district agencies, officials and stakeholders should formalize TDM considerations into the current DDOT/OP development review process.**

There is no formal or consistent process followed by both DDOT and OP when considering TDM in the current development review process. An official process should be formalized between the agencies (to transcend beyond current staff tenure) and include coordination with the Zoning Administrator (and DCRA for Matter of Right applications). The following steps are suggested as possible inclusions:

- At the pre-application preparation meeting, should it occur, DDOT would present the TDM table. (Input from stakeholders indicated that these meetings are offered to all applicants to facilitate the application preparation and review process. This meeting is not mandatory, but when it occurs, the TDM Table should be included as an agenda item.)
- When the applicant files a pre-hearing statement, DDOT would review the provided TDM program. OP and DDOT would send joint recommendations on the application. When applicable, this could be incorporated into the review of zoning relief requests.
- DDOT only has direct oversight on a limited number of transit services in the District; however, transit is an alternative mode that is key to the success of any TDM program. As such it is recommended that WMATA be included as an advisor into the development review process, primarily to provide comment on larger scale developments and Transit Oriented Development (TOD) projects.
Adopting these recommended steps would require addressing current shortcomings in the overall development approval process, including more regular engagement by DDOT. Additional staffing resources would need to be made available to implement these measures.

Workshops should also be offered to the BZA and ZC members, as well as ANCs, to educate relevant stakeholders in TDM as a policy priority and effective means of implementation (workshops on special exemptions, campus plans, PUDs, and variances can be held when relevant). Separate workshops for the DCOZ are recommended on the importance of follow-up on TDM agreements in the post-approval period for PUDs.

I) DDOT will need to spearhead an effort to formalize TDM as a regulatory requirement for new developments and as an ordinance in the Zoning Regulations for the District. This ordinance will need to address not only physical elements at the time of design and construction, but also ongoing survey requirements and the ability to assess fines when violations are identified or program goals are consistently not met. Funding of specific TDM programs will also need to be addressed.

For TDM to be effective in the District it will need to become a formalized and mandated planning element, fully outlined in new zoning ordinances. Some of the long-term elements that DDOT should consider for inclusion in the plan include:

- Adopt the TDM Expectations Table (see Table 2) as part of Zoning Regulations (or equivalent) and authorize DDOT to serve as the administrative agency.
- Establish a requirement that a TDM plan be included with the development application. The size of the actual document would be in line with the size of the development. Smaller developments might just provide a listing of the programs, a contact person, a funding commitment and a brief description of program. Larger developments would require extensive reports that would include goals and reporting commitments and may include elements such as:
  1. Providing contact information for the individual overseeing the TDM aspects of the project with a commitment for regular (annual) updates;
  2. A commitment to develop an operations manual delineating day-to-day tasks undertaken to successfully implement program;
  3. Branding the TDM program based on input from focus group studies;
  4. Developing a strategic marketing plan based on the outcome of the focus group studies;
  5. Developing programs specific to each TDM strategy;
  6. Conducting annual transportation trip generation and mode split surveys, including a baseline survey;
  7. Track the progress and success of each TDM program;
  8. Creating a monitoring and evaluation plan;
  9. Commitment to submit annual TDM report based on requirements;
 10. Hosting a development-specific TDM Web site;
 11. Addressing the TDM concerns of the residents, employers and employees of the specific developments;
 12. Scheduling alternative transportation promotional events at the applicant site;
 13. Locating a TDM office within the applicant site;
 14. Developing a targeted marketing program for residential sales/leases;
15. Developing a targeted marketing program for commercial programs for office tenants;
16. Establish a dedicated transportation fund, likely managed by DDOT, to fund TDM programs (that cannot be shifted to the General Fund). While this fund will include developer contributions, it should not be expected that the TDM program will be self-sustaining.\(^4\) Alternately, funding may flow through a TMA or similar independent body;
17. Offer an in lieu payment option where developer includes no TDM elements but pays a lump sum into District’s Transportation Fund (equivalent to TDM requirements for 30 years) and permit DDOT/TMAs to implement a TDM program on-site or to fund an implementing agency such as a TMA that has taken on this role.\(^5\) In this case DDOT would need to work closely with the developer to ensure developer and operators have the support (programs, policies and in some cases infrastructure) to ensure that TDM targets are met;
18. Establish modal split goals for all new developments. Require the developer/successors to conduct an annual survey of residents/tenants/employees. Allow the public to notify DDOT or Zoning Enforcement if commitments are not provided; and
19. Authorize DDOT or Zoning Enforcement to monitor all developments for TDM commitments at least once per year or based on public notifications. Establish a fine system based on number of days commitments are not provided.

A sample TDM plan is provided in Appendix C for illustrative purposes and a possible starting point for the DDOT in beginning to develop a plan for use in the district.

**M) Measures of Effectiveness for TDM programs should be two-fold: a reduction in peak period vehicle trips and a reduction in overall weekly vehicle trips.**

TDM and auto trip reduction in general is not just a tool for addressing peak period traffic, it is also a way to increase mobility for all residents, employees, and travelers in the District all the time. Also, parking is the primary consideration for residents and is not limited to peak travel periods. Any performance measures or monitoring should therefore include both peak period and weekly travel (all-day and weekend.) How these measures are estimated will require further investigation.

**N) Rather than calculating the potential impact of any specific elements of a TDM plan, DDOT should set overall vehicle trip goals and allow the developer to address the specific goals accordingly, with success determined via ongoing surveys and reporting back to DDOT.**

Quantification of TDM measures is challenging. The state of the practice is generally sketch level techniques intended to give a general idea of TDM impacts. The EPA COMMUTER model is generally accepted as the preferred estimation technique; however, it was intended for gross estimates of emissions reductions associated with TDM programs, not as a traffic analysis tool. Several locations,
including cities and counties near the District, have turned to performance-based programs instead of program quantification. This allows the developer and/or the building operator to select measures best suited to their projects. The District will need to establish a reasonable set of goals that developers and building operators are expected to achieve. These goals should be sensitive to the location of the development relative to transit services as well as the mode shares achieved by similar developments in the District. A study will need to be undertaken to identify how DDOT will set these goals. Initially DDOT may choose to turn to the MWCOG model mode share component and the Census Transportation Planning Package (CTPP) as possible sources for baseline and achievable mode shares goals. In the future, DDOT should require annual surveys from developments with TDM plans and from the TMAs in the region, which would provide a robust source of information to draw from.
Table 2: TDM Recommendations Matrix

DDOT TDM Expectations For All District Development Proposals

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposal consistent with the Zoning Code and project generates less than 50 peak hour auto trips.</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Compliance with Zoning requirements to provide bicycle parking/storage facilities.</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Require all parking costs be unlinked from the cost of lease or purchase. Parking costs must be set at no less than the charges of the lowest fee garage, located within ½ mile.</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Post all TDM commitments on-line, publicize availability, and allow the public to see what commitments have been promised.</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Identify a project’s TDM Leader (for planning, construction, and operations). Provide DDOT/Zoning Enforcement with annual TDM leader contact updates.</td>
<td>e</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Install a Transportation Information Center Display (kiosk) containing printed materials related to local transportation alternatives and maintain a stock of materials at all times.</td>
<td>S</td>
<td>S</td>
<td>e</td>
<td>e</td>
</tr>
<tr>
<td>Provide website links to CommuterConnections.com and goDCgo.com on developer and property management websites.</td>
<td>e</td>
<td>e</td>
<td>e</td>
<td>e</td>
</tr>
<tr>
<td>At no cost, dedicate spaces in the garage for car sharing services to use with right of first refusal. Locate spaces that are convenient to the garage entrance, available to the members of the car sharing service, twenty-four hours a day, seven days a week, without restrictions (the garage may be gated—members of the service would have access to the spaces via a key pad combination to a pass code system, or other similar device). Count the car sharing spaces towards the project’s parking requirements.</td>
<td>$</td>
<td>$</td>
<td>S</td>
<td>$</td>
</tr>
<tr>
<td>Provide reserved spaces for carpools and vanpools that are conveniently located with respect to the elevators serving the buildings. Oversee a program to provide carpools and vanpools with a parking subsidy.</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Provide secure bicycle parking/storage facilities (baskets, bicycle parking, etc.)</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Contribute funding to available, non-exclusive Shuttle Service to Metro or DC Circulator (based on total number of trips generated). Only applies to developments not considered Transit Oriented Developments by DDOT.</td>
<td>S*</td>
<td>S*</td>
<td>$</td>
<td>e*</td>
</tr>
<tr>
<td>Provide an on-site business center to residents with access to copier, fax, and internet services.</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Provide location for Bikeshare Program Stations/Kiosk.</td>
<td>Not Applicable</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Provide ongoing Funding for on-site Bikeshare Program</td>
<td>$</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Provide each new resident with 1-year subscription to DC BikeShare Program.</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Provide residents with $75 mail-in refund on bicycle purchases.</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Contribute $100.00 Metro fare media per person, for free, one time, per employee, to each of the tenants’ employees and each on site employee of the property management company and/or building operator.</td>
<td>S*</td>
<td>S*</td>
<td>$</td>
<td>e*</td>
</tr>
<tr>
<td>Provide SmartTrip cards plus $100.00 Metro fare media per person, for free, one time, per resident.</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>$</td>
</tr>
<tr>
<td>Provide a one-time membership fee subsidy in a car sharing program for each residential unit.</td>
<td>S</td>
<td>e</td>
<td>S</td>
<td>e</td>
</tr>
<tr>
<td>Locate and furnish an on-site Transit Store free of charge.</td>
<td>Not Applicable</td>
<td>$</td>
<td>S</td>
<td>$</td>
</tr>
<tr>
<td>30 year commitment to operate an on-site Transit Store.</td>
<td>Not Applicable</td>
<td>S</td>
<td>S</td>
<td>$</td>
</tr>
<tr>
<td>Operate a Shuttle service to metro or other appropriate destinations specific to the site/development.</td>
<td>Not Applicable</td>
<td>S*</td>
<td>S*</td>
<td>e*</td>
</tr>
<tr>
<td>Install and maintain new bus stop infrastructure.</td>
<td>$</td>
<td>S*</td>
<td>S*</td>
<td>S*</td>
</tr>
<tr>
<td>Construct new Metro Rail stations connection (entrance, elevator, fare area).</td>
<td>S*</td>
<td>S*</td>
<td>S*</td>
<td>S*</td>
</tr>
</tbody>
</table>

* Shuttles and Direct Access to Metro are site specific. DDOT expectations for these measures will be dependant on the practicality of adopting them at a specific location.

Guide to Users:
Use the top row of this table to identify the category which best describes the development proposal, the minimal TDM measures expect are indicated in column below along with others that may be used as substitutes and/or above and beyond the minimum requirements. These expected measures which develop for maneuvering TDM plans in other locations both in the greater DC region and nationally. DDOT encourages the adoption of measures above the minimum expected, reserves the right to require additional measures beyond these minimal expectations as warranted.
5.0 Other Planning Issues that Indirectly Impact TDM

In undertaking this study, a number of general planning concepts and goals were proposed that, while supportive of TDM, are beyond the scope of this work. These are provided to DDOT as suggestions for the agency as it continues to refine its approach to TDM and the planning process in general.

- Establishing parking maximums by neighborhood or district would have a profound impact on transportation and development. In this scenario, if a developer wanted to provide more spaces than allowed in an area, a per-space fee could be levied and funds deposited into the District’s non-auto transportation fund. In this case, shift the standard traffic impact from “10 additional trips generated” to “any increase in the amount of off-street parking they maintain for non-residential uses.” This is an initiative that should be jointly investigated between DDOT and OP.

- Require the “unbundling” of parking costs from real estate purchases and leases so that parking costs can be better understood by occupants and DDOT. (One peer model is San Francisco’s unbundling requirement in its Zoning Code for downtown.)

- Establish multimodal standards that specify the number of trips that can be generated by and accommodated in any zone.
  - Include trip supply for all modes (roadway capacity, transit capacity, and sidewalk and bike network completeness).
  - Assign weights for each mode and assign to districts based on the Comprehensive Plan.
  - If a proposed development will generate more trips than the supply will accommodate, require the development to expand the transportation network based on the modal weights and balance mode use with TDM measures.

- Establish, as policy, that the District will not widen any roadways for additional auto capacity. This concept, often referred to as “complete streets,” is based upon the belief that the current transportation network accommodates all the peak hour trips it can and will not be significantly expanded (widening to accommodate additional capacity for alternative modes or to address substandard safety conditions would be exempt from this requirement). Therefore, since all new developments will create additional trips, all new developments will result in impacts.
  - Calculate how many new trips could be accommodated by all of the non-auto transportation projects in the District’s Transportation Improvement Program (TIP).
  - Determine the price of all of the non-auto transportation projects in the District’s TIP.
  - Calculate the average price per additional trip accommodated by the transportation network by dividing the total cost by the total number of trips.
  - When a development is proposed, determine how many trips it will generate. Require the developer to pay the District an impact fee based on the number of trips generated multiplied by the average price per trip accommodated.
  - Dedicate the impacts fees paid to the implementation of the non-auto transportation improvements.
Appendix A: TDM Programs and Ordinances: Literature Review
DDOT Incorporation of TDM in the Development Process

TDM Programs and Ordinances: Literature Review

November 18, 2009

Submitted to:
District Department of Transportation
Transportation Policy and Planning Administration

Submitted by:
Michael Baker Jr., Inc.
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1.0 Introduction

As part of the ongoing effort to identify ways of better integrating Travel Demand Management (TDM) into the District’s overall development process, a research effort was undertaken to identify TDM programs from across the country and to summarize some of the best practices and approaches. Candidate studies were identified by online sources, suggestions by DDOT staff and through practitioners in the field. From the initial review, six locations were chosen for more in depth study:

- Cambridge, MA
- Montgomery County, MD
- Arlington, VA
- Alexandria, VA
- Contra Costa (Bay Area), CA
- Seattle, WA Metropolitan Region

These more detailed reviews drew upon the experience of the project team and additional research into the specific programs. For the other TDM programs identified, shorter descriptions are provided. Additional point-form summaries are provided for regional programs where only limited information could be found as well as a selection of site specific programs.

1.1 General Observations

Review of the various ordinances, regulations and planning policies identified during the research effort revealed a vast array of approaches. Goals varied widely, with some agencies looking at TDM as a traffic mitigation tool, others setting goals for alternative modes of transport, still others using TDM to complement and re-enforce their urban planning vision. However a number of general themes were identified that may assist the District in formulating an approach for the region:

- Approaches to “elevate TDM” in the development process are very unique and a reflection of how a particular region operates from a political perspective. As such, few “tried and true” methods exist.
- The metric by which the success of a program will be evaluated has a direct impact on how TDM is approached. Metrics are generally a reflection of the underlying policy goals of the TDM program. For example, a metric based on transit use might focus development at major transit station, a parking ordinance might focus development along corridors.
- The more successful TDM programs rely on continuing, enforceable ordinances. Stand alone programs relying on voluntary measures, while often somewhat successful in reducing auto trips, tended to have less influence on the nature or type of the development in a region.
- Ordinances take on many forms and may tie into zoning, the building/site approval process or specific parking requirements.
- The most successful TDM programs generally set low thresholds (size of development, number of employees, number of parking spaces, etc.) where TDM requirements become mandatory. However a broad range of thresholds exist and in some cases programs focus solely on larger employers and/or developments.
- In order to have TDM considered earlier in the development process, most locations make the submission of a TDM plan a requirement of the certificate of occupancy. The degree to which
these plans are scrutinized varied widely, with many plans only being a small sub-section within a project’s traffic impact study.

- Significant TDM program support funded at least in part by the city/regional agency was a common theme in the more successful examples. This took the form of a significant staff commitment at the regional government office to TDM efforts (including an area-wide coordinator) or an active Transportation Management Association (TMA).
- The existence of an agency with enforcement authority appeared to be a necessary element for TDM to have a significant impact.
- While difficult to measure, TDM efforts appear to be greatly impacted by the local culture or mindset. San Francisco, Seattle and Cambridge, MA are all examples of areas that have aggressive trip reduction goals and anecdotally developers in these areas tend to address TDM early on as a selling feature. Businesses attracted to these locations also appear to place a high value on quality of life issues addressed by TDM either in response to customers or as a benefit to staff.
- Locations with limitations on roadway capacity (physically as in San Francisco or self-imposed as in Arlington) and parking also tended to have the strongest programs. In these locations TDM directly influences accessibility and ultimately the viability of projects. The results tended to be a development process where TDM is a fundamental consideration.
- The difficulty of implementing TDM in a residential setting was noted in a number of locations, with only the most active programs addressing this type of development in a significant way.
- Monitoring is a major requirement if TDM programs are to have an influence, with the vast majority of programs requiring annual reporting. The most successful survey programs are those tied to other survey requirements in the region.

The diversity of approaches suggests that a “one-size-fits-all” program may not be as successful in a setting as large as the District. Developing programs tailored to specific communities and neighborhoods is an option that may warrant further consideration.
2.1 Detailed TDM Program Review: Cambridge, Massachusetts

A. Background

The City of Cambridge established a Vehicle Trip Reduction Ordinance (VTRO) in 1992 to reduce overall auto trip impacts in the city. Out of this ordinance, the City has developed two new programs, one to mandate TDM participation at existing developments and one to cover new development projects — the City’s Parking and Transportation Demand Management (PTDM) ordinance and its Article 19 process (A19), respectively.

The PTDM enjoys widespread support among the city council, city planners, the business community, and the public. This is most clearly evident by the Cambridge City Council’s September 11, 2006 vote to eliminate the program’s sunset clause in order to expand the positive impact of the program. The A19 program is newer and has recently begun to affect residential developments.
B. Vehicle Trip Reduction Ordinance

In 1992, the Cambridge City Council passed the Vehicle Trip Reduction Ordinance as part of an effort to address community concerns about increasing traffic congestion and environmental pollution. The ordinance required the City government to begin implementing Transportation Demand Management strategies such as transit subsidies and bicycle parking that would reduce vehicle trips by City staff. The most significant effort was led by the Environmental and Transportation Planning Division of the City’s Community Development Department, which also began working cooperatively with citizens, businesses, and institutions in Cambridge and the Boston area to implement similar TDM benefits for their employees.

C. Parking & Transportation Demand Management (PTDM) Ordinance

In 1998, a formalized, mandated TDM program for businesses in Cambridge was approved by the City Council with the passage of the PTDM Ordinance (Section 10.18 of the Cambridge Municipal Code).

1. Participation Trigger

The PTDM Ordinance is triggered when any landowner in the City of Cambridge seeks any increase in the amount of off-street parking they maintain for non-residential uses. All landowners are required to register their parking with the City’s Traffic, Parking & Transportation Department (TPTD) which has maintained a comprehensive inventory of all off-street parking facilities in Cambridge since 1971. The Director of TPTD determines if a building permit or parking license to increase registered parking has triggered the PTDM Ordinance and if so, sends notification to the landowner.

2. Compliance

Compliance with PTDM requires approval of a PTDM plan by a PTDM Planning Officer. Parking facilities with a total of 5 to 19 spaces are considered “small projects” and must implement three unique TDM measures from a toolbox of suggested TDM measures – as a one-time implementation with no required monitoring or performance targets.

The list of specific measures is not documented in the ordinance, but is rather maintained and updated by the Planning Officer. Commonly implemented measures include:

- subsidized transit passes;
- information kiosks;
- bike racks;
- bike showers;
- car-sharing spaces;
- carpool spaces; and
- a guaranteed ride home program.

Projects that create facilities of 20 or more parking spaces are considered “large projects” and are subject to greater implementation and reporting requirements. Most significantly, most projects must commit to reducing their percentage of drive-alone trips by 10% from 1990 levels for the census tract in
which the site is located. To achieve this goal, landowners must prepare an aggressive package of TDM measures under the guidance of the Planning Officer.

Typical plans include many of the small project measures listed above as well as:

- Membership in a Transportation Management Association (TMA);
- Market-rate parking fees;
- Employee transportation accounts;
- On-site transportation coordinators;
- Commuter awareness events;
- Shuttles to transit;
- Transit shelters;
- Bike stations; and
- Tele-commute programs.

Each plan must also include a detailed monitoring program to determine the mode shares of all persons who may use the subject parking facility. Programs typically include annual or biennial employee surveys, parking utilization counts, and driveway counts — each of which are compared to a base-year set of observations.

All small or large project plans must be approved or rejected by the PTDM Planning Officer within 90 days of their submittal. If a plan is rejected, the landowner cannot receive a permit to expand their parking facility.

Large projects that are subject to monitoring must implement additional, more aggressive TDM measures if they fail to meet the mode split goal of a 10% drive-alone-rate reduction from 1990 levels for the census tract in which the site is located.

3. Administration and Enforcement

If a landowner fails to comply with the PTDM, the TPTD Director may take enforcement action until the landowner complies. Enforcement can consist of a fine of $10 per day for every parking space in the facility or even physical closure of the subject facility. Landowners are directed to work with the City’s PTDM Planning Officer who is appointed by the City Manager and works in the Community Development Department. The Planning Officer provides guidance to landowners, approves final PTDM plans, and reviews and approves any required monitoring reports.

Compliance has been very high and consistent. To date, non-compliance penalties have not been used. Survey return success has been aided by the fact that the State requires a number of annual surveys from employers. As a result, employers tend to have already implemented effective strategies for surveying, including contracting out for the services.
4. Performance Measures

The fixed 10% target reduction in drive-alone commute rates is the primary performance measure for the program. A secondary measure of the program’s impact is its own growth in terms of how many developments enter into PTDM agreements.

5. Performance to Date

The PTDM Ordinance has been very successful for Cambridge. Nearly 100 large projects have resulted in detailed monitoring plans — and dozens of small project landowners have implemented one-time TDM measures. The regular monitoring requirement for large projects has demonstrated much success. Over 85-percent of the monitored businesses have met or exceeded their mode split goal. The average drive-alone mode split for monitored businesses by 2004 had dropped from 68% to 55%, removing an estimated 7,000 vehicle trips from Cambridge roads each day.

The ordinance is notable for both its impact on new developments and popularity. It enjoys widespread support among the city council, city planners, the business community, and the public. The original ordinance contained a sunset clause for the ordinance, which was lobbied for by the business community which feared the implications of TDM on the cost of business. After two renewals, the sunset clause has been eliminated in the latest version of the ordinance, so PTDM is now a permanent program.¹

Developers who originally received the ordinance with skepticism found that employees support the transit benefits program and it has become an effective marketing tool to attract prospective employees.

Success stories include the Technology Square development which sought to double its office and research campus from 1M square feet to 2.6M square feet and add over 600 new parking spaces. During preparation of its PTDM plan, the developer cut back the parking expansion by over 200 spaces and was able to commit to a drive-alone rate of 50 percent. Within one-year, the project exceeded this goal, and was operating at only 40 percent drive-alone by year two. A smaller development with 220,000 square feet of office space and 220 parking spaces committed to a 56 percent drive-alone mode split in 2002, and has been performing at less than 48 percent since.

6. Funding

Program participants fund their own mitigation activities, and are not required to contribute to the overall cost of program administration.

D. A19 and the Project Special Review Permit

The success of the PTDM program, though significant, was limited in its impact on overall traffic generation by the program’s narrow focus — existing land uses for which parking expansions were sought. Throughout the 1990’s, Cambridge residents continued to oppose the overall level of local traffic growth due to rapid development within the city, especially in East Cambridge. Eventually,

¹ Section 10.18.090
citizens demanded a halt on development, eventually settling for the Interim Planning Overlay Petition (IPOP) that sought detailed traffic review of new developments along with impact thresholds and mitigation requirements.

The IPOP became formalized as Article 19 of the City’s zoning ordinance. While the City’s PTDM did not require participation from residential developments, the only exclusion in A19 was for university housing.

1. Intent of A19

The intent of A19 is to establish traffic and urban design standards for development projects likely to have significant impact on abutting properties and the surrounding urban environment.

To realize this intent, A19 codifies the city’s urban design objectives and establishes detailed building and site development standards to (1) regulate new building construction in the city’s commercial and high density residential areas; (2) establish standards by which significant adverse traffic impacts can be measured; and (3) establish procedures by which individual proposals can be reviewed by the Planning Board, city staff and the general public before a building permit is issued.

2. Traffic Impact Review

The Planning Board assesses the impact of the vehicular traffic, and pedestrian and bicycle circulation expected to be generated by a proposed development project. The procedures and requirements are intended to encourage applicants to adopt a development program that reduces the number of single occupancy vehicles coming to the site.

Such a program is also expected to encourage pedestrian and bicycle access to the site and throughout the neighboring district, while reducing potential negative impacts of the vehicles coming to the site on abutting properties. While the review focuses especially on the impacts affecting abutting properties and the immediate environment, the impacts on streets and locations more distant from the site, and on transit and bus facilities serving the site, are also assessed.

3. Project Special Review Permit

To ensure that new construction or changes of use in existing buildings do not impose substantial adverse impacts on city traffic, a special permit process was established as part of A19.

a. Participation Threshold

A Project Special Review Permit (PSRP) is required for new building construction based on the gross floor area (GFA) and nature of the proposed project, as stipulated within the ordinance. In an existing building, the PRSP shall be required where the total GFA of a new use or uses on a lot exceeds the threshold limits set forth for new developments.
b. Application

An application for the PSRP is made to the City Planning Board. The application must consist of the following materials:

- Planning Board Special Permit Application Form. The application shall include all required plans and narrative statements. The site plan and other plans, elevations, and drawings shall clearly show:
  - The access and egress points for all forms of travel to the site;
  - The location of adjacent bus and transit stops;
  - The schematic design of proposed mechanical equipment; and
  - The architectural screening treatment proposed for that mechanical equipment.
- Traffic Study. This must include a geographic and functional scope determined by the Traffic, Parking and Transportation Department (TPTD) to be appropriate to the location of the project. In general, the study must review intersections where the project will have significant and measurable impact.

The TPTD must issue a certification to the applicant within twenty-one (21) days of its submission that the traffic study has been done in a complete and reliable manner. Where that certification is denied, the applicant may revise the information in the traffic study and resubmit it; a certification of the revised study must be issued or denied by the TPTD within fourteen (14) days of the resubmission of material.

Based on guidelines established by TPTD, the traffic study must include a narrative discussion of:

- The nature and quantity of vehicles traveling to the site including, in addition to passenger cars, service, delivery and other commercial vehicles;
- The likely impact of such vehicular traffic on abutters, abutting streets, and nearby residential streets, including on-street parking behavior;
- The physical nature of pedestrian and bicycle access to the site and the quantity of movements anticipated for each;
- An analysis of the crash history at intersections within the study area; and
- Parking and transportation demand management measures proposed to ameliorate any adverse traffic impacts identified in the study.

Additional elements of the Application (not related to traffic) include:

- A Tree Study;
- An Urban Design Objectives Narrative;
- A Sewer Service Infrastructure Narrative;
- A Water Service Infrastructure Narrative; and
- A Noise Mitigation Narrative.

c. Approvals Evaluation

The Planning Board only grants the special permit if it finds that the project will have no substantial adverse impact on city traffic within the study area as analyzed in the Traffic Impact Review. In determining whether a proposal has substantial adverse impacts on city traffic the Planning Board assesses the following indicators:
Project vehicle trip generation: weekdays and weekends for a twenty-four hour period, and A.M. and P.M. peak vehicle trips generated;
- Change in level of service at identified signalized intersections;
- Increased trip volume on residential streets;
- Increase of length of vehicle queues at identified signalized intersections; and
- Lack of sufficient pedestrian and bicycle facilities.

When one or more of the indicators is exceeded, it is indicative of potentially substantial adverse impact on city traffic. In making its findings, however, the Planning Board considers the mitigation efforts proposed, their anticipated effectiveness, and other supplemental information that identifies circumstances or actions that will result in a reduction in adverse traffic impacts.

Such mitigation efforts and actions can include, but are not limited to:
- Transportation Demand Management plans;
- Roadway, bicycle, and pedestrian facilities improvements;
- Measures to reduce traffic on residential streets; and
- Measures undertaken to improve safety for pedestrians and vehicles, particularly at intersections identified in the Traffic Study as having a history of high crash rates.

The precise numerical values that indicate potentially substantial adverse impacts for each of these indicators are revised periodically by the City Planning Board in consultation with the TPTD, and published and made available to all applicants.

4. Results

Around 2002, several large residential developments were proposed. This was the first real test of applying the new program’s requirements to residential development, which was met with much resistance. Residential developers claimed they were fulfilling an official City goal by providing more housing, and so shouldn’t be treated like commercial developers. However, traffic studies of the projected impacts of large residential developments were not easily dismissed — and the new legislation has been upheld.

E. Residential Implementation – A New Challenge

Residential projects tend not to trigger the primary VTRO criteria — peak-hour trip generation — as much as they do secondary criteria such as daily trip rates. Therefore, unlike commercial developments, impacts were not as clear for peak-hour intersections. Impacts on overall daily trip volumes, by contrast, are not as easy to quantify, nor as immediately noticeable. For instance, a large residential development may not significantly impact nearby intersections at any one hour of the day, though it produces a significant amount of trips throughout the day.

**TDM Measures for Residential Developments**

The most effective measures among commercial developments caused much debate and resistance among residential developers — contributions to the transit shuttles, subsidized transit passes, and
ongoing, annual monitoring. These measures required on-going financial commitments, which were deemed to be unsustainable by some homeowners’ associations.

Cambridge’s zoning prevents unbundling (assessing a fee for parking distinct from rental fees or home purchases), so pricing parking is not an available tool for residential developments. Bike & pedestrian measures have been frequently implemented — racks, sidewalks, paths, bigger elevators, etc. Other TDM toolbox measures that have been used include car-sharing, electric charging stations, posting transit information in lobbies and on websites, and on-site transportation coordinators (provided by the management office).
2.2 Detailed TDM Program Review: ARLINGTON COUNTY’S TDM PROGRAM FOR SITE PLAN DEVELOPMENT

A. Background

Arlington County’s coordinated policy approach to land use and transportation planning has allowed it to grow rapidly over the last 30 years without major expansions in the highway network and minimal traffic growth. In that time, nearly 18,000 residential units, 14 million square feet of office space, 1.5 million square feet of retail, and 1,218 hotel rooms have been built just in the area served by the county’s Orange-Line Metrorail corridor – Rosslyn, Courthouse, Clarendon, Virginia Square, and Ballston stations. Other major development areas include the Jefferson Davis and Columbia Pike Corridors. Today, the County contains more than 46 million square feet of office and retail space – more than downtown Dallas, Denver, or Seattle².

As intense as this development has been, it has generated only modest levels of traffic growth. Year 2000 U.S. Census data show that almost half of Orange-line corridor residents ride transit to work. Traffic counts from 1997 to 2004 show that while office and residential square footage increased by 17.5% and 21.5% respectively, traffic along the Rosslyn-Ballston corridor grew by only 2.3%. Surveys at large apartment buildings have shown peak hour auto trip generation rates of one trip per 5.9 units, far below the standard in the Institute of Transportation Engineers’ Trip Generation Manual.

The resulting economic prosperity has been remarkable, including the lowest property tax rate among the major cities and towns in northern Virginia and a AAA bond rating. The county’s Metrorail corridors provide 50% of the County’s tax base — on only 7% of the land. The County also enjoys far lower vacancy rates and higher lease and sale prices, compared to other regional locations.

B. The TDM Program for Site Plan Development

Arlington County’s TDM Program for Site Plan Development is an Arlington County Commuter Services (ACCS) program adopted by the County Board in 1990. This program was the product of a joint task force of the Arlington County Planning and Transportation Commissions, and an outgrowth of the comprehensive site-plan review process headed by the Arlington County Department of Community Planning, Housing and Development (DCPHD).

Arlington’s TDM policy focuses on workplace commuter travel and looks to reduce peak hour work travel by achieving a reduction of single occupant vehicle trips. Its objectives are consistent with, and help support, those of the County’s Master Transportation Plan, including achievement of major street and intersection level of service goals.

The key program requirements include:

- A TDM plan for each development consistent with the TDM Matrix (see Figure 1);
- A standard site plan condition to implement the TDM Matrix;
- In-building parking provisions that extend preference to vanpools, carpools, and bicycles;
- The encouragement of travel to and from the work place by modes other than single occupant automobile through various educational and incentive measures;
- Coordination and cooperation on such measures among employers, building owners, and management companies. The county has one central transportation management agency (TMA), Arlington Transportation Partners, that serves this function for most developments; and
- Arlington County using its roles as developer of public buildings and as employer to encourage TDM practices.

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3 Ibid
4 The county’s second TMA, the recently formed, Potomac Yards TMA, was established exclusively to assist in the implementation, coordination, and monitoring of TDM’s generated among developments within a single, large development area in southern Arlington County.
C. The Matrix

Recommended County TDM programs are set forth in the TDM matrix (see Figure 1). However, upon providing clear and convincing evidence that particular elements of the TDM matrix may be inappropriate for a particular project, the developer may propose substitution of other elements which provide equivalent value.

No Site Plan TDM Program is expected to incorporate all the strategies outlined in the matrix. Rather, the matrix provides a framework of options from which the County will help developers identify appropriate actions for their project. In doing so, the County distinguishes the intensity of the strategies, matching them with the assessed impact of different developments on the transportation system. The greater the impact, the more intense the mitigation measures in the approved Site Plan will be. The categories and density thresholds are described in the matrix below and through the following context codes:

Matrix Land Use Category Codes
A. Development plan is consistent with the General Land Use Plan (GLUP), and no traffic problems are projected related to the development and its surroundings.
B. Development plan is consistent with the GLUP, however, traffic problems are projected related to the development and its surroundings.
C. A GLUP amendment is requested for a non-conforming development plan, no traffic problems are projected however.
D. A GLUP amendment is requested, and traffic problems are projected.

The DCPHD reviews submitted site plan proposals to assess transportation impacts and opportunities. Reviews incorporate an assessment of site characteristics, proposed land-uses, a traffic impact analysis (TIA) report, and a proposed parking plan. The ACCS then helps the developer identify site-specific strategies and prepare a TDM plan. Each TDM strategy is selected to mitigate the transportation impacts of the site on a case-by-case basis.

Developers can obtain further assistance in implementing their TDM plan requirements by contacting the County’s primary TMA – Arlington Transportation Partners (ATP), a division of ACCS – or the County’s TDM planner.
To ensure that parking rates will reflect true market conditions in a competitive environment, lease agreements with parking garage operators are encouraged. Although a set number of spaces may be reserved for a tenant, the cost of an individual parking space is not controlled by the tenant and subsidies are prevented from being passed along to specific persons.
### Figure 2: Arlington’s TDM Program Matrix

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Land Use Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td><strong>Transit Programs</strong></td>
<td></td>
</tr>
<tr>
<td>Contribute to Employer Bus Shuttle</td>
<td>**</td>
</tr>
<tr>
<td>$7,970/Year</td>
<td>***</td>
</tr>
<tr>
<td>$15,947/Year</td>
<td>***</td>
</tr>
<tr>
<td>$23,911/Year</td>
<td>***</td>
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<tr>
<td>Operate Employer Bus Shuttle</td>
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<tr>
<td>Fare Media Subsidy</td>
<td></td>
</tr>
<tr>
<td>25-50 Percent</td>
<td>X</td>
</tr>
<tr>
<td>50-75 Percent</td>
<td>X</td>
</tr>
<tr>
<td>75+ Percent</td>
<td>X</td>
</tr>
<tr>
<td><strong>On-Site Construction</strong></td>
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<tr>
<td>Bike Lockers, Racks</td>
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<tr>
<td>Shower Facilities</td>
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<tr>
<td>Van Accessible Garage</td>
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<tr>
<td>Off-Street Delivery/ Loading</td>
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<tr>
<td>Roadway Improvements</td>
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<tr>
<td>Pedestrian Systems</td>
<td>X</td>
</tr>
<tr>
<td><strong>Off-Site Construction</strong></td>
<td></td>
</tr>
<tr>
<td>Direct Metro Connections</td>
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</tr>
<tr>
<td>Existing Knockout Panels</td>
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<tr>
<td>New Connections</td>
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<tr>
<td>Intersection Improvements</td>
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<td>New Facility Construction</td>
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<tr>
<td>New Metrorail Station</td>
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<td><strong>Employee Policies</strong></td>
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<td>Flex Time</td>
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<td>Telecommuting</td>
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<tr>
<td>Trip Generation Restrictions</td>
<td>X</td>
</tr>
<tr>
<td>Transportation Management Organization</td>
<td>X</td>
</tr>
<tr>
<td><strong>Monitoring &amp; Compliance</strong></td>
<td></td>
</tr>
<tr>
<td>Contribution</td>
<td>**</td>
</tr>
<tr>
<td>$1,000/Year</td>
<td>***</td>
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<tr>
<td>$5,000/Year</td>
<td>***</td>
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<tr>
<td>$10,000/Year</td>
<td>***</td>
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<tr>
<td>Performance Guarantees</td>
<td>X</td>
</tr>
<tr>
<td>Zoning Compliance Fines</td>
<td>X</td>
</tr>
<tr>
<td>Contingent Phasing</td>
<td>X</td>
</tr>
</tbody>
</table>

* If GFA is less than 100,000 SF
** If GFA is 100,000 - 200,000 SF
*** If GFA is more than 200,000 SF

6 To date, approved Site Plans have not required either Contribution - to offset monitoring and compliance costs - or Performance Guarantees.
D. Participation

Participation in the Site Plan Review process is voluntary, but incentivized through density bonuses. Each zoning district permits a certain type and level of development "by-right." Beyond this, certain districts provide public review processes for a special exception by "site plan" that allows for greater flexibility in use, density, and form of development. The key to the success of the Site Plan Review Process is that additional development potential serves as an incentive to developers to seek a special exception by site plan and participate in the process.

To date, the density bonuses have been significant enough to attract the majority of new development projects into the process. By framing incentives in terms of added project density, the Site Plan Review Process supports the County’s objective of concentrating development around transit stations.

E. Implementation

The developer must follow conditions outlined in the final approved site plan in order to receive a building permit and to continue to be in compliance with the property’s existing zoning. While entering the site plan approval process is voluntary, once approvals are received, TDM conditions run for the life of the building, regardless of ownership, and guide all future decisions regarding development on the property.

The developer of an approved site plan property must implement the TDM program and obtain approval from the County before gaining the first Certificate of Occupancy. At this time the developer will prepare a property TDM Report. Subsequent to the first approval, the property owner will re-submit the property’s TDM Report on the anniversary of the approval of the first Certificate of Occupancy.

Common components of site plan implementation include:

- Ridesharing promotion;
- Parking management;
- Transit promotion;
- On-site construction measures;
- Mutually agreed off-site provisions or contributions;
- Lease agreements; and
- Monitoring and compliance

F. Common Strategies

Some of the most common strategies used today include:

- Conducting an employee transportation survey, provided free by ATP;
- Attending a free, ATP-sponsored employer workshop or seminar;
- Posting commuter information in a company newsletter, on a central bulletin board, internal e-mail system, or website;
Installing a permanent display case, stocked with commuter information tailored to the specific worksite, in a central area;
Hosting an on-site transportation event for employees;
Providing preferred parking spaces for carpools and vanpools;
Implementing an informal teleworking program;
Installing bicycle and/or shower facilities to encourage bicycle and pedestrian commuting; and
Offering employees flextime, compressed work week, or job sharing options.

More intensive TDM strategies include:
- Starting a formal telework program;
- Instituting a tax-free transit benefits program, either employer-sponsored or through pre-tax payroll deduction;
- Developing a commuting incentive program for those who carpool, bicycle or walk to work;
- Providing an employee/customer shuttle to local transit stations or other service areas;
- Supplementing the regional Guaranteed Ride Home program with an additional employer-sponsored service;
- Implementing a parking fee for solo drivers (for employers who previously offered free parking);
- Offering free or reduced-price parking for carpools and vanpools (where a fee previously existed);
- Starting business-sponsored or subsidized vanpools; and
- Implementing an active Air Quality Action Days program.

G. Monitoring and Compliance

The County’s TDM planner is assigned to cover TDM compliance and monitoring. Staff for these tasks has increased along with the number of properties with Site Plan review obligations.

For Category D projects, developers can be required to provide a performance guarantee to assure continuing performance. To date this option has not been used by the County for any project.

H. Performance Measures

The Arlington TDM program seeks to achieve the following results, which may be employed as evaluators of the success of the program:

1. Maintain pre-construction peak hour levels of service at major intersections.
2. Limit single occupancy vehicle trips generated by development.
3. Reduce vehicle-generated air pollution.
4. Maximize transportation alternatives while minimizing single occupancy travel.
5. Utilize transportation facilities efficiently.
6. Encourage efficient, cost effective modes of transportation that focus on moving people, not vehicles.
7. Improve transit information and dissemination so people will be able to make the most efficient and friendly use of the system.
8. Utilize public transportation effectively and efficiently, through improved system information, frequencies, routing, connections, transfers; innovative technologies are encouraged.
9. Configure mass transportation to provide access to, through, and around employment centers.
10. Encourage innovative technologies that move people between home and work the most efficient and effective way.
11. Maximize convenience of inter-modal transfers between the commuter rail system and feeder/distributor systems.
12. Encourage group riding and shared parking arrangements through parking management plans.
13. Minimize or eliminate barriers to group riding.
14. Review transportation management plans during the site development process.

I. Performance

Arlington’s TDM initiatives have successfully evolved and expanded since authorization of the original policy in 1990. Today, over 110 site plans have been approved by the County Board with TDM plans and ACCS now includes a ten-person sales team that serves 600 businesses. Ninety percent of all development is now conducted through the Site Plan review program - almost all of the remaining 10% consists of either single-family homes or small, town home developments.

J. Funding

The most fundamental obstacle to long-term operation of the TDM program is a lack of funding. Currently, no dedicated funding is available for ACCS; instead programs rely upon state and federal grants. Unlike most other civic functions performed by Arlington, TDM programs have no financial backing from the County. This leaves this important function in a precarious position, especially in its potential for continued growth. Recent changes that have brought improved financial security for the program include: indexing contribution increases to inflation (as indicated by the Consumer Price Index) and expanding the obligation for Transit Store/TMA contributions from 10 years to 30 years.

The key opportunity for the County continues to be the level of development demand. This has allowed the County to extract substantial civic improvements from private developers without slowing development activity. In fact, over time, the public investments secured by the program increase development demand by contributing to the distinct mobility environment that makes Arlington County a uniquely desirable place to live, work, and visit.


2.3 Detailed TDM Program Review: MONTGOMERY COUNTY’S TRANSPORTATION MANAGEMENT DISTRICTS AND TRAFFIC MITIGATION PLANS

A. Background

Montgomery County Commuter Services (MCCS), a section of the Division of Transit Services in Montgomery County’s Department of Public Works and Transportation (DPWT), provides free commuter assistance to county employers and employees through education and promotional outreach services, as well as incentive programs and a transit store.\(^7\)

Beginning in the late 1980’s, Montgomery County established Transportation Management Districts (TMDs) to provide concentrated services to encourage the use of transit and other commuting options in the County’s major business districts — Downtown Bethesda, North Bethesda, Friendship Heights, and Downtown Silver Spring. A dedicated TMD staff was assigned to each district, to focus efforts in these areas.

\(^7\) These are physical stores although online fare media sales are also available - http://www.montgomerycountymd.gov/cittmpl.asp?url=/apps/dpwt/fare_media/index.asp.
B. The TMD Program

The County has four broad goals for its TMDs:
- Reduce traffic congestion;
- Increase transportation capacity;
- Reduce air and noise pollution; and
- Promote bicycle and pedestrian access.

On November 26, 2002, the County Council passed legislation mandating that employers with 25 or more full- or part-time employees located within a TMD actively work with their TMD’s staff to reduce drive-alone commute trip rates. At a minimum, these employers are required to:
- Designate a Transportation Benefits Coordinator to serve the company’s employees;
- Implement a Traffic Mitigation Plan (TMP) – developed in consultation with TMD staff;
- Submit an Annual Report of Activities; and
- Participate in the County’s Annual Commuter Survey.

1. The Traffic Mitigation Plan
MCCS and its contractors assist County employers in developing a Traffic Mitigation Plan (TMP) designed to reduce the rates at which their employees drive alone to work. Each TMP is reviewed by the TMD staff and the Advisory Committee for that TMD which recommends approval or changes. The Director of DPWT has final approval authority.

2. Annual Report of Activities
Once a year, employers are asked to summarize the activities they have undertaken to implement their plans. Employers who successfully encourage “Better Ways to Work” (used as the program’s tag line) are eligible for local and national recognition and awards.

3. Annual Commuter Survey
Employers receive Annual Commuter Surveys from Commuter Services for distribution to their employees. Employers are required to circulate the Commuter Surveys to their employees within 45 days for their completion. The completed Annual Commuter Surveys are submitted to each Employer’s TMD. All surveys are conducted in the spring.

These surveys are used to track employee commuting patterns in the TMD and to monitor progress toward reaching any commuting goals set in the County’s Annual Growth Policy. They help DPWT determine what changes to programs and services are necessary. Employers are asked to make a good faith effort to achieve an 80% response rate from their employees.

The County assists employers in reaching the target response rate by supporting the efforts of the company’s Transportation Benefits Coordinator (TBC) in getting a survey into every employee’s hand. The TBC is the contact person at that employment site with whom MCCS and its contractors work to provide services and the person who is asked to distribute the survey. Surveys are available in hard copy format or online, distributed through the company email system. The County also provides detailed instructions, flyers, and prize drawings for participants who take the survey. If requested, TMD staff will hand out surveys at company-sponsored events and provide refreshments and additional prize drawings for participants.
**4. Common TMP Strategies**

- Designate contact person for employee transportation information (TBC);
- Distribute information on transit/pooling/other commute alternatives to employees on a regular basis;
- Commute information/alternatives presentations to employees at worksite by TMD staff;
- Information on commuting alternatives provided to new employees (orientation materials and presentations available from TMD staff);
- Attendance at free TMD-sponsored meetings/workshops permitted for TBC to learn about new services;
- Ozone Action Days participation (regional program to alert people to dangerous air quality days);
- Guaranteed Ride Home Promotion (free regional program offering emergency rides);
- Permanent display area for TMD-provided bus schedules and other transportation information;
- Provide ADA transportation options information;
- Tax-free monthly transit subsidies provided to employees (County subsidies and State commuter tax credit may be available);
- Transit passes/tokens offered for purchase at worksite (at full or reduced price);
- Pre-tax payroll deduction for transit costs;
- Transit/pedestrian amenities at worksite, e.g. sidewalks, benches, etc.;
- Bike amenities at worksite - racks, lockers, and/or showers (TMD may be able to supply);
- Employee carpool matching service;
- Free or reduced rate parking for car/vanpools offered to employees;
- Preferred location and/or reserved parking for car/vanpools offered to employees;
- Alternative work schedules: Flex Time, Compressed Work Week; and Telecommute, telework, and job-sharing.

**C. Compliance**

The basic steps for compliance among qualifying employers include:

1. Contact TMD Staff for assistance in customizing an effective TMP;
2. Submit TMP to DPWT — DPWT reviews submitted TMP. Upon successful review, DPWT issues confirmation of approval;
3. Work with TMD Staff and employees to actively implement and promote the strategies that are included in approved TMP;
4. Participate in the Annual Commuter Survey;
5. Submit an annual “Report of Activities” documenting results of TMP implementation.

To date, compliance rates have been very high – estimated by one TMD administrator to be about 95%. There are very few non-compliant companies in any of the TMDs. Those few will probably face fines in the near future. Failure to comply is a misdemeanor under County Code.

The County sets an 80% survey-response rate target in order to effectively measure the program’s performance. While this is a goal which many employers do not reach, most produce response rates

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8 Jim Carlson, Planning Specialist, Montgomery County Commuter Services
significant enough to effectively track program performance. For some agreements, the TMDs conduct their own mode split surveys, usually through driveway counts at the employment site.

D. Enforcement

An employer or owner that does not submit a traffic mitigation plan or provide survey data within 30 days after a second notice has committed a Class C violation. Continued non-compliance can result in fines.

To date, the County has not invoked any non-compliance penalties though enforcement efforts are being undertaken. There are no penalties for failing to achieve established survey-response rate targets.

E. Performance Measures

In addition to the broad goals set out for established TMDs, commuting goals are identified for each district, stated as the percentage of participant-commuters not driving to work during peak times – tracked by the County as “non-auto driver mode share” (NADMS). Current NADMS targets for each TMD are as follows:

- Bethesda: 37%;
- North Bethesda: 39%;
- Friendship Heights: 39%; and
- Silver Spring: 46% (50% for new development\(^9\)).

While there are no individual NADMS targets established for participants, these targets serve as effective performance measures for the overall program.

F. Performance

Each TMD has active TMPs from dozens of area employers – see Figure 3.

\(^9\) Established developments in Silver Spring are grandfathered at 46% in order to allow the County to maintain and update ambitious NADMS targets for new development in this transit-rich location.
All TMDs have achieved or exceeded their NADMS target, according to the latest processed survey data (2006).  

G. Funding – County

A variety of funding structures have been established to support TMD efforts. The Bethesda and North Bethesda TMDs are primarily funded from parking revenues: parking meter payments, parking violation revenue, monthly permits for public parking lots, and In-Lieu of parking development fees. For the Bethesda TMD, revenues from the Bethesda Parking Lot District facilities (including lots and garages) are used to support TMD expenses as well as other types of transportation costs. In the North Bethesda TMD, the County installed more than 800 parking meters to manage its parking system which also generates revenue for TMD activities.

Silver Spring TMD is eligible to receive net revenue from the Silver Spring Parking Lot District when available, though net revenue is not always generated there. The TMDs in Silver Spring and Friendship Heights are supported by other sources, including developer fees and funds from the County’s general operating budget. Friendship Heights is the only TMD that does not receive any parking revenue, as there are no County parking facilities in Friendship Heights.

Around 2005, the County began assessing an annual fee for most new projects within TMDs. These revenues are collected by the County and allocated to traffic mitigation actions — identified in coordination with TMD staff and the TMD Advisory Committees. The fee is currently set at $.10/SF for all commercial uses. There is enabling legislation for applying a fee of up to $60 per unit for multi-family residential development, but the County has chosen not to implement this strategy. The fee is assessed upon use and occupancy of the development.

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10 Carlson, Montgomery County Commuter Services

Developments deemed to produce significant increases in traffic may also be required to produce a Traffic Mitigation Agreement, which outlines measures they will take to mitigate their project’s traffic impacts.

This policy may soon be changing significantly with the recent adoption of a new County growth policy. This policy will likely increase the frequency with which Traffic Mitigation Agreements are required. In addition, developers usually are required to pay the cost of driveway counts and similar monitoring required as part of their development approval.

H. Funding – Participants

Participants must bear the cost of the specific strategies they implement as part of their TMP. However, MCCS and its contractors provide assistance to all County employers, including those mandated to participate in the TMD program. Free services provided include:

- Transportation Benefits Plans — How to design a suitable plan, while boosting productivity and morale;
- Transit Subsidies and Tax Credits — How commuter benefits can lower taxes for employers and employees;
- Public Transportation — Information on routes, fares, schedules, and where to buy transit passes, including pre-tax Metrochek and other discounts;
- Carpools/Vanpools — Free assistance in forming or joining a carpool;
- Parking — Information on free/discount parking for carpools/vanpools and park-and-ride lots;
- Biking/Walking — Help with rental lockers, commuting routes, and other amenities;
- Guaranteed Ride Home — Free rides home in cases of emergency or unscheduled overtime;
- Teleworking/Alternative Work Schedules — How to design a program tailored to specific needs;
- Car Sharing — Programs that provide 24/7 access to a vehicle, available at Metro stations;
- Accessible Transportation — Freedom of mobility for those with special needs;
- HOV Lanes Information — Where, when, and how to access them;
- Customized Seminars and Presentations — For setting up a commuting benefits program that works for each business; and
- Commuter Information/ Marketing Materials — Fact sheets, posters, flyers, exhibits fairs.
2.4 Detailed TDM Program Review: CITY OF ALEXANDRIA, VIRGINIA

A. Background

In 1997, as a result of traffic congestion from new development and rapid economic growth, the City of Alexandria’s leadership determined that a traffic mitigation plan would need to be created to maintain the attractiveness and viability for Alexandria as a place to live and work. This was especially true in the light of rapid commercial development adjacent to the King Street, Braddock Road and Eisenhower Metrorail Stations. New development in the area of the rail stations included an 80-acre parcel with 6.5 million square feet of mixed use development adjacent to the King Street and Eisenhower Metrorail Stations, as well as a 1.2 million square foot mixed-use development directly across from the King Street Metrorail Station. Development along the Eisenhower corridor was imminent as local developers began applying for Special Use Permits (SUPs) for creating a commercial business community along the once desolate two-lane highway, parallel to Interstate I-495. Additionally, the King Street Metrorail Station had become a transit center, or hub, for the region-wide Washington Metropolitan Area Transportation Authority’s (WMATA) Metrorail system Blue and Yellow lines, as well as Amtrak’s Northeast Regional Service (Boston to Richmond) and the newly authorized Virginia Railway Express, commuter rail service.
providing service from Fredericksburg/Manassas, through Alexandria, terminating at Washington DC’s, Union Station. Utilizing the transit services options by the three providers created a tremendous opportunity to mitigate the impact of future development. The City’s Office of Transit Services and Programs (OTS&P) would provide the administrative support to monitor compliance to the proposed traffic mitigation planning ordinance. OTS&P already provided outreach to the business community on transit services and transportation program options.

B. Transportation Management Planning (TMP) Ordinance

On May 16, 1987 the City of Alexandria Council passed the Transportation Management Plan (TMP) Ordinance (No. 3204) which requires developers to reduce Single Occupant Vehicle (SOV) traffic associated with their projects. The TMP Ordinance was the first in the Commonwealth of Virginia and only one of two in the Washington, DC region. The other being the Adequate Public Facilities Ordinance required in Montgomery County, Maryland.

C. Purpose of the Ordinance

The Alexandria City Council created the Ordinance not to limit development but rather to limit the amount of traffic that development would create. This is accomplished by requiring the developer to provide certain incentives and apply selected transportation demand management (TDM) strategies to commuters who choose to use transit services and participate in transportation programs, and provide disincentives to those commuters who choose to drive alone to and from their place of employment in the City of Alexandria, each day. The Plan, that includes the use and implementation of transit services and transportation programs, is known as the TMP, or Transportation Management Plan.

D. Goal of the Transportation Management Planning Ordinance

The goal of the Ordinance is that through the operation, and management of an approved TMP program, peak period trips generated by a development will be reduced by 10% to 30% over the AM peak period trips generated by a development without a TMP program.

Each TMP consists of two parts: the developer’s submitted TMP and the supplementary City staff recommendations. These recommendations are printed and become part of the TMP SUP that is officially adopted by the Alexandria City Council. The two documents, together, represent the ‘working TMP’ and the developer is responsible for complying with the provisions adopted in both of these documents. Where there is conflict between the two documents, the language in the staff recommendations prevails. A standard supplemental staff recommendation would be that each applicant designates a TMP Coordinator upon application for the initial building permit. The Coordinator shall maintain an on-site office and be responsible for establishing and administering the TMP for the project, including all of the approved TMP activities, or strategies.

The City Council will approve an application for a SUP if it determines that:
• The Applicant’s TMP is in accord with the requirements of the TMP, and
• The TMP, together with any amendments deemed appropriate by City Council, demonstrates that reasonable and practicable actions will be taken in conjunction with and over the life of the proposed use which will produce a significant reduction in the traffic and transportation impacts of the use.

In deciding whether such a determination may be made, City Council may consider whether either of the following goals for the proposed use will be achieved by the TMP:

**Goal #1:**
That 10% to 30% of the total number of projected trips for commercial, industrial, retail or residential uses, during the AM and PM peak periods, utilize a travel mode other than the single occupancy vehicle;

**Goal #2:**
That no more 40% of the projected SOV trips from commercial, industrial, retail or residential uses, occur between 6 AM and 10 AM, and that no more than 40% of the number of projected SOV trips occur between 3 PM and 7 PM.

E. Development Projects Subject to the TMP Ordinance

All new developments meeting the following size (square footage [SF]) thresholds that are required to receive a SUP before construction can begin.

**Figure 4: Thresholds for Special Use Permits**

<table>
<thead>
<tr>
<th>Proposed Use</th>
<th>Minimum SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>50,000 or more SF of usable space</td>
</tr>
<tr>
<td>Retail</td>
<td>40,000 or more SF of usable retail sales space</td>
</tr>
<tr>
<td>Residential</td>
<td>250 or more dwelling units</td>
</tr>
<tr>
<td>Mixed-Use</td>
<td>If the proposed building includes any of the uses listed above which meet the size threshold, the TMP must be prepared for the entire project.</td>
</tr>
</tbody>
</table>

F. Application and Approval Process

The developer’s application for a SUP must contain a Traffic Impact Study (TIS) to assess the peak period traffic impacts of the proposed project without the TMP in place, and a mitigation plan (TMP) with goals and strategies to reduce SOV traffic, particularly during AM and PM peak hour periods.
The Departments of Planning & Zoning (P&Z) and Transportation and Environmental Services (T&ES) review the SUP application and make joint recommendations to the Alexandria Planning Commission. After the Planning Commission reviews the SUP application along with the recommendations of P&Z and T&ES, the Commission makes their recommendation to City Council which finally either approves or disapproves the application. An SUP application may be amended with conditions that are recommended from Planning, T&ES and the Planning Commission. The developer must comply with the conditions. The SUP and thus, the TMP, run with the land and are mandatory and binding upon the applicant, all owners of the land, and all occupants and upon all of their heirs, successors and assigns.

G. Components of the TMP

The required TIS determines the extent to which traffic mitigation measures are needed, and which traffic mitigation measures and strategies will be the most effective.

An important impact of the TIS is that the minimum amount of parking the developer is allowed to build is adjusted downward to take into account the number of people that will be commuting by Single Occupant Vehicle (SOV) travel. Developers typically take advantage of being allowed to build less parking, therefore at full occupancy there is not enough parking for everyone to drive alone to the project. Consequently, developers are able to charge higher parking rates.

The TMP includes a reasonable and effective combination of some or all of the following elements which shall be appropriate to the size, scale and location of the proposed use and shall demonstrate that reasonable and practicable actions will be taken in conjunction with and over the life of the use which will produce a significant reduction in the traffic and related impact of the use.

- Designate a TMP Coordinator to market and promote SOV alternatives and implement and manage the approved TMP.
- Offer ridesharing incentive programs which may include activities to encourage and assist in the formation of carpools, vanpools and bus pools. This includes cash payments or subsidies; preferential parking spaces and discounted parking charges.
- Offer public transit incentive programs which may include:
  - The provision of Para transit services to/from convenient public transit sites and to accommodate midday and evening excursions;
  - The construction of transit shelters and amenities;
  - The construction of bus/rail transit stations and related facilities;
  - Dedication of land and the provision of other subsidies for the construction and operation of public transit facilities;
  - The provision of transit fare media subsidies and marketing programs; and potentially
  - The provision of other analogous incentive programs.
- Recommended improvements in public transit which services the site of the proposed use, such as changes in service routes, increases in the frequency of service, alterations in the location of facilities, the establishment of fare incentive programs and other measures designed to make the public transit more accessible to occupants of the proposed use.
• Bicycle and pedestrian incentive measures which may include the provision of bicycle parking and storage facilities; the construction and extension of bicycle paths and pedestrian walkways; the provision of shower and locker facilities; and, similar incentive features.

• In the case of office and industrial uses, variable work hour, or flex time, programs under which employees working at the proposed use will stagger their work hours in order to affect a reduction in the amount of peak period traffic to and/or from the use which would otherwise occur.

• Measures to reduce the reliance on SOV by employees and others who will travel to and from the proposed use which may include parking fee structures tailored to discourage SOV vehicles. Proscription of tenant-employer subsidy of parking costs for SOV vehicles. Time and other access restrictions of parking spaces in on-site parking facilities. Programs to support and encourage the utilization of alternative transportation modes.

• Use and accessory use design options which reduce reliance on SOV vehicles by employees and others who will travel to and from the proposed use, such as the provision of less parking area than that required under the provisions of the Ordinance. Shared parking arrangements. The incorporation of residential units (in the case of proposed commercial use).

• Any other techniques, or combination of techniques, capable of reducing the traffic and related impacts of the proposed use, such as the following:
  o Set aside a minimum of 5% of the off-street parking to be reserved for carpool and vanpool vehicles until 10:30 AM on weekdays.
  o Sell transit fare media at a location on the approved TMP development site.
  o Create a TDM program, including all applicable and reasonable program initiatives, i.e. rideshare matching, preferential & discounted parking, teleworking, etc.
  o Provide incentives for commuters who use bicycles and walking as their commute mode, including the installation of bicycle lockers and provision of shower facilities.
  o Implement alternative work hour programs, i.e. staggered work hour, flextime and compressed work weeks.
  o Create a parking management program, whereby parking pricing policy is established that supports HOV travel.
  o Establish a TMP Account to fund TMP program activities. Commercial and retail developments are required to spend, at least, $0.10 per square foot of occupied floor space annually. Residential projects are required to spend $60.00 per dwelling unit. These rates typically increase by 4% annually or through the consumer price index. They may also be tied to parking fees, or other appropriate means stated within the specific SUP.
  o Install bus shelters and similar amenities to enhance transit usage.
  o Install transit information display and maintain the same.

H. Legal Requirements

Failure to comply with the conditions of the approved TMP may result in revocation of the SUP.
2.5 Detailed TDM Program Review: Contra Costa County Department of Conservation and Development - Transportation Demand Management Plan

A. Introduction

In 1992 Contra Costa County (CA) passed their first Transportation Demand Management Plan Ordinance and Guidelines with revisions in 1995 and 1997. The focus of the Ordinance is to require developers to use effective ways to reduce traffic trips, and their associated impacts, created by new development projects.

County staff will review development projects with the Applicant (developer/owner) based on these guidelines and determine if a combination of acceptable options/measures will reduce the net number of trips that the project is anticipated to generate. This Ordinance provides recommended TDM measures and guidelines to achieve trip reduction.

The County faces the inevitability of a growing population, in conjunction with an expanding job market. The County’s TDM Ordinance Guidelines are committed to reduce traffic congestion through techniques designed to encourage the use of modes of transportation alternative to the single-occupancy vehicle (e.g. carpool, transit, etc.). The following sections paraphrase the ordinance and provide additional insights into the intent of each section.

B. Intent and Purpose of the Ordinance

Under the County’s zoning ordinance or possibly under a project’s conditions of approval, County staff has the authority to require the submittal and approval of a TDM program prior to the issuance of a
building permit for a project. TDM programs associated with development projects typically aim at achieving the following general outcomes:

- Reduce the frequency and distance of auto trips;
- Spread peak-hour trip making to off-peak time periods;
- Shift trips toward the use of environmentally friendly and non-motorized modes of transportation; and
- Provide technological solutions to reduce the environmental impacts of vehicular traffic, such as provision of charging stations to encourage the use of electric/hybrid vehicles, and provision of real-time or interactive information on bus services.

It should be noted that development projects are also subject to the potential requirement of Traffic Impact Analysis (TIA), which may include mitigations to individual and cumulative project impacts at study intersections, roadway segments, and/or freeways as well as on-site and site access improvements.

The TDM Ordinance defines important terms to clarify the type of projects subject to its requirements:
(a) "Residential Project" means any residential development application containing thirteen or more dwelling units that must be approved through a public hearing process and has not received final approval.
(b) "Non-Residential Project" means any non-residential or mixed-use development application that must be approved through a public hearing process and has not received final approval. Non-residential projects also include an application to expand an existing office or industrial structure that has at least five thousand square feet of gross floor area, by twenty-five percent or more of the structure’s gross floor area.

C. Application for Off-Street Parking Reductions

A project may qualify for reductions in off-street parking requirements. An Applicant requesting parking reductions must submit a conceptual TDM program to the community development department concurrently with the application for the project. If the tenant is known, the project Applicant and tenant must jointly submit the conceptual TDM program.

The two main benefits to project Applicants associated with a reduced off-street parking requirement are: (1) Significant savings in construction and maintenance costs for off-street parking; and, (2) The availability of space/land that otherwise would be used for parking. Such space could be utilized to provide on-site amenities, landscaping, or increased project density subject to County approval.

A mixed-use development application can have characteristics that could qualify for a reduction in off-street parking required by the zoning code. Different uses can vary in their peak parking demands in a
day, week and/or season which could support the concept of shared parking. An example would be opening up office parking to an entertainment complex in the evening to more fully utilize the facility.

D. Required Information for Development Permit Application

1. Conceptual TDM Program

The conceptual TDM program must identify TDM measures that can be demonstrated to attain the trip reduction necessary to qualify for the requested parking reductions. The department must review the project’s conceptual TDM program and make a recommendation to the division of the planning agency hearing the project application.

All Conceptual TDM Programs must contain a monitoring, evaluation and enforcement component.

To ensure the success of the TDM program, it is important that the project Applicant establish mechanisms that guarantee the perpetuity of the program. Examples of such mechanisms are described below:

- Incorporate the TDM program requirements into the Covenants, Conditions & Restrictions (CC&Rs) of the property to ensure that the TDM program runs with the land.

- Incorporate the TDM program requirements into the tenant lease agreement to ensure that occupants of the project site cooperate with the property owner/Applicant, property manager and/or the County in meeting all requirements.

2. Proposed Improvements

The Applicant must include in the tentative map, land use permit, or development plan application, any improvements that will provide access to public transit, ridesharing opportunities and non-motorized forms of travel.

If the project lies within a transit service area identified in the circulation element of the General Plan, the Applicant must consult with the transit service provider on the need to provide infrastructure to connect the project with the transit services. Evidence of compliance with this requirement may include correspondence from the local transit provider(s) regarding the potential need for installing bus turnouts, shelters or bus stops at the site.
3. Final TDM Program

The design and implementation of the final TDM program must be a condition of a project’s approval. The Applicant and all subsequent owners of the project must provide deed notification of mandatory participation in the final TDM program to all subsequent purchasers and owners of the project.

The County’s approval of a TDM program for a reduction in off-street parking is discretionary. County staff will review the Conceptual TDM Program, in consultation with the Applicant, and determine its potential to achieve the off-street parking reduction requested in the development application. A recommendation for a Final TDM Program will be made to the approving body. Approval may be conditional and include performance standards which, if not met, would require reconsideration of the Final TDM Program. If the TDM Program is not approved, there will be no reduction in off-street parking requirements.

Following the County’s review and approval process, the Final TDM program will be set as a condition of approval on the project. The project Applicant and all subsequent owners of the project must provide deed notification of mandatory participation in the Final TDM program to all subsequent purchasers, owners and tenants of the project.

E. TDM Requirement for Residential Projects

1. Residential TDM Program Content

The Applicant of a residential project containing thirteen or more dwelling units must prepare and implement a TDM program that includes at least the following:

(1) Owner-Occupied Units. Upon a residential dwelling being sold or offered for sale, the Applicant must notify and offer to the buyer or prospective buyer, as soon as it may be done, materials describing public transit, ridesharing, and non-motorized commuting opportunities available in the vicinity of the project. Such information must be transmitted no later than the close of escrow;

(2) Rental Units. Upon a residential dwelling being rented or offered for rent, the Applicant must notify and offer to the tenant or prospective tenant, materials describing public transit, ridesharing, and non-motorized commuting opportunities in the vicinity of the development. The materials must be approved by the Department of Conservation and Development. The materials must be provided no later than the time the rental agreement is executed.

The Applicant and all subsequent owners of the project must provide deed notification of mandatory participation in the TDM program to all subsequent purchasers and owners of the project.
The TDM Program for a residential project should be understood as a disclosure document to the occupants of the residential project. It discloses the transportation facilities and services located on-site and off-site that are available to the occupants.

The TDM Program must be approved prior to issuance of the first building permit for the project, unless the conditions of approval indicate otherwise. The Applicant must submit an initial submittal to County staff for review. County staff will review this submittal and identify any revisions needed, in consultation with the application, to receive approval. County staff’s primary concern is that the TDM program be accurate regarding the on-site and off-site transportation services available for project residents and that it be easily understood by residents.

2. Proposed Improvements

The Applicant must include in the tentative map or development plan application, all improvements that will provide access to public transit, ridesharing opportunities and non-motorized forms of travel.

The Applicant whose project lies within a local transit service area identified in the circulation element of the general plan must consult with the local transit service provider on the need to provide infrastructure to connect the project with transit services. Evidence of compliance with this requirement may include correspondence from the local transit provider(s) regarding the potential need for installing bus turnouts, shelters or bus stops at the site.

Proposed improvements are a primary feature of a TDM Program for residential projects. The Program will incorporate a copy of the project’s site plan showing the internal paths, bicycle parking, pedestrian/cyclist connections to off-site facilities pedestrian signage and lighting, etc. It will also require a plan/map showing bicycle lanes/routes, sidewalks/paths in the area around the project site. If the project lies within a transit service area identified in the Circulation Element of the General Plan, a map showing the transit services and the stops closest to the project site is also required.

E. TDM Requirement for Non-Residential Projects

The Applicant must include in the tentative map or development plan application, all improvements that will provide access to public transit, ridesharing opportunities and non-motorized forms of travel.

The Applicant whose project lies within a local transit service area identified in the circulation element of the general plan must consult with the local transit service provider on the need to provide infrastructure to connect the project with transit services. Evidence of compliance with this requirement may include correspondence from the local transit provider(s) regarding the potential need for installing bus turnouts, shelters or bus stops at the site.
F. Transportation Strategies Options

The four general categories of strategies recognized by Contra Costa are outlined in Figure 5. For each initiative, the Effectiveness, Cost and Implementor are defined as follows:

Effectiveness – is a measurement tool to determine the value of the effort in reducing single occupant vehicle trips at the site. Effectiveness is on a scale of 1-10, with 10 being the most effective and 1 being the least effective.

Cost – indicates the cost relative to the other options listed.

X = no cost

$ = low cost (less than $10/year per employee, or offered by 511 Contra Costa

$$ = medium cost ($10-$30/year per employee)

$$ = high cost (more than $30/year per employee, or higher infrastructure cost)

Implementor – identifies who will likely implement this strategy. This may be the developer, (property owner) or employer; however in some cases, the rideshare agency called 511 Contra Costa (511 CC) provides these services free of charge, or for a nominal charge.
## Figure 5: Contra Costa Transportation Strategy Options

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Effectiveness</th>
<th>Cost</th>
<th>Implementor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facilities and Design</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle Racks/Lockers</td>
<td>3</td>
<td>$</td>
<td>D/E/511CC</td>
</tr>
<tr>
<td>Bicycle Station</td>
<td>6</td>
<td>$$</td>
<td>D</td>
</tr>
<tr>
<td>Showers and Clothes Lockers</td>
<td>3</td>
<td>$$$</td>
<td>D/E</td>
</tr>
<tr>
<td>Walk/Bicycle Corridors</td>
<td>4</td>
<td>$$</td>
<td>D</td>
</tr>
<tr>
<td>Onsite Amenities</td>
<td>5</td>
<td>$$</td>
<td>D/E</td>
</tr>
<tr>
<td>Site Design</td>
<td>5</td>
<td>$$</td>
<td>D</td>
</tr>
<tr>
<td><strong>Alternative Work Schedule</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Compressed Work Week</td>
<td>4</td>
<td>X</td>
<td>E</td>
</tr>
<tr>
<td>Flexible Work Hours</td>
<td>3</td>
<td>X</td>
<td>E</td>
</tr>
<tr>
<td>Telework Policy</td>
<td>5</td>
<td>X/S</td>
<td>E</td>
</tr>
<tr>
<td>Carpool Incentives</td>
<td>5</td>
<td>$$</td>
<td>D/E/511CC</td>
</tr>
<tr>
<td>Vanpool Incentives</td>
<td>5</td>
<td>$$</td>
<td>D/E/511CC</td>
</tr>
<tr>
<td>Vanpool Empty Seat Subsidy</td>
<td>3</td>
<td>$$</td>
<td>E</td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>3</td>
<td>$</td>
<td>D/E/511CC</td>
</tr>
<tr>
<td>Transit Incentive</td>
<td>4</td>
<td>$$</td>
<td>D/E/511CC</td>
</tr>
<tr>
<td>Commute Alternative Program</td>
<td>4</td>
<td>$$</td>
<td>D/E/511CC</td>
</tr>
<tr>
<td>Tax Benefit Program</td>
<td>5</td>
<td>X</td>
<td>E/511CC</td>
</tr>
<tr>
<td>Car/Bike Sharing</td>
<td>2</td>
<td>$$</td>
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<tr>
<td>Bicycle Loan Program</td>
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<td>$</td>
<td>D/E</td>
</tr>
<tr>
<td>Free Bicycle Accessories</td>
<td>1</td>
<td>$</td>
<td>D/E</td>
</tr>
<tr>
<td><strong>Marketing Strategies</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Employee Transportation Coordinators</td>
<td>5</td>
<td>$$</td>
<td>D/E</td>
</tr>
<tr>
<td>Employee Orientation</td>
<td>2</td>
<td>$</td>
<td>D/E</td>
</tr>
<tr>
<td>Transportation Health Fairs</td>
<td>3</td>
<td>$</td>
<td>D/E/511CC</td>
</tr>
<tr>
<td>Commute Options Brochures</td>
<td>1</td>
<td>X</td>
<td>D/E/511CC</td>
</tr>
<tr>
<td>Bike to Work Day</td>
<td>1</td>
<td>X</td>
<td>D/E/511CC</td>
</tr>
<tr>
<td>Bicycle Riders Guide</td>
<td>1</td>
<td>$</td>
<td>D/E/511CC</td>
</tr>
<tr>
<td>Spare the Air</td>
<td>1</td>
<td>X</td>
<td>D/E/511CC</td>
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<tr>
<td><strong>Parking Management</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Preferential Parking</td>
<td>4</td>
<td>$</td>
<td>D/E</td>
</tr>
<tr>
<td>Parking Management Program</td>
<td>8</td>
<td>$$$</td>
<td>D/E</td>
</tr>
<tr>
<td>Parking Cash Out</td>
<td>10</td>
<td>$$$</td>
<td>D/E</td>
</tr>
<tr>
<td>Unbundled Parking Leases</td>
<td>8</td>
<td>X</td>
<td>D</td>
</tr>
<tr>
<td>Parking Charges</td>
<td>10</td>
<td>$$</td>
<td>D/E</td>
</tr>
</tbody>
</table>
2.6 Detailed TDM Program Review: Trip Reduction in the Seattle, Washington Metropolitan Area

A. Introduction and Overview

The trip reduction ordinance in King County, Seattle, Washington, as well the following Washington State jurisdictions, are tied to the Washington State, Commute Reduction (known as CTR) State law 70.94:

- Settle Commute Trip Reduction (Washington)
- Non CBD Transportation Management Ordinance - Bellevue (Washington)
- Commute Trip Reduction Program - Durham County (North Carolina)
- Commute Trip Reduction Plan - Camas (Washington)
- Commute Trip Reduction Plan Ordinance - Thurston County (Washington)
- Commuter Trip Reduction - Gig Harbor (Washington)
- Commute Trip Reduction - Puyallup (Washington)
- Commute Trip Reduction Program - SeaTac (Washington)
- Commute Trip Reduction Parking Program - Spokane County (Washington)
- Commute Trip Reduction Law - Kitsap County (Washington)
- Commute Trip Reduction Plan Ordinance - Tumwater (Washington)
- Commute Partnerships Program - King County (Washington)
- Commute Trip Reduction Program (Municipal Ordinance - Vancouver (Washington)

The King County CTR program began in 1996 and by 1999, 425 King County employers reduced daily SOV travel to work by 40%. The objective of the ordinance, the first established in Bellevue, Washington, is to provide a framework for all state jurisdictions to be consistent state-wide and help to meet air quality standards through the implementation of trip reduction strategies required of employers who have 100 or more employees.
Employers that meet the criteria must identify themselves to the city/county within 180 days of either moving to the area or growing in employment number at a worksite to 100 or more employees. Such employers shall be given 180 days to develop and submit a CTR program. Employers that do not identify themselves within 180 days are in violation of the ordinance. Newly affected employers shall have two years to meet the first CTR goal of a 15 percent reduction in proportion of single occupant vehicle trips or vehicle miles traveled per person; four years to meet the second goal of a 20 percent reduction; six years to meet the third goal of a 25 percent reduction; and twelve years to meet the fourth goal of a 35 percent reduction from the time they begin their program.

Under Washington State law, the Commute Trip Reduction (CTR) approach addresses employers having at least 100 employees who commute to work during peak commute hours of 6 AM -9 AM. CTR-affected employers are required to designate an employee transportation coordinator (ETC), distribute information about alternatives to driving alone, and report on performance goals. Over 6,400 employees (18 percent) of an estimated 35,000 downtown workforce are affected by CTR requirements. The 2006 update to the state CTR Act encouraged municipalities to enhance TDM efforts in areas of concentrated development, and Bellevue has designated downtown as a Growth and Transportation Efficiency Center (GTEC). Under this new state framework, Bellevue’s GTEC endeavors to reduce 5,000 daily auto trips by 2011 through multiple voluntary programs for employers, employees, residents, and visitors in downtown Bellevue. Rounding out the TDM repertoire, TMPs address the role of property owners and managers. Generally, TMPs support an efficient transportation network by promoting awareness of and incentivizing alternatives to driving alone, moving more people on existing infrastructure. In regard to the GTEC goal of 5,000 less auto trips, transit capacity is expected to accommodate only half, meaning that carpool and vanpool TMP requirements will be a major element in accommodating the other half.

Bellevue’s TMP is a traffic and parking plan agreement between the city and developers intended to mitigate transportation impacts of new development. First under the authority of the Washington State Environmental Policy Act, and now under city code, the City of Bellevue currently requires ongoing Transportation Management Programs for new developments depending on their size and land use. Depending on the development, a TMP may include a number of programmatic and performance requirements to reduce drive-alone commutes, such as:

- Posting transit and rideshare information
- Distributing information
- Designating a Transportation Coordinator
- Providing Preferential Parking for carpools and vanpools
- Providing Financial Incentives for carpool, vanpool, and transit commuters
- Providing a Guaranteed Ride Home program for carpool, vanpool, and transit commuters

In addition to these requirements, large downtown office buildings are required to provide commuter information for tenants having 50 or more employees, institute lease agreements incorporating employee surveys and line item parking costs, provide a ridematching service, and demonstrate a 35 percent reduction in drive-alone commuting over a 10 year period.
B. TMP History

The earliest TMP agreement was established downtown in 1980, and by 1987 there were nine agreements. Early TMP agreements focused on preventing parking spillover of office buildings, and then focus shifted to reducing drive-alone commute trips. In 1987, TMP requirements were codified and included varying requirements for buildings of different land uses and sizes, both within and outside of downtown.

Between 1987 and 1995, fifteen developments were TMP-conditioned both downtown and Citywide, mostly in the Bellevue-Redmond area. In 1995, the TMP code was revised to include: additional downtown specific requirements, particularly for office developments; and, adjusted square footage thresholds at which developers were required to implement a TMP.

C. TMP Implementation and Administration

After a developer submits a design proposal for a specific project in Bellevue, development services staff review the proposal for code compliance. Transportation Development Review staff inform the developer of any transportation-related design modifications or concerns, including a TMP, if required. If a development is determined to require a TMP, the developer must sign and record an agreement with the Bellevue city clerk and King County office of records before a building permit is issued. Recorded agreements do not include specific requirements; they are general agreements stating that the property owner will comply with the TMP city code. Following these two steps, implementation requirements differ between downtown developments and developments outside of downtown.

Developers are to submit an action plan within six months of the temporary certificate of occupancy (TCO). With the help of transportation planning staff, developers confirm this action plan in writing, describing the specific transportation management techniques that the property owner will use to encourage non-drive-alone commuting and reduce peak period vehicle trips. The action plan is not required to be recorded. A survey to determine commute behavior of employees and a report are then due a year after the certificate of occupancy (CO), followed by biennial surveys and reports for the life of the building. A number of downtown properties use the professional services of the Transportation Management Association (TMA) to administer surveys, reports, and programmatic requirements.

3.0 Other Travel Demand Management Programs and Initiatives

In addition to the case studies, a number of additional programs were identified during the literature review. The following are brief summaries of the programs using information readily available.

3.1 Gainesville, Florida

The City provides specific design standards that developers must incorporate according to the size and impact of the project. Depending on the size and impact, developers can choose from a list of transportation improvements to mitigate the conditions. These improvements include traffic signals, dedicated turn lanes, bus pass programs for residents or employees of the development, payments to the regional transit system which will add or increase the frequency of bus service, ride-sharing or van pooling, participation in a TDM program, or provision of shading over sidewalks.
3.2 Alachua County, Florida
The planning approval process in Alachua County requires that each development must document both new and ongoing mass transit modifications, bicycle/pedestrian modifications, and any other TSM/TDM strategies undertaken to date to reduce single occupant vehicle (SOV) trips, and changes in mass transit frequency and level of service as well as bicycle/pedestrian levels of service, when such levels of service are adopted by the Board of County Commissioners. This information is included in the county’s annual Monitoring Report which evaluates and recommends mitigative measures involving/including local street networks, transit, bicycle/pedestrian facilities, and service to address any transportation system capacity deficiencies identified in the report for the year being monitored.

3.3 Boca Raton, Florida
To meet the requirements of the Downtown Boca Raton DRI development order, the City of Boca Raton is required to prepare and implement a Transportation Demand Management program before issuing certificates of occupancy for developments of more than 1.5 million square feet of office equivalents. The City elected to prepare a trip reduction ordinance to meet this requirement, officially known as the Transportation Demand Management Plan. The proposed ordinance would require the development of a TDM Plan for any building, structure, or development with a minimum of 50 full time and/or part time employees and has the specified minimum size:

- general retail of 15,000 square feet of gross floor area;
- general office of 50,000 square feet of gross floor area;
- medical office of 30,000 square feet of gross floor area;
- light industrial/warehouse of 100,000 square feet of gross floor area; and
- others including hotel/motels, schools, nursing homes, movie theatres, day care centers, restaurants, recreation facilities, and government or institutional uses.

The requirements of the TDM Plan include provisions for facilities supporting a variety of alternative transportation modes, including transit. The TDM Plan for each development would adopt some combination of at least two elements contained in a list that includes:

- public transit incentive programs, including the construction of transit shelters and amenities and the provision of fare subsidies;
- public transit improvements, such as changes in service routes;
- increases in frequency of service, alteration in the location of facilities;
- the establishment of fare incentive programs and other measures designated to make public transit service more accessible to the occupants of the proposed use; and
- designated spaces provided on site that are restricted to bus pool vehicles, for those who utilize bus subscription service. Bus pool spaces would be provided at a minimum rate of 2 percent of the total parking required by the City Code of Ordinances or the Downtown Development Order. The spaces must be non-handicapped employee parking spaces located closest to the building entrance.

3.4 Hillsborough County, Florida
Hillsborough County has no legal requirements either for employers to reduce trip making by their employees or for their employees to participate. In order to address TDM in the county, the Bay Area Commuter Services, the transportation management organizations and the transportation management
initiatives seek to foster voluntary actions through their employer outreach efforts to increase employer participation in TDM programs. The County’s TDM Program Scenario consists of the following strategies:

- Employer outreach to encourage the voluntary adoption and support of TDM programs among large employers or worksites (56% of employees work for employers with more than 100 employees. Only 3% of companies have more than 100 employees.);
- Advocating for new and expanded transit services;
- Compressed work week and telecommuting outreach program;
- Vanpool program management and promotions;
- Matching program for employer-provided discounts for transit, vanpool and other commute benefits;
- Preferential parking for carpools and vanpools.

3.5 Prince George’s County, Maryland

The Maryland National Capital Park and Planning Commission (MNCPPC) is currently responding to a request from the Prince George’s County Council to create Transit District Development Plans (TDDP) in the College Park, Prince George’s Plaza, New Carrollton, and West Hyattsville areas of the County. The goal of the TDDPs is to reduce vehicle trips during specified periods of the day. A transit district is a legally defined geographic area in which vehicle trip reduction procedures, strategies, and programs are required. Developers within transit districts may be asked to provide bus shelter installations, transit use incentives and improved pedestrian facilities.

3.6 San Diego, California

The City has identified several strategies that have potential for implementation at work sites in San Diego. These strategies include: alternative work schedules, telecommuting, alternative modes of travel, on-site amenities that reduce employees’ need to have access to a personal vehicle, and parking management. The initial focus of the City’s TDM program is to work with large employers to seek their participation in implementing TDM strategies at their work site. Based on research conducted by others, employer-based TDM programs are most effective in reducing trips during peak periods. The City’s employer-based TDM program has both voluntary and regulatory components.

**Voluntary** - Voluntarism requires motivation and commitment, and thus, involves extensive efforts to market TDM benefits to potential participants (employers with 50 or more employees.) These efforts could include, but are not limited to:

- Extensive dialogue and coordination;
- Marketing and advertising, campaigns;
- Public-private partnerships with employers and institutions;
- Incentives; and
- Training.

**Regulatory** - The City is considering requiring developers applying for discretionary permits or tentative maps for developments or redevelopments of commercial, scientific research, mixed use or industrially zoned projects exceeding 25,000 square feet of gross floor area to file a Developer Transportation Demand Management Plan as a condition of the permit. The plan requirement would be a condition of approval placed upon development during the discretionary permit review process. The purpose of the plan is to promote consideration of Transportation Demand Management objectives early in the
development process. Such consideration could include providing bike lockers, carpool parking, showers and lockers; developing designs that promote biking and walking; and parking management.

3.7 Dallas-Fort Worth, Texas
NCTCOG, the Metropolitan Planning Organization for the Dallas-Fort Worth area, has been instrumental in ensuring the incorporation of TDM and TSM elements in any Major Investment Study or MIS, which in this region is an extension of the NEPA requirements for large scale projects but also includes those without federal funding. TDM aspects include:
- Employer Trip Reduction Programs (ETR);
- Vanpools (and other similar ridesharing modes);
- Park-and-Ride Facilities;
- Transportation Management Associations;
- Bicycle and Pedestrian Transportation Improvements.

4.0 Summaries of Additional Regional TDM Initiatives

In the following section information is provided on TDM programs, both regional and site-specific, that were not fully detailed in the literature reviewed. The information that was available however provides insights that may prove using to the District in the development of its approach.

4.1 City of Aspen, CO
- Types of TDM: Mode Choice
- Keywords: tourism, shuttle service, paid parking, marketing, ridesharing, recreation, HOV
- Area Demographics: Premier winter sports and recreation destination in west-central Colorado. Peak season visitor population nearly matches resident population.
- Program: Various programs including carpool parking incentives, mandatory shuttle service, paid parking programs, and aggressive marketing.
- Results: Money generated from the paid parking program directly benefits demand-side strategies. Traffic volumes have not exceeded 1993 volumes. Parking occupancy reduction of 10%.
- Cost of Program: Unavailable; numerous departments cover resource needs. As an indication, the City's marketing budget (including printing costs) for 2003 was approximately $50,000.
- Staff: The City of Aspen has one full-time individual dedicated to demand-side strategies.
- Contact: Lynn Bader, City of Aspen, www.aspenpitkin.com

4.2 Lake Tahoe Basin, CA
- Types of TDM: Mode Choice, Route Choice
- Keywords: tourism, trolley service, private shuttle service, gondola, transportation management association, recreation
- Area Demographics: Mountain communities surrounding Lake Tahoe, an attractive year-round recreation and vacation destination. Historically, a peak Friday in August experiences the highest annual daily traffic volumes. About 56,000 live in the Tahoe Basin year-round.
- Program: Various programs including two summer trolley services and private shuttle services catering primarily to Basin visitors. Private investments such as the Heavenly Gondola.
• Results: 20% of Heavenly’s visitors arrive via the gondola. In 2001, the combined trolley service ridership was nearly 90,000 passengers during a limited summer operational season.
• Cost of Programs: Limited information available. In 2001, the Nifty 50 trolley service operated on a budget of $200,000 which included 5 vehicles. During the same year, the TNT / TMA operated with a budget of about $160,000.
• Staff: Limited information available. South Shore TMA has one full-time person. TNT / TMA utilizes one full time director and one part-time employee.
• Contact: Dick Powers, South Shore TMA and Jennifer Merchant, TNT / TMA

4.3 Hennepin County, MN
• Types of TDM: Modal Shift, Location Shift
• Keywords: Transit subsidy, Pre-Tax benefits, Legislation
• Employer Demographics: Hennepin County, Minnesota, has 130 offices and facilities dispersed throughout the county with differing levels of transit service at each site. About 10,000 County employees are located in downtown Minneapolis and are well served by transit.
• Results: Estimated 60% drive alone, 15% carpool, 2% vanpool, 15% bus, 3% telework, 5% flextime
• Cost: $559,000 bus subsidy + $14,000 vanpool, parking and administration costs = $573,000 - $109,000 FICA Savings = Total Cost: $464,000.
• Staff: Minimal staff time and staff costs once program was set up.
• Contact: Mike Bastyr, Sr. Human Resources Representative, 612-348-4640

4.4 Commonwealth Atlantic Properties, Arlington County, Virginia
• Proposed a redevelopment plan for Potomac Yard in Arlington
• 2.9 million square feet of office and commercial space
• 1.4 million square feet for residential and hotel use.
• Plan also includes new streets, parks, and other amenities
• As a condition of development, the developer agreed to a Transportation Management Plan. The developer is required to achieve a transit/bike/walk mode share of 40 percent through a combination of TDM, Transportation Systems Management (TSM) and other strategies.

4.5 The Florida Hospital System, Orlando, Florida
• As a condition of their Certificate of Occupancy, the Florida Hospital must continue to be an “active and financially supportive” member of the Downtown Orlando Transportation Management Association (DOTMA).
• Either through DOTMA or on their own, the hospital must develop a TDM program.
• The TDM program is to consider “at a minimum the following”
  o Parking management provisions for carpools and vanpools
  o Publicity for transit and ridesharing information
  o Work hour adjustments (compressed week, flextime)
  o Telecommuting (where possible)
  o Showers and bicycle lockers
  o Daycare facilities.
4.6 Transportation Expansion Project (T-REX),– Denver, CO
- As part of the T-REX project, a TDM-based maintenance of traffic/construction mitigation program was required through the existing regional program TransOptions.
- TransOptions seeks specifically to reduce congestion associated with major roadway projects.
- Roadway Project sponsors have dedicated $3 million to the TransOptions program,

4.7 Port of Long Beach, Long Beach, CA
- The Los Angeles region has 16 million residents, 9 million jobs, and one of the busiest freight ports in the world.
- The Long Beach port moves close to 13,000 20-foot long containers each day.
- To better manage this high level of goods movement, Intelligent Transportation Systems (ITS) were employed as a tool to implement TDM concepts traditionally seen in personal commuting.
- Concepts explored included better scheduling, better routing and reduction of bottlenecks at check points.

4.8 University of Washington – Seattle, WA
- Types of TDM: Mode Choice
- Keywords: U-PASS, university transportation, parking disincentive, flexible parking, transit service
- Area Demographics: UW-Seattle is the City’s second largest employment and activity center outside of the central business district. In 2002, enrollment topped 39,000 students.
- Program: One pass, the U-PASS, provides an array of transportation options including transit service, preferential parking, consumer discounts, and rideshare matching.
- Results: Due to its success, other campuses have developed their own programs using U-PASS as an example. U-PASS has saved UW-Seattle capital investment costs associated with traditional parking expansion projects. U-PASS has eliminated 91 million trips since 1991.

4.9 Zion National Park, UT
- Types of TDM: Mode Choice
- Keywords: national park, shuttle system, sustainable practices, parking restriction, road closure, alternative fuel vehicles
- Area Demographics: Utah’s first national park, annual visitation of 2.61 million in 2002.
- Program: Mandatory summer shuttle system since 2000 serving Zion Canyon and Springdale. Parking is restricted on Scenic Drive.
- Results: 75% of Zion’s annual visitors use the system. In 2000, the shuttle system reportedly reduced nearly 1,200 vehicle trips per day and almost 11,000 vehicle miles traveled per day.
- Cost of Program: $12 million for the initial capital investment and approximately $2.5 million in annual operating costs.
- Contact: Ron Terry, Zion National Park

4.10 Calibre – Alexandria, VA
- Types of TDM: Modal Shift, Location Shift
- Keywords: Transit Subsidy, Parking Management, Shuttle, Relocation, Parking Cash Out, Telework, Lease Negotiation
• Employer Demographics: Located in Alexandria, VA near Washington, DC in an area well served by subway, commuter train and bus
• Program: $65 transit, bike or walk subsidy, $65 parking cash out, carpool subsidy, telecommute
• Cost of Program: $99,500 - $30,000- transit subsidies, $5,500 Telecommute program administration, $64,000 TeleworkVA! subsidy
• Staff: 2 (Benefits Coordinator and HR Director)
• Results: 2% carpool, 12% transit, 5% telework
• Contact: Michelle Voisinet Caylor, Benefits Coordinator mcaylor@calibresys.com

4.11 CH2M Hill – Denver, CO
• Types of TDM: Time Shift, Location Shift
• Keywords: Telework, Intranet, Technology, Flextime, Relocation
• Employer Demographics: Located in a suburban business park, little bus service, ample parking, adjacent to a large corridor construction project.
• Program: Corporate Telework and Flextime policies, “Look Before You Leave” Intranet travel site, relocation based on commute time analysis, accessibility to roadways and future alternative mode infrastructure.
• Results: 17% mode shift
• 8% Telework and Flextime, 3% transit, 5% Carpool, 5% bike
• Cost of Program: $60,000 includes 40 hours a month of staff time, Intranet upkeep and marketing costs.
• Staff: 1 FTE with limited transportation related responsibilities.
• Contact: Michele Wagner, michele.wagner@ch2m.com

4.12 Georgia Power Company – Atlanta, GA
• Types of TDM: Modal shift, Location shift
• Keywords: Company sponsored vanpools, Fleet vehicles, transit subsidy, telework, intranet
• Employer Demographics:
• Program: Smart Ride commuter options program. Offers a variety of commuter options to employees
• Results: 15% Compressed/flex time, 13% Vanpool/Carpool, 5% Telework
• Staff: 3 FTE. 1 Project Coordinator, 2 Corporate Facilities Analysts
• Contact: Jane Franklin, Project Coordinator 404-506-1967

4.13 Johns Manville – Denver, CO
• Types of TDM: Modal Shift
• Keywords: Transit subsidy, parking management, pre-tax benefits
• Employer Demographics: Corporate office located in downtown Denver near ample bus and light rail service, limited parking. Although Johns Manville has multiple offices around the country, the program is offered to Denver employees only
• Program: 100% transit subsidy, GRH, free-parking vouchers and parking subsidy
• Results: 55% drive alone, .5% vanpool, 44% bus/rail, .5% walk, carpool not tracked
• Cost of Program: $372,129 includes parking charges, EcoPass and parking validation stamps.
• Staff: 1 FTE, Risk Management Coordinator dedicates 20 hours a month to transportation benefits.
4.14 Nike – Beaverton, OR
- Types of TDM: Time Shift, Modal Shift
- Keywords: Internal Rideshare Technology, Incentives, Flextime, Relocation, Transit Subsidy, Bike Commute
- Employer Demographics: Located in a suburban business park, bus and light rail service, ample parking. 5,000 employees at world headquarters.
- Program: Evolution of incentive based program from Nike Buck giveaway to TRAC program featuring prize incentives, transit and rail subsidy, preferential parking, shuttle, service amenities and flextime.
- Results: 78% SOV, 10% carpool, 5% bus/rail, 5% flextime, 2% bike
- Cost of Program: $302,000 annually plus staff time. 43% of expenditures go to shuttle operations, 34% to transit subsidies, 6% to incentives, 1% to marketing, remainder to other expenses.
- Staff: 1 FTE, Transportation Specialist dedicates 150 hours a month to the TRAC program.
- Contact: Pam Linam, LinamP@JM.com

4.15 Overlake Christian Church – Redmond, WA
- Types of TDM: Modal Shift
- Keywords: Suburban Location, Carpool, Incentives
- Employer Demographics: Located in the City of Redmond, WA, Overlake Christian Church has ample free parking and receives minimal bus service.
- Program: The transportation benefits program provides up to 16 hours of paid time off per year to employees utilizing other forms of alternative transportation and $20 a month financial subsidy for public transportation.
- Results: 52% drive alone, 1% bus, 26% carpool, 12% Flextime/compressed work week
- Cost of Program: $4,000
- Staff: 1 FT with other various responsibilities including transportation program and 1 FT Director with only oversight of program.
- Contacts: Nancy Thorgeson, Director of Human Resources, nancyt@occ.org; Barbara Graef, Human Resources Administrative Assistant, barbg@occ.org

4.16 Simmons College - Boston, MA
- Types of TDM: Modal Shift
- Keywords: Transit subsidy, Parking Management, Incentives, Disincentives, Shuttle
- Employer Demographics: Located in a dense, area of Boston, MA that is well served by transit.
- Program: $65 T-Pass subsidy, increased parking costs
- Staff: 1 (Director of Auxiliary Services), contributes approximately 20 hours a month to transportation program and has assistance from other staff.
- Results: 27% transit usage, 41% SOV, 32% carpool, bike, walk
- Contact: Roy Schifilitti, roy.schifilitti@simmons.edu

4.17 Swedish Medical Center – Seattle, WA
- Types of TDM: Modal Shift
• Keywords: Transit Subsidy, Ferry Subsidy, Parking Management, Preferential Parking, Vanpool and Carpool subsidy, State and Local Mandates
• Employer Demographics: Swedish has three campuses dispersed throughout the greater Seattle area: First Hill in a downtown, dense, area well served by transit and Ballard and Providence, less dense and less transit service.
• Program: Carpool promotion program expanded to include transit, vanpool and parking benefits. Program is flexible given different shifts and campuses.
• Results: Varies with each campus.
• Cost of Program: $1.6 million for Flexpass, Puget Pass and Washington State Ferry Pass
• Staff: 1 FTE, Parking Manager/Employee Transportation Coordinator dedicates 80 hours a month to transportation benefits program.
• Contact: Karen Lee Kimber, Parking Manager/Employee Transportation Coordinator, Karen.Kimber@swedish.org.

4.18 Texas Children’s Hospital - Houston, TX

• Types of TDM: Modal Shift
• Keywords: Transit subsidies, Vanpool Subsidies, Carpool allowances, Recruitment and retention, Home/Life balance
• Employer Demographics: Located within the largest medical center in the world, TCH is the largest pediatric hospital in the United States.
• Results: 20% mode shift, 10% carpool/vanpool, 10% transit
• Staff: 1 FTE for seven sites
• Contact: Patsi Davis, Transportation Specialist, 832-824-2070

4.19 Metropolitan Seattle Transit-Oriented Development and Flexcar – Seattle, WA

• Types of TDM: Mode Shift, Origin/ Destination Location Choice, Trip Substitution Choice
• Keywords: park and ride, transit oriented development, parking variance, car sharing
• Area Demographics: Metropolitan Seattle, project locations are varied
• Program: Transit-oriented development at existing park and ride facilities, car sharing program.
• Results: New multi-family construction parking variance. Flexcar operates over 100 vehicles in more than a dozen Seattle area neighborhoods.
• Cost of Program: $1 million appropriation for staffing, consulting fees, and project development for TOD Program. Additional private development costs. The County contributes up to $200,000 per year for member incentives and staff support.
• Staff: Three project managers oversee the TOD Program.
• Contact: Flexcar – Christine Anderson, Flexcar Program Manager, King County Department of Transportation, cristine.anderson@metrokc.gov
  TOD - Ron Posthuma, King County Department of Transportation, TOD Program Manager, ron.posthuma@metokc.gov.
4.20 Orenco Station Mixed-Use Development – Hillsboro, OR

- Types of TDM: Mode Choice, Location Choice
- Keywords: light rail, transit-oriented design, housing, zoning, community design
- Area Demographics: Master-planned community at Orenco Station proximate to Tri-Met Westside MAX light rail within metropolitan Portland, Oregon.
- Program: Transit-oriented development featuring a varied housing selection and pedestrian-friendly amenities. Free transit passes are offered to all new tenants for one year.
- Results: 53% increase in transit usage after Westside light rail opened. Reduced need to travel outside of immediate community for discretionary trips.
- Contact: www.orencostation.com

5.0 Summary

Through the research undertaken to identify best practices in TDM integration it became evident that the process tends to be addressed in three general ways:

- By directly specifying TDM requirements in the development approval process.
- Through the use of TDM ordinances that require long term commitment by developers and owners, knowledge of which, influences the development process early on and throughout the planning stages.
- A combination of the two options above.

A difficulty noted in some locations was a poor record of enforcement and support for TDM programs. In situations where programs tended to wane over time, TDM is not given significant consideration and the result has been developments designed to be viable with or without a robust TDM program in place.

TDM programs and policies are very unique and reflect the political landscapes of the regions concerned. Tying TDM requirements to other elements such as parking and transit ridership simply reflects the difficulties some areas have in promoting TDM as a stand-alone measure. By tying TDM to these other elements, the goals of trip reduction can be achieved within a development process that might not consider it otherwise. However, other regions have successfully promoted TDM independent of other factors. This is all simply a reflection of how TDM is perceived and how the local approval process works. The diversity of approaches is a reflection of regional differences which has resulted in solutions as unique as the regions involved.
6.0 References


Appendix B: Focus Group Summaries
MEMORANDUM

To: Anna McLaughlin, DDOT

From: David Fields, Nelson\Nygaard
Robert d’Abadie, Baker
Cynthia Fondriest, STI

CC: Thomas Osborne, PHR&A

Date: December 14, 2009

Subject: TDM in the Development Review Process: Interview and Focus Groups
Summary and Key Findings

Introduction

This technical memorandum summarizes the input received during the Focus Group interviews conducted during the week of December 7, 2009. Interviews included representatives from the development community, advocacy groups, District agencies, and agencies from other local municipalities. Interviews included representatives from the following organizations:

- Arlington County Department of Environmental Services
- North Bethesda Transportation Management District
- City of Alexandria Office of Transit Services and Programs
- Coalition for Smarter Growth
- Developers (2) and Land Use Attorney (1)
- Downtown DC Business Improvement District
- District Office of Planning
- District Department of Transportation

Several of the interviews were held in close door sessions at the request of the interviewees and/or to encourage frank and open discussion. Staff interviewed at other local municipalities was done for informational purposes and to further assist the district in identifying successful practices in the region as well as to highlight potential pitfalls.

Arlington County Department of Environmental Services
John Durham, TDM Planner

Arlington County’s TDM Program for Site Plan Development was adopted by the County Board in 1990. Arlington’s TDM policy focuses on workplace commuter travel and looks to reduce peak hour work travel by achieving a reduction of single occupant vehicle trips. TDM measures are required for use permits if the developer wants an exception to the zoning code such as reduced parking, even if there is no increase in density.
Arlington County’s planners have learned many lessons over the program’s 20-year lifespan. The following outlines the key lessons learned:

- The most critical elements for a successful TDM program include:
  - Political support: Elected officials and citizen commissions must be willing, and have the vision, to back up TDM planning requests. Educate these key people to the goals of good planning for sustainable development.
  - Enforceable language, to understand the information flow of the design process: Develop standards and apply them fairly to all development. Permit language should be precise; never use the word “May” when you mean “Shall or Will”. Any weakness will be exploited creating loopholes to weaken the provisions or save money.
  - Understand the process is collaborative and adversarial at the same time. You seek to collaborate to create a more robust business environment, which is good for developers.
  - Maintain control over the provisions (i.e. you make the decisions, not the developer).
  - Enforcement authority and staff: A dedicated staff person is needed to visit and inform on a regular basis to maintain continuity of the programs, as well as to keep property manager contacts up to date and apprised of their responsibilities.

- TDM programs are not intuitive to most project applicants, nor the owners or managers who will be responsible for on-going program operations. Therefore, clearly defined responsibilities and goals must be spelled out in the approvals that are granted with the TDM requirements. These must be monitorable and enforceable over the long-term and should include all requirements inherited by project inheritors and successors, not just original applicants.

- To ensure agreements are fulfilled, significant penalties must be included in the TDM code. The objective is never to have to penalize, but if needed, the penalties must be of the magnitude and schedule to persuade immediate correction of the deficiency.

- Capital requirements should be included in the original building design. It is much harder to redesign or retrofit a structure later and result in the facilities needed for effective use of the program elements. Transit information, bike storage, and pedestrian access are examples.

- Applicants should be required to utilize the skills of design specialists. General designers, engineers, or planners do not have adequate education to design the specialty elements needed to support significant pedestrian and bicycle usage. One option is for the municipality to provide these services as part of design review and charge the applicant for the service.

- Do not require the TDM program to be self-sustaining financially. In Arlington, only 4% of program costs are generated by the program itself. Arlington considers the program’s objectives and results are worth the cost of financially supporting the program.

- New TDM elements being considered for the update to the County’s TDM Matrix include unbundling parking, carsharing, and providing Smart Trip Cards to every new tenant.

- Arlington encourages cooperation between the County and project applicants. The County provides assistance in developing TDM programs by meeting early and often with applicants, and recommending what should be included in their TDM program. Once projects are open, the County also offers on-site reviews to help building operators implement their programs.
An important element is to help elected officials understand beyond the value of TDM to the details of specific TDM elements. That way, when Staff recommends TDM programs, they generally have the support of elected officials who will ultimately approve the plan.

Most developers would prefer a more expensive, predictable process, to a less expensive inconsistent one where results cannot be predicted.

Make sure any financial commitments are tied to the inflation index, otherwise today’s commitments provide little financial results in the future. Also make sure financial commitments are based on square footage, not number of units.

Incorporate TDM service providers into your TDM program. For example, working with carsharing companies to understand what they need to be successful in developments, will help develop TDM elements that result in successful programs.

Allow TDM users to help monitor the program. Place TDM commitments on-line where building residents and tenants can see what they’re “entitled to”, and request them directly from the building before reporting them to the municipality. Complaints that do reach the municipality should be responded to with on-site visits and notification of how the agency and building operator addressed the issue.

North Bethesda Transportation Management District (NBTMD)
Peggy Schwartz, Executive Director

- TDM in Montgomery County is administered under the Adequate Public Facilities Ordinance which originally was adopted in 1978.
- Focus is on growth policy while mitigating traffic.
- TDM Application Process consists of the submittal of a trip reduction plan in the form of a Traffic Mitigation Plan (directed to employers) or a Traffic Mitigation Agreement (directed to residential development).
- The TMP is a requirement for the application process and is included in the mandated Traffic Mitigation Agreement and Traffic Mitigation Plan. This is a single submission, not stand-alone documents.
- Plan is submitted to Montgomery County Park and Planning, with a copy to the Montgomery County Department of Transportation after approval.
- After approval, the Agreement and Plans are shared with Montgomery County DOT for implementation and tracking.
- The role of NBTMD is to assist employers within their policy area in complying with the TMP and TMA and/or assisting them in reporting on implementation of TDM plans and strategies.
- Montgomery County’s ordinance has goals based on traffic flow and auto travel times and as such the metrics used are focused on roadway operations, not directly on the success of programmatic strategies (i.e. Roadway and intersection level of service vs. measurement of mode share).
- Trip reduction goals are determined by the planning or policy area where the development is located. Each policy area has its own trip reduction goals.
- Federal agencies are exempt from the ordinance.
- Approved developments must submit annual reports which include how the TMP funds are spent as per their reporting requirements found in the ordinance.
- The Planning Department is the first to find out about applications for new development.
Peggy Schwartz Continued

- Challenges noted:
  - Lack of organization within the jurisdiction;
  - Confusion as to whom to report changes to; and
  - Lack of staff experience with TDM.

City of Alexandria, Office of Transit Services and Programs (OTS&P)
James Maslanka, Division Chief, OTS&P

- The City of Alexandria’s TDM ordinance is simply know as the Transportation Management Plan (TMP) and was originally adopted in May, 1988.
- Agencies involved are the Office of Transit Services and Programs and City Planning and Zoning Department.
- For the TDM application process, information on compliance with the City’s TDM/TMP is presented to the Applicant when they seek to secure Special Use Permits to develop property (both commercial and residential).
- Federal Agencies are exempt from the ordinance.
- Although Federal Agencies are NOT required to comply to any land use ordinances, the City of Alexandria is pleased with the cooperation and efforts of the Patent and Trade Offices (PTO), located in the Carlyle development adjacent to the Eisenhower and King Street Station Metrorail Stations. In good faith, PTO, with its 6,500 employees, has achieved a 51% trip reduction, above and beyond the required established trip reduction goal for Carlyle which is 49%. The Federal agency, also in good faith, provides the City with on-going reporting on TDM activities.
- Approved developments must submit semi-annual reports which include how the TMP funds are spent as part of the mandatory reporting process.
- The Planning and Zoning Department is the first to find out about applications for new development. The staff reviewing TDM plans attend weekly meetings with Planning and Zoning to find out about new developments.
- The TMP is a requirement for the application process and is included in the mandated Transportation Impact Study/Traffic Impact Analysis usually submitted by traffic engineers on behalf of the applicant. The TMP is NOT a stand-alone document.
- Challenges:
  - Monitoring for non-compliance;
  - Change of ownership of property;
  - Change in property management firm; and
  - Public hearing process.
- OTS&P suggested that residential properties, other than multiple dwelling units such as condos and apartment buildings, should never be required to comply with the TMP.
Coalition for Smarter Growth
Cheryl Cort, Policy Director

- Washington D.C. currently has no policy to require TDM in the development process. A new policy should be developed that encompasses the entire District, but prioritized Downtown. One policy document which should be reviewed to find support for a TDM policy is the Comprehensive Plan.
- Community input on TDM in the development process is limited to BZA hearings and ANC meetings.
- A menu of TDM options would help agencies and the public recommend projects applicable to different neighborhoods and land uses, as well as help create campus specific plans for campuses and PUD’s. Factors to consider include intersection density and transit density, which should also help determine applicable parking ratios. TDM should also be considered on an area-wide basis through a Transportation District Management approach.
- Project planning should consider a trade-off between traffic impacts, parking supply and cost, and TDM elements. There may be an opportunity to encourage developer-supported TDM programs, if the District can show why TDM can be less expensive to provide than it costs to build parking. It would also help garner community and representative support, if TDM can be shown to reduce auto trips.
- District-sponsored projects should be the first included in a TDM policy. One example is the DCUSA project (Target at Columbia Heights) which was built with more parking than is used; parking is an expensive project cost that is “bleeding the District money.”
- By-right applications are a separate concern, as the District may not be able to require TDM elements for these projects, unless they change the status of TDM to a level equivalent with safety and welfare.
- The following elements should be considered as part of TDM programs:
  - Constraining parking
  - Requiring charging for parking and unbundling those costs from leases/purchases
  - Transit passes
  - Pedestrian and bicycle access
  - Bicycle storage
  - Changing rooms and showers
- An enforcement mechanism is also required as part of the TDM Code, to ensure promised TDM elements are provided.

Developers/Lawyers/Downtown DC Business Improvement District

- The District has no official TDM policy or requirement. In comparison, there is a clearly delineated Streetscape Program which applicants can incorporate into their designs and the public can understand.
- There is also a need for a “different culture” at District agencies, based on transparency and allowing all projects to follow a consistent process.
- TDM Plans should be integrated with the Vehicular and Bicycle Parking Plans required under District zoning.
Developers/Lawyers/Downtown DC Business Improvement District Continued

- Many developers see the value for LEED certification as a project amenity that can be marketed. TDM programs should be marketed the same way. Developers would also support TDM if they understood how they can save money by building fewer parking spaces.
- There is no post-construction follow-up to make sure TDM commitments are provided, or if they are provided on building opening, to make sure they’re provided in the long-term.
- The only way to retrofit existing buildings (or provide new operating programs) is to offer a tax credit. Otherwise, there’s no incentive to start a new TDM program.
- Proposed Clean Air Incentives Program: The District currently imposes a sales tax on all parking spaces except those bundled in the cost of a lease or purchase. All parking should be unbundled, with the parking taxed at the parking sales tax rate. This tax could be waived with the implementation of TDM programs instead.
- It is critical that any new TDM program be consistent, so Developers understand the cost when initiating projects.
- Developers reported a frustration in the entire development approval process inclusive of the TDM requirements. Developers were unsure what ultimately will be required of them in terms of analysis requirements, acceptable methods, assumptions, etc. as well as final documentation.
- Developer noted a desire for less negotiation and “back and forth” when approving a project.
- Developers and their advocates noted, without exception, that additional upfront costs would be welcomed for a consistent, well defined, transparent and equitable process. As an aside, two parties noted that Montgomery County assesses a one-time fee of $11,000 per peak hour auto trip reduced if that is accounted for in the traffic impact study, however this has not been tested as no new major development has occurred since this was enacted (effects of the current economic recession). One person providing this information felt the amount was too high.
- Developers feel that TDM requirements should be reflective of the size and location of a particular development. Flexibility in the requirements is also desirable (which elements of TDM to use).
- Developers and their advocates noted that higher up-front costs are preferable to an ongoing commitment. Developers would like to ensure that TDM fees benefit their projects directly.
- It was noted that documentation requirements are unnecessarily onerous and seemingly arbitrary.
- DCOP and DDOT are thought not to speak in one voice.
- There are instances where the first indication of any TDM issues from either DCOP or DDOT were three weeks prior to the planning commission hearing.
Zoning Commission is frustrated that a) TDM is not a consistent process; and b) the connection is not clear between recommended TDM elements and development applications.

- Zoning Commission is supportive of TDM Programs and providing less parking as part of development approvals.
- Residents frequently request more on-site parking to reduce the number of drivers looking for free on-street spaces.
- DCOP and DCDOT have re-energized their development review process. Representatives from the agencies are in on-going communication and jointly meet with applicants.
- The only leverage to require TDM programs currently lies with the Zoning Commission.
- Planned Unit Developments are treated differently than traditional zoning applications, because they are supposed to be superior to as-of-right projects. This also provides leverage to request more from the developer to make it a superior project, including TDM programs.
- Context for TDM requirements should be based on land use and distance to MetroRail station, which can be found in the District’s Comprehensive Plan.
- WMATA is not currently involved in development of TDM programs, with no mechanism for transferring funds for operating transit services.
- Development applicants are happiest when the application process (including TDM) is clear and predictable.
- TDM Policy is supported by the Comprehensive Plan, but to be effective it needs to be solidified in regulations.
- The Zoning Commission Public Hearing is the only time when DCOP and DDOT have standing to present their technical recommendations. The Applicant can modify their application anytime until the Zoning Commission takes Proposed Action.
- There are three types of development applications: Matter of Right, Planned Unit Development, and Special/Variance.
- The only way TDM requirements can be added to a project are PUD or Variance.
- There is no process for proffers in District applications, aside from within the PUD approval process.
- Zoning Commission is supportive of TDM and expects more detailed TDM plans with each application; however, these plans must make sense individually and in relation to other applications.
- Residents generally don’t ask for TDM elements in their comments on development applications.
- Long-term enforcement of TDM requirements is unclear, other than it is led by DCRA. ANC’s are a potential watchdog for compliance, as are building tenants or unit owners. In addition to an unclear enforcement process, it is unclear where fines would be deposited.
An airtight system to require TDM in the development application/review process is needed. The District can’t be capricious in their requirements, but if the details are not specified, developers will take advantage of any ambiguity.

DDOT is now included in the application process from early scoping. This allows DDOT to outline for applicants what TDM measures will be required.

Bicycle requirements are included in the Zoning Code. No other TDM elements are required by zoning. This limits DDOT’s leverage to create a reliable process and results.

Developers currently will agree to low-cost TDM elements including marketing and providing bike racks. They do not want to commit to programs with on-going costs, such as transit passes.

Zoning Commission would like TDM elements to be defined by the number of Single Occupancy Vehicle trips they would reduce. This would also help developers understand the value of the requested/required TDM programs.

There is no long-term monitoring or enforcement of current TDM agreements.

TDM elements should be specified as mitigations, not amenities. Amenities can be eliminated, mitigations cannot.

TDM elements by mode:

- **Vehicular Parking**
  - Zoning Commission and agencies support less parking. Residents request more.
  - Car sharing raises security issues, especially in residential-only buildings.

- **Bicycle**
  - Bicycle spaces are required in the Zoning Code and these elements are generally provided.
  - There has been a mixed response to providing space for the District’s Bike Sharing Spaces
  - Also a mixed response to requiring showers/changing rooms.

- **Transit**
  - TDM Plans can require providing transit passes for new residents/tenants (though it is difficult to ensure they are provided).
  - Bus shelters are provided by an advertising contract, so developers cannot provide them.
  - No way to provide operating funds to WMATA, but funds could potentially be provided to DDOT for streetcar/circulator service. Clarification of how to accept these funds is still needed.

- **Impact Fees**
  - No clear process on how to accept these fees currently exists.
  - DDOT staff needs a process to simplify TDM program approval.

The ANC’s were mentioned as a potential avenue for monitoring TDM compliance.
Additional Comments

The follow are some general concepts which came up repeatedly during the interview process. These recommendations from the interviewees are provided to help inform the process as the project moves forward:

1. There is support from Washington DC’s Zoning Commission to include TDM elements in development applications.
2. The level of frustration with the current, overall district development process was palpable. Most of the groups, both public and private, talked of systemic problems in the system to the point where it was labeled non-existent by some. It cannot be stressed strong enough that this is a fundamental issue.
3. Legal requirements for TDM elements should be formalized to ensure maximum effectiveness. Requirements should include elements to be provided in the development application, as well as mechanisms for on-going funding, monitoring, and enforcement of TDM requirements.
4. Currently there is no enforcement process, there is no mechanism available to impose fines, and even if fines were collected there is no way to direct funds to TDM projects.
5. TDM requirements should be predictable, based on an easy to replicate format. This will provide TDM benefits, encourage developers to include TDM in applications, and minimize additional workload of District staff.
6. Different processes may be required to ensure TDM is included in the process for By-Right, PUD, and Variance developments.
7. TDM elements should be considered equivalent with other transportation mitigations (roadways, intersections, signals) and not amenities.
8. Education of the value of TDM should be provided to developers, ANC/Community members, and Zoning Commission.
Appendix C: Draft TDM Plan Requirements
For proposed development the TDM requirement will be submitted in the format of a TDM Strategic Plan (“The TDM Plan”) attached as a Proffer, or an item that serves the same purpose to the proposed Site Plan being submitted for approval by the Applicant developer for residential (all uses with the exception of single family dwellings), commercial, hotel, retail and all other uses.

The Proffer, or item, will set forth the programmatic elements of a transportation demand management plan (the “TDM Plan”) that shall be implemented by the Applicant, and if applicable subsequently the Umbrella Owners Association (“UOA”) to encourage the use of transit (Metrorail, Metrobus, and DC Circulator), other high occupant vehicle commuting modes, walking, biking and teleworking, etc. in order to reduce automobile trips generated by the uses constructed on the Application Property. The TDM Plan shall be provided to complement the numerous physical attributes of the proposed development that provide for transportation systems management and may be referenced elsewhere in proffers required by DDOT. Depending on the timeline for development, “The TDM Plan” may be submitted, as part of the Proffer, in assigned phases relative to development thresholds and construction constraints.

I. The TDM Strategic Plan will address four specific areas:

A. Trip Reduction Objectives.

General. The purpose of the TDM Plan shall be to reduce vehicle trips generated by the uses constructed on the Application Property through the use of mass transit, ride-sharing, and/or other strategies.

Stabilization. Specifically, upon “stabilization” of the Application Property and thereafter, the objective of the TDM Plan shall be to reduce vehicle trips generated by the on-site uses during the weekday peak periods as defined by DDOT by a required percentage as well as an overall reduction in all daily vehicle trips. “Stabilization” of the Application Property shall be deemed to occur on either the one-year anniversary of the issuance of the last initial RUP (residential use permits) for a dwelling unit to be constructed on the Application Property or on the one-year anniversary of issuance of the last initial Non-RUP for floor area representing 80% of full occupancy of the first of the office buildings to be constructed on the Application Property.
During Construction. In addition, during construction of the Application Property the objective of the TDM Plan shall be to reduce trips generated by on-site residential uses and on-site office uses, and construction activities.

Baseline. The baseline number of vehicle trips from which such reductions shall be determined at the time of the trip generation analyses required by DDOT shall be based on the methods adopted by agency at the time of the analysis.

B. TDM Program Plan and Implementation

In order to meet the objectives set forth by DDOT, the Applicant shall implement the TDM Strategic Plan prepared by them, or on their behalf. It is the intent of this proffer that the TDM Strategic Plan adapt over time to respond to the ever-changing transportation related circumstances of the site, the surrounding community and the region, as well as to technological and/or other improvements all with the objective of meeting the required objectives by DDOT. As such, the TDM Strategic Plan may be amended from time to time, subject to approval of DDOT.

Within 90 days of the approval of this Application, the Applicant shall designate a transportation management professional to be the Transportation Coordinator ("TC") for the building or development, whose duties shall be to further develop, implement and monitor the various components of the TDM Plan. The TC shall oversee all elements of the TDM Plan and act as the liaison between the Applicant and DDOT. The TC may be employed either directly by the Applicant/UOA or through a property management company contracted by the Applicant/UOA. The Applicant shall provide written notice to DDOT of the designated TC, along with a demonstration of his/her qualifications, within 10 days of such designation and, thereafter, within 10 days of any change in such designation, plus an annual written notice to DDOT confirming the person’s name and contact information. Following the initial designation of the TC, the Applicant/UOA shall continuously employ, or cause to be employed, a TC for the Application Property.

Within 180 days of approval of this Application the Applicant, through the TC, shall establish an initial budget sufficient to implement the TDM Strategic Plan for the forthcoming year (the “TDM Budget”). The TDM Budget shall include a contingency (the “TDM Budget Contingency”) equivalent to a minimum of 10% of the amount of the TDM Budget. The Applicant shall provide written documentation demonstrating the establishment of the TDM Budget to DDOT within 10 days of its establishment. In conjunction with annual monitoring of TDM strategies the TC shall re-establish the TDM Budget for the forthcoming year. If acceptable a cost of living component will be including in the budget. As a rule, Federal agencies do not comply to/with local TDM ordinances.

C. TDM Account, Remedy Fund and TDM Penalty Fund
TDM Account: Within 90 days of the approval of the Proffer, and TDM Strategic Plan, the Applicant shall establish and fund a TDM Account in the initial amount established by DDOT. The purpose of the account is to help fund the TDM budget, including a TDM budget contingency. The TDM account shall be established in an interest bearing account with a fully insured and licensed financial institution. The Applicant shall provide written documentation demonstrating the establishment of the TDM account to DDOT within 10 days of its establishment TDM account shall be utilized by the transportation coordinator (TC) each year to implement the approved TDM Strategic Plan in accordance with the TDM Budget. The TC shall provide an annual audit of the TDM Account to DDOT, and such audit shall include demonstration that the applicable strategies of the TDM Strategic Plan were implemented and sufficiently funded that year.

Any funds remaining in the TDM Account at the end of any given year shall be transferred to the TDM Remedy Fund until such time as the TDM Remedy Fund has achieved a balance required by DDOT. Upon such time as the TDM Remedy Fund achieves the balance, any funds remaining in the TDM Account at the end of any given year shall remain in the TDM Account to be utilized for the forthcoming year. In the event that the TDM Remedy Fund is drawn upon then the process for replenishing the TDM Remedy Fund as outlined above shall be repeated until the TDM Remedy Fund again achieves the required balance.

The TDM Account shall be replenished annually following the establishment of each year’s TDM Budget reporting expenditures in an annual report to DDOT.

D. Land Use and Trip Generation

Assumption: Required trip reduction goals established by DDOT

Trip Generation: As part of the required monitoring of the TDM programs, the Applicant shall measure actual auto trip generation from the site at select intervals to evaluate the success in meeting the auto trip objectives (maximums) as required by the DDOT. Specifically, the Applicant shall conduct an auto trip generation analysis to monitor peak period auto trips generated by the uses constructed on the Applicant’s property using either traffic count or survey based methods as appropriate. Auto trips generated will be determined at the following phases of the construction process:

Phase I: Following the occupancy of an agreed upon density
Phase II: Double the amount of occupancy of Phase I
Phase III: Following stabilization of the Proffer which will occur after one-year following issuance of the last initial RUP for a dwelling unit to be constructed on the Applicant property or one year following the issuance of the last initial Non-
RUP for floor area representing 80% of full occupancy of the first office building constructed by the Applicant.

**Phase IV:** One year following stabilization  
**Phase V:** Two years following stabilization

Following the Phase V, and the fifth auto trip generation analysis, if the auto trip standards are NOT met then the Applicant, or successor developer (but not successor UOA) shall conduct additional auto trip generation analyses as provided until such time as two consecutive post stabilization auto trip generation analyses state that the auto trip requirements are being met. Auto trip generation analyses shall include vehicle counts or survey based analysis as defined by DDOT, however, the consultant may make recommendations as to the definition. Additionally, if the results of the auto trip analyses indicate that the goals have not been met, the Applicant shall meet with DDOT to review the approved TDM Plan and develop modifications to the TDM strategies to ensure that the auto trip goals are met.

II. Existing Conditions

Prior to DDOT establishing an official policy for TDM as part of the planning process it is recommended that Section B, development of a TDM Strategic Plan, be required for all new development separate of the planning and approval process through DDOT zoning/planning.
MITIGATING TRAFFIC CONGESTION
THE ROLE OF DEMAND-SIDE STRATEGIES
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BY
The Association for Commuter Transportation

WITH

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AND

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As we advance further into the 21st Century, strategies to manage demand will be more critical to better transportation operations and system performance than strategies to increase capacity (supply) of facilities. The inability to easily and quickly add new infrastructure, coupled with the growth in passenger and freight travel, have led to the need for transportation system managers and operators to pay more attention to managing demand.

The original concepts of demand management took root in the 1970s and 1980s from legitimate desires to provide alternatives to single occupancy commuter travel – to save energy, improve air quality, and reduce peak-period congestion. Today, the need to manage travel demand has broadened to encompass the desire to optimize transportation system performance for both commute and non-commute types of trips, and during both recurring as well as non-recurring events.

Growth in population, number of vehicles and the number of travelers, freight, and development has affected travel demand and re-shaped travel patterns. Managing travel demand now occurs at shopping malls, tourist sites, employment areas, or special events, such as the Olympics. The need to manage demand can occur in the middle of the day, during weekends, or evenings. Demand–side approaches are needed to help address transportation issues created by growth and the variability in demand for use of the system.

In this light, the Federal Highway Administration's Office of Transportation Management is pleased to present this new report on demand-side strategies and the important role that it plays in 21st Century transportation operations. This report builds upon previous work done on travel demand management in the early 1990's to present a newer, more contemporary, perspective on what managing demand in the 21st Century really means.

Given the greater need to manage demand under a broader set of situations and conditions, as well as the influence of information and the technologies to deliver it, the concept of demand management in the 21st Century takes on a broader and more relevant meaning. Managing demand in the 21st Century goes beyond just encouraging travelers to change their travel mode from driving alone to a carpool, vanpool, public transit vehicle, or other alternative. Managing travel demand today is about providing travelers, regardless of whether they drive alone or not, with informed choices of travel route, time, and location – not just travel mode.

Information and the technology to deliver it to travelers are beginning to have a significant impact on managing demand for both commute and non-commute situations. Real-time information systems can now let travelers make better decisions about how they travel (mode), when they travel (time), which route they travel (route), and whether they travel at
all. Real-time traveler information systems are also critical to managing significant shifts in demand that occur as a result of special events, tourist activity, incidents and emergencies, schools, shopping centers, recreation areas, medical facilities, weather problems, and reconstruction projects. In the 21st Century, the need to deliver information to help manage transportation demand will grow and be further supported by intelligent transportation systems (ITS) technologies.

The FHWA Office of Operations has a two-pronged action agenda of awareness and guidance to evolve the thinking of managing demand to a more 21st Century perspective. This report is a significant step in that direction.

To learn more, visit our website at: www.ops.fhwa.dot.gov

We look forward to working with organizations, public agencies, and interest groups to advance the ideas presented in this publication.

Jeffrey Lindley
Director
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INTRODUCTION

Traffic congestion is slowing America down. In cities large and small, from the east coast to the west coast, traffic congestion is steadily getting worse each year. A larger percentage of the nation's roadway network is congested, more severely and for longer portions of each day, than ever before. In 1982, the average person living in one of the country's 75 largest cities faced seven hours of travel delay per year. By 2001, that figure had shot to 26 hours of delay per year, and the most severely congested periods of the day – once known as the “rush hour” – stretched to cover nearly six hours of each day. By 2001, the severity of peak-period congestion also intensified, with the average “rush hour” trip taking nearly 40% longer than the same trip at other times of the day (TTI, 2003).

The impacts of traffic congestion are far-reaching – impacting individuals, families, businesses and communities. The Texas Transportation Institute (TTI), at Texas A&M University, calculates that the country’s “congestion invoice” amounted to nearly $70 billion in 2001 – the byproduct of 3.5 billion hours of delay and 5.7 billion gallons of excess fuel consumed in congestion-related delays. These costs directly affect individuals and families, as people spend more time and money stuck in traffic. For most American households, transportation costs now account for 18% of total household expenditures. Only shelter represents a larger portion of expenditures, at 19%. The impacts on lower-income families are even more severe. For households earning between $12,000 and $23,000 per year, transportation expenses consume one in every four dollars spent (STPP, 2000).

Recognizing the growing burden of traffic congestion and the importance of efficient access and mobility, community leaders and transportation planners are actively working on transportation improvements to alleviate traffic congestion. Much needed roadway, bridge, and transit infrastructure projects – considered transportation “supply” or “capacity” enhancements – are underway across the country to mitigate travel delays and accommodate future growth needs.

As urban areas mature, however, opportunities for further investments in transportation infrastructure are often limited. Urban transportation corridors increasingly lack the physical space to accommodate more lanes. In some areas, communities voice concerns that impacts to private rights-of-way or sensitive environments outweigh the potential benefits of expanding facilities. Many areas simply lack the funds needed to pay for major roadway or transit projects. Competition for limited federal and state funds is intense, and even where needed infrastructure projects are in the planning or construction stages, project completion can still be years away.
Effectively tackling traffic congestion increasingly means employing all available strategies. New infrastructure projects – from roads to bridges to transit facilities – remain a core element of comprehensive transportation improvement programs.

Supplementing these “supply-side” investments are a broad array of “demand-side” strategies intended to make existing transportation facilities work better. Demand-side strategies are designed to better balance people’s need to travel a particular route at a particular time with the capacity of available facilities to efficiently handle this demand. Many people have attended a sporting event or a concert where everyone tries to leave the same place at the same time. While in the extreme, this is a perfect example of where travel demand exceeds available supply – and severe traffic congestion often results. The focus of demand-side strategies is to provide people with enhanced travel choices – from choices in travel mode (such as driving, using transit or bicycling), to choices in travel route and trip departure-time – and to provide incentives and information for people to make informed travel choices. For example, many sports and concert venues provide incentives for people to arrive a little early or stay a little late, essentially spreading the “peak” of the demand to travel to/from the building, reducing traffic congestion, and improving the visitor’s overall experience.

This contemporary understanding of demand-side strategies is broader in scope than prior, more traditional views of transportation demand management – or TDM. To some, the realm of demand management applications is limited primarily to encouraging alternatives to single-occupant vehicle travel for the commute to work. In practice, however, this narrow view is no longer consistent with the broad applications of demand-side strategies currently underway across the country. Today’s applications are not only limited to facilitating shifts in travel mode – they also address shifts in travel routes and travel departure-times (for all travelers, including single-occupant vehicle drivers). Today’s applications also extend beyond a focus on commute trips. At national parks, sports stadiums, university campuses, and other diverse destinations, transportation and facility managers are implementing demand-side strategies as part of coordinated efforts to reduce congestion. On bridges, and along corridors undergoing roadway reconstruction programs, demand-side strategies are helping travelers avoid congestion by utilizing alternative travel routes, travel times and/or travel modes – or by reducing the need for some trips altogether by facilitating work from home options a few days a month.

*Mitigating Traffic Congestion: The Role of Demand-Side Strategies* articulates a framework for understanding contemporary efforts to manage demand and improve the performance and efficiency of transportation systems. The document provides extensive examples of programs already underway in a variety of application settings, including over 25 in-depth case studies from across the country.
The in-depth case studies illustrate a handful of the many applications of demand-side strategies in place today. The case studies attempt to highlight the diversity of programs, with an effort to find examples that also provided one or more measures of program effectiveness. A few highlights from the case studies include:

- **SBC Park** (formerly Pac Bell Park) in San Francisco – a 41,000 seat baseball stadium – forged an access plan that integrated excellent access to existing transportation facilities (roadways, bus and rail transit, ferry services, and an extensive sidewalk network) and a comprehensive transportation management plan. With only 5,000 dedicated parking spaces available, demand-side strategies to promote a variety of mode and route travel options, along with advanced transit ticket sales and an aggressive marketing program, were key to the stadium’s success. The year the park opened, approximately 50% of baseball fans arrived in non-auto modes, over 100,000 advance-purchase transit tickets were sold, and the limited number of parking spaces were rarely full.

- **CH2M Hill** in Denver implemented a transportation program to improve the commute and enhance their employee recruitment and retention abilities. They designed an aggressive telework program with full-time and part-time telework options, and instituted a flextime program to better support a variety of commute options. CH2M Hill also designed the “Look Before You Leave” program, which encouraged all employees to check traffic conditions on a company intranet that centralized a variety of resources for current traffic conditions, roadway construction updates, etc. This resource encouraged employees to avoid the most congested travel routes and travel times whenever feasible. At this suburban work location, 17% of CH2M Hill employees use transit, carpool, bicycle, or telework. In 2002, the program reduced the number of miles driven by employees by over 115,000, and saved nearly 3,700 staff hours.

- **Lee County Bridges** crossing the Caloosahatchee River in southwest Florida are a major source of congestion and travel delay for the region. In 1997, County leaders implemented a variable pricing system for the bridge tolls which incorporated a discount for travelers crossing the bridges just before and just after the peak-periods (when using the electronic toll collection system). A 1999 survey found that this demand-side pricing system encouraged 7% of users to shift their travel patterns to cross the bridges during the discounted, non-peak hours of the day.
A full understanding of demand-side strategies must recognize the reasonable limits of these applications. Demand-side strategies should not be considered total solutions to regional traffic congestion problems. Rather, they should more often be implemented as part of an integrated set of solutions that balance supply-side infrastructure investments and demand-side strategies. Demand-side strategies can be relatively easy to implement in a shorter timeframe, within a more constrained budget, than capital improvements. As such, supply-side and demand-side approaches can prove complementary – with demand-side efforts taking on an asset management role by maximizing the performance and extending the life of existing roadways. Successful demand management programs often leverage the synergistic results of many demand-side strategies working together – essentially producing the cumulative results of a number of small percentage improvements.

Demand-side strategies are ultimately about choice and balance. Expanding the array of mode, route and departure-time choices available – supported by robust real-time traveler information, incentives, and other resources – allows each person to choose the options that work best for them regarding when they travel, the mode and route they use to get there, or whether they travel at all.

What’s Inside?
Mitigating Traffic Congestion outlines a framework for understanding the full scope of demand-side strategies, and provides a wealth of case studies, both brief and in-depth, that illustrate where and how these strategies are already underway. The document is organized around these primary five sections:

- **The Demand-Side Framework** – The broad framework for understanding demand-side strategies, their impact on traveler choices, and the varied settings where they are applied.

- **Summary of Case Study Experience** – A review of the case studies collected and key lessons learned from the case study exploration.

- **Conclusions & Future Developments** – A summary of concluding thoughts from the publication as a whole and highlights of important future developments.

- **Additional Resources & References** – A collection of organizations, publications and internet resources, along with citations from this publication.

- **The Case Studies** – In-depth case studies of over 25 examples of demand-side programs underway across the country.
**THE DEMAND-SIDE FRAMEWORK**

This section outlines a framework for understanding demand-side strategies, their impact on traveler choices, and the varied settings where they are applied.

In order to better understand the scope of demand-side strategies, the following section presents a framework outlining three primary areas for discussion of demand-side strategies: the variety of available action strategies, the realm of targeted traveler choices, and the variety of program applications.

The basic framework for how these concepts work together is presented in Figure 1. Essentially, in considering demand management programs:

> A variety of demand-side strategies are implemented in order to impact the travel choices of individuals and organizations, in the context of a wide array of application settings.

Further detail on each of these three areas is provided below, and illustrated in Figure 2 on the following page.

**Demand-Side Strategies.** These are the actual strategies designed and implemented by organizations with a role to play in mitigating traffic congestion, including state/regional/local governments, employers, special event managers, and many others. Organizations frequently tailor packages of both general strategies and targeted strategies to facilitate the most appropriate blend of efficient traveler choices.

**Traveler Choices.** These are the key travel choices made by individuals and organizations that collectively impact the efficiency and performance of the transportation system. Elements include both day-to-day choices about travel mode, departure-time, and travel route, as well trip reduction choices (i.e., telework) and more fundamental residential and business location choices.

**Application Settings.** Demand-side strategies impacting traveler choices are tailored for a wide range of different application settings, each addressing different trip types or travel market segments. Examples are shown in Figure 2, along with some of the case studies included in this document.
FIGURE 2: THE THREE CORE ELEMENTS OF DEMAND-SIDE STRATEGIES
DEMAND-SIDE STRATEGIES

This section describes the scope of programs and policies implemented by organizations to impact the demand for travel. These are the on-the-ground strategies designed and implemented by organizations with a role to play in mitigating traffic congestion, including state/regional/local governments, transportation management associations, non-profit transportation services providers, transit agencies, employers, special event managers, property managers, and many others. Action strategies can include “general” strategies that have a broad impact on a variety of travel choices. For example, financial incentives can be used to impact travel choices in a variety of ways. In addition to the general strategies available, there are also many “targeted” strategies that focus on a specific travel choice. For example, implementation of workplace “flextime” policies is a demand-side strategy specifically targeting travel departure-time choices. Organizations designing and implementing demand-side strategies frequently tailor appropriate packages of both general and targeted action strategies to facilitate the most appropriate blend of traveler choices.

General Strategies

“General” demand-side strategies impact the full range of traveler choices – from mode choices to departure-time choices and route choices. Ranging from infrastructure investments like high-occupancy vehicle lanes and preferential parking spaces, to more programmatic investments like tax-based incentives, these broad-based, general strategies often work in conjunction with the targeted strategies described below. The full range of general demand-side strategies are described in greater detail in the sections below, and are organized in four primary categories:

- Technology Accelerators
- Travel Time Incentives
- Financial Incentives
- Marketing & Education
Targeted Strategies
Often complementing the more broad-based, general demand-side strategies, an array of demand-side strategies are targeted to specific traveler choices – such as choices regarding travel mode or trip departure time. These targeted strategies are described in detail in the sections below, and are organized around the five primary categories of choices that affect overall transportation demand:

- Mode Strategies
- Departure-Time Strategies
- Location/Design Strategies

Route Strategies
- Trip Reduction Strategies

General Strategies
General demand-side strategies impact the full range of traveler choices – from mode choices to departure-time choices and route choices.

Technology Accelerators
Advances in technology are quickly accelerating the ability of transportation organizations to implement effective demand-side strategies. Significant investments in intelligent transportation system (ITS) infrastructure throughout the country are yielding increasingly precise, real-time information about transportation conditions (i.e., current traffic congestion, transit vehicle locations and wait times, etc.), and increasingly user-friendly and robust pre-trip travel planning tools – all of which are making it easier for travelers to make smart transportation mode, route, and departure-time choices. Additionally, rapid advancements in broadband and wireless internet connectivity are making trip reduction strategies, like telework and e-commerce, viable for larger segments of society. While ITS hardware and software technologies will continue to improve – demand-side strategies play a critical role ensuring that advances in transportation information technology translate into more efficient mode, route, and departure-time choices by the users of the transportation system. By developing partnerships with employers, property developers and managers, residential districts, transportation providers and others, organizations that design demand-side programs can ensure full integration of technology accelerators and other complementary demand-side strategies (i.e., financial incentives, travel-time incentives, etc.). Specific technology applications accelerating the scope of demand-side strategies include:

- Real-Time Traveler Information
  The expanded deployment of intelligent transportation system infrastructure and networks, such as road sensors and video cameras, means that accurate, real-time information about traffic congestion, parking availability, transit arrival times, and more are now available to more and more travelers around the country. Real-time traveler information can be provided through a wide variety of communications mediums, including: (1) websites, (2) telephone systems, (3) wireless devices (cell phones, pagers, PDAs, etc.), (4) information kiosks, (5) variable message signs on roadways, at transit stops, and in parking lots, and (6) in-vehicle navigation systems. In order to reach more people before they make travel decisions, transportation organizations are working with a variety of partners to integrate such real-time traveler information resources into corporate intranets at the workplace, building lobbies and elevators, and residential developments through “internet communities.”
By providing better information about current travel conditions, transportation agencies and their partners allow people to make travel mode, route and time choices that best match their individual travel needs. Real-time travel information evaluations show that – armed with real-time travel information – a significant number of travelers alter their original route, departure-time, and even mode choices, reducing the demand for already congested facilities and maximizing the use of underutilized alternatives.

**FAST FACTS:** According to a 2001-2002 survey of real-time travel information users, 68% of users in Pittsburgh and 86% of users in Philadelphia changed their original travel route, while 47% of users in Pittsburgh and 66% of users in Philadelphia changed their original time of travel as a result of the traffic information. The effect on mode choice was less noticeable, 6% in Pittsburgh and 2% in Philadelphia changed their mode of transportation based on the information provided. (Fekpe, 2003)

**REAL-TIME TRANSIT INFORMATION – REHOBOOTH BEACH, DE.** Summertime parking and traffic problems in the beach town area around Rehoboth Beach, Delaware, are addressed with seasonal bus services including a park-and-ride Beach Bus. Electronic signs placed at the Rehoboth Park-n-Ride, the Rehoboth Boardwalk, and Dewey Beach’s Ruddertown complex, provide both scrolling text messages and AVL-based bus arrival time predictions (NextBus, 2002). In the season following installation, “ridership increased over 13 percent from the year before. No additional service hours or miles were operated…” (Hickox, 2002). This notable response pertains to a recreation and tourist oriented rider clientele, and the electronic sign placement may have had an advertising as well as informational effect. (TCRP, 2003)

**REAL-TIME TRANSIT & PARKING INFORMATION – ACADIA NATIONAL PARK, ME.** The Acadia National Park, in Maine, is visited by an increasing number of people each year, exceeding 2.5 million annually in 2002. In 2001-2002, a partnership between the U.S. Departments of Transportation and Interior, Acadia National Park, and the State of Maine, implemented several real-time traveler information systems to provide more timely and accurate information to visitors regarding the Acadia’s Island Explorer free shuttle bus service and on-site parking availability. Components included (1) real-time bus departure electronic message signs, (2) automated on-board “next-stop” announcements on each Island Explorer bus, and (3) real-time parking information made available by website, telephone, and parking status signs.

A visitor survey, conducted near the end of 2002, revealed the following shifts in transportation choices and preferences among park visitors:

- Real-time parking information impacted decisions visitors made about travel in the park. Of visitors using the parking information, 43% changed the time they visited a destination and 38% changed destinations based on the information.
- Visitors strongly believed in the benefits of the Island Explorer’s real-time bus departure signs and the on-board bus announcements. Over 80% found that these technologies made it easier to get around and 69-80% visitors believed they helped to save time.
- Visitors using the electronic bus departure signs and on-board announcements reported that the technologies helped them decide to use the Island Explorer bus (80% and 67%, respectively). 44% of the users of the real time parking information said it helped them decide to use the Island Explorer bus. (Battelle, 2003)
• National 511 Phone Number
During the 1990s, a variety of organizations established hundreds of travel information telephone numbers across the country to provide real-time and other transportation information. In 1999, the U.S. Department of Transportation petitioned the Federal Communications Commission for a three-digit dialing code to make it easier for consumers to access these travel information services – using the same, simple phone number nationwide. The FCC assigned the “511” number on July 21, 2000. In early 2004, 511 was available in over 20 states/regions, providing users access to advanced traveler information services.

DID YOU KNOW? By January 2004, the 511 system was available to almost 57 million Americans (19.4%), in over 20 states/regions. In January 2004, 1.8 million calls were placed to the 511 system, with an average length of 1 minute and 46 seconds (for a total of over 3.2 million minutes of call time in the month). (Resource511, 2004)

• Integrated Electronic Payment Systems
Electronic Payment Systems (EPS) allow travelers to pay for transportation services electronically. The advancement of EPS technologies is allowing more widespread – and more integrated – application of electronic payment options for transit, parking, roadway tolls, and other fee-based transportation services. Integrated EPS technologies – from the “smart card” fare payment systems with imbedded microprocessors in each card to the Radio Frequency Identification (RFID) systems at many toll plazas – are quickly reducing many of the barriers to seamless transportation across travel modes and between different transportation providers. EPS technology can allow for seamless payment, with a single fare payment media, across a variety of modes (bus, rail, ferry, etc.), and on a variety of transportation service providers within the same region. Transit agencies and other providers are also exploring adding retail purchase options to fare payment smart cards, allowing transit users convenient purchase of retail goods and services in and around transit stations and stops. In each case, technological advances are enabling more efficient and convenient travel choices.

DID YOU KNOW? Smart card electronic fare payment systems are now in use by transit agencies in over ten regions of the U.S., including Washington, DC; Atlanta, GA Los Angeles, CA; San Francisco, CA; Orlando, FL; Minneapolis, MN; and others. (APTA).

INTEGRATED ELECTRONIC FARE PAYMENT – WASHINGTON, DC. The Washington Metropolitan Transportation Authority’s (WMATA) SmarTrip program was the first public transportation system in the U.S. to adopt smart cards, launching a pilot program in 1999. In June, 2002, WMATA sold its 250,000th SmarTrip permanent rechargeable plastic smart card which holds up to $200.00 in fare value. One third of WMATA Metrorail riders use SmarTrip cards regularly. SmarTrip will be expanded to parking, bus transit, and other regional rail service over a total of 17 transit systems. (APTA, 2003)
Financial Measures
Transportation expenses are a major factor in the travel choices people make everyday. In fact, for the average American household, transportation costs represent 18 percent of total household expenditures (STPP, 2000). As such, a wide range of demand-side strategies are oriented around using financial incentives and targeted pricing systems to encourage efficient travel choices.

• Tax Incentives
  The Federal tax code allows employers to provide tax-free transit, vanpool, and parking benefits to their employees. The employer and employee save on taxes, since neither pays federal income or payroll taxes on these benefits. Called "qualified transportation fringe" benefits in the Internal Revenue Code, Section 132(f), these tax incentives are often referred to as "Commuter Choice tax benefits" or simply "commuter benefits." For tax year 2004, transit and vanpool expenses up to $100 per month ($1,200 per year) and qualified parking expenses up to $195 per month ($2,340 per year) are tax-free. The monthly tax-free limits are subject to annual adjustments, indexed to inflation (see www.commuterchoice.com for continually up-to-date information). Providing commuter tax benefits to employees can save payroll taxes for employers. Because the value of the benefit paid to employees is considered a tax-free transportation fringe benefit and not wage or salary compensation, the cost of the benefit is eligible as a business expense and payroll taxes do not apply. There are three primary ways employers can structure the benefit:

  Employer-Paid Transportation Benefits. Employers can pay for their employees to commute by transit or vanpool, up to a limit of $100/month (subject to annual change). With this arrangement, employees get up to $100 in a tax-free transportation benefit. Employers get a tax deduction for the expense and enjoy savings on payroll-related taxes. Employers have found that providing transportation benefits offers significant savings over offering the equivalent dollar value to employees in the form of a salary increase. Employers can also pay for the cost of parking for employees, up to a limit of $195/month (this limit is subject to annual change).

  Employee-Paid, Pre-Tax Transportation Benefits. Employers can allow employees to set aside up to $100/month of pre-tax income to pay for transit or vanpooling (subject to annual change). Employers save money overall since the amount set aside is not subject to payroll taxes. Employees save money, too, since the amount of an employee's salary set aside for transportation benefits is not subject to income or payroll taxes, up to the specified monthly limits.

  Shared-Cost Transportation Benefits. Employers can share the cost of transit or vanpool costs with employees—and everyone can receive valuable tax savings. With this approach, employers can provide a portion of the cost of taking transit or vanpooling as a tax-free benefit and allow the employee to set aside pre-tax income to pay for the remaining amount of the benefit (up to the specified limits).
**Questions & Answers**

Q. Are additional tax incentive programs available to employers at the state level?

A. Yes, several states have tax incentive programs to encourage employer participation in providing commuter benefits to their employees. For example, the Maryland Commuter Tax credit provides a 50 percent tax credit, up to $30 per employee per month, for provision of transit passes, vanpool benefits, and reimbursement for carpooling expenses. Other states offering tax incentives to employers include: Georgia, Minnesota, Delaware, Connecticut, Oregon, New Jersey. See the following U.S. EPA document for more information: www.bwc.gov/pdf/fedtax.pdf

**FAST FACTS:** Although 86 percent of American workers feel that commuter assistance benefits — such as discount transit passes, ride sharing boards, or parking benefits — are beneficial and useful, only 17 percent have access to such assistance through their employers. Eighty-six percent of employees who do not have commuter assistance typically drive alone to work, compared with only 71 percent who do have access to commuter assistance. Surveyed employees who have commuter assistance are almost eight times more likely to use public transportation such as the train, subway or bus than those employees who do not have assistance (15 percent versus 2 percent). (Xylo, 2001)

- **Parking Cash-Out**
  Employers can offer their employees the option to “cash out” of their existing parking space. For example, if Company A subsidizes parking for their employees at $60/month, a parking cash-out program would allow employees to choose from the following options: (1) keep the parking space worth $60/month, (2) give up the parking space and receive $60 extra each month in taxable salary, or (3) receive $60/month in tax-free transportation benefits to pay for transit or vanpooling. Cash-out programs often work best for employers that pay separately for parking and for organizations with parking shortages or demands to expand parking facilities.

**FAST FACTS:** A 1997 study of eight parking cash out programs in California found that total vehicle trips declined by 17% after a parking cash out option was introduced at various urban and suburban worksites, as shown in Figure 3 below. (Shoup, 1997)

**FIGURE 3: CASHING OUT IMPACTS ON COMMUTE MODE (SHOUP, 1997)**
• Parking Pricing
Parking pricing entails charging vehicles directly for use of a parking space, and is among the most powerful demand-side strategies. There is a cost (whether in land value, construction cost, maintenance cost, etc.) for all parking spaces. The question is whether these costs are subsidized by developers, property owners, property managers, or others – or whether, and how, these costs are charged directly, in full or in part, to those using the spaces. Well-crafted parking pricing strategies can impact the use of alternative travel modes, in particular where high-quality transit services are available. Variable parking pricing programs (see below for more detail on variable pricing), where parking prices are higher during more congested hours of the day or along more congested routes, assist in managing demand and encouraged the use of less-congested travel times and travel routes. Within particular parking lots, parking managers can discount certain parking spaces (preferably in priority locations, such as next to a building entrance) for use by those arriving in multi-occupant vehicles.

FAST FACTS: Over 95 percent of commuters park for free at work in the US, and almost all of them drive alone (91 percent of total commuters). For 2002, this yielded an estimated commuter parking subsidy for off-street parking paid by the employer and/or developer of $36 billion. (Shoup, 2003)

• Variable Pricing
Variable pricing changes the price structure of toll roads, bridges, parking lots, and other congested transportation facilities in order to provide incentives for using the facilities in uncongested times or by different modes. On variable priced toll roads, toll rates are structured such that higher prices are assessed based upon time of day concurrent with typical or even actual periods of congestion. Despite the nature of the program, tollway users will experience higher charges during the peak periods and lesser charges during off-peak or shoulder periods. The effect of variable pricing on toll facilities is to: 1) help divert some traffic from the peak period to the shoulders of the peak period, and, 2) provide a cost-based encouragement for the use of transportation options (such as transit and ridesharing). Shifts to either off-peak periods or other transportation options will likely reduce the overall congestion on the facility, and, reduce the need for additional capacity on the toll facilities.

VARIABLE-PRICED TOLLS – LEE COUNTY, FL. Lee County is using variable-priced tolls to mitigate congestion on two county bridges by spreading traffic away from the peak period “rush hour.” In the “shoulders of the peak period” (6:30 – 7:00 am, 9:00 – 11:00 am, 2:00 – 4:00 pm, and 6:30 – 7:00 pm), patrons received a 50% discount on the bridge toll if they utilize the bridge’s electronic toll collection system. According to a 1999 telephone survey, half of respondents indicated they always or sometimes considered the toll discounts prior to making a trip across the bridges. As a result of the program, use of the bridges increased in the off-peak times and decreased during the peak periods. Analysis indicated that the travelers who modified their travel plans were more likely to be retired or working part-time. The survey results indicated that commuters were less likely to modify their schedules as a result of variable pricing, and that the program appears to have a greater impact on shopping trips. (Burris, 2000)
FAST FACTS: Over forty-five projects in fifteen states have investigated and, in some cases, begun implementation of pricing programs. In Hudson County, NY, variable pricing on existing toll bridges increased transit usage and reduced peak-period traffic by 7 percent. On the New Jersey Turnpike, up to 15 percent of peak-period traffic was reduced by variable pricing. Variable tolls on the State Route 91 facility has increased three-or-more person carpools. (FHWA, 2004)

• Distance-Based Pricing
Distance-based pricing involves shifting automobile expenses that are often fixed monthly or annual costs, such as automobile insurance or vehicle registration, to expenses that vary according to how much the vehicle is driven. Distance-based pricing strategies are designed to directly tie more types of automobile expenses (i.e., in addition to fuel expenses) to the number of miles driven. Distance-based pricing programs may include (1) pay-as-you-drive automobile insurance, (2) mileage-based vehicle registration fees, and (3) mileage-based vehicle purchase taxes.

DID YOU KNOW? Progressive Insurance became the first insurance company in the United States to offer mileage-based vehicle insurance when it initiated service in Texas in 1999. Not only does Progressive charge per mile, but the company also uses a Global Positioning Satellite (GPS) system to charge motorists more when they drive under higher risk conditions. In 2004, GMAC Insurance and OnStar teamed up to offer mileage-based insurance discounts to OnStar subscribers in four states. Under the new program, vehicle owners with active OnStar accounts may be able to save from 5 to 40 percent on their car insurance, depending upon where they fall within seven mileage categories. (OnStar, 2004)

• Incentive Rewards Programs
Reward-based incentive programs use financial and recognition rewards to encourage travelers to try and to maintain efficient transportation choices. There are a wide variety of ways incentive reward programs are structured: (1) direct cash or gift certificate rewards offered to travelers for efficient travel choices, either on a regular basis or through periodic prize giveaways, (2) points-based systems for use of efficient travel choices, much like airline frequent flier programs, (3) extra time off of work, or similar workplace-based rewards, and (4) recognition of travelers or sponsoring organizations in newspaper ads, award ceremonies, etc. Reward-based incentive programs are sponsored by organizations at many different levels, from single-site employers to federal agencies. For example, the Best Workplaces for Commuters℠ program, established by the U.S. Environ-
M I T I G AT I N G T R A F F I C C O N G E S T I O N

The Environmental Protection Agency (EPA) and the U.S. Department of Transportation (DOT), publicly recognizes employers whose commuter benefits reach a National Standard of Excellence. EPA and DOT also recognize entities other than employers, such as business parks, downtown districts, or shopping malls, which provide and administer to each of the district’s employees a commuter benefits program that meets the National Standard of Excellence. For more information, visit: www.bwc.gov.

**Travel Time Incentives**

Increases in congestion levels around the country are creating longer and longer travel times. The average driver in the country’s 75 largest cities experienced about 26 hours of travel delay due to congested driving conditions in 2001. In addition to an overall increase in average travel times, travel time “reliability” has also decreased, with crashes, vehicle breakdowns, weather, special events, construction and maintenance accounting for about 50 percent of all delay on the roads in 2001 (TTI, 2003). As such, a variety of demand-side strategies are oriented around providing travel time incentives to encourage efficient travel choices. These demand-side travel time incentives address both overall travel time savings and improved travel time reliability.

- **High-Occupancy Vehicle (HOV) Lanes**

  HOV lanes are exclusive roadways or lanes designated for high-occupancy vehicles, such as buses, vanpools, and carpools. The facilities may operate as HOV lanes full time or only during the peak periods. HOV lanes typically require minimum vehicle occupancy of two or more persons. However, in some locations, occupancy requirements have been increased to prevent congestion on the HOV lane. Support facilities, such as park and ride lots and transit centers with direct access to the HOV lane, are important system elements to increase facility use. HOV lanes may also be used to provide bypass lanes on entrance ramps with ramp meter signals. Keys to the success of lanes include location (areas of high congestion do better); enforcement; interagency coordination; synergy with parking policy, trip reduction ordinances, and transit and ridesharing programs; public and policy-maker support; and education and marketing. A related concept, high-occupancy toll lanes, or HOT lanes, allow single-occupant vehicles to utilize HOV lanes for a fee. HOT lanes can expand the range of travel choices available to all users and even help articulate the perceived “value” of HOV lanes to transit, vanpool, or carpool travelers able to use the same lanes at free or reduced rates. Revenues generated through fees paid by single-occupant vehicles on HOT lanes can also bolster ongoing funding for transit and ridesharing services along a HOT/HOV route.

**FAST FACTS:** There are more than 2,500 lane-miles of HOV facilities in the U.S. and Canada. This is expected to double within the next 25 years. One of the first HOV lanes, the I-10 HOV lane in southern California, known as the “El Monte Busway”, was opened in 1973 as a dedicated busway and later opened to carpools of three or more people. In 2002, the single El Monte HOV lane carried more people than three regular general purpose lanes during peak periods, and, saved users an average of 20 minutes over the eleven mile distance. On average in southern California, HOV lane users saved more than half a minute per mile compared to the general purpose lanes. (CA DOT - District 7, 2003)
Mitigating Traffic Congestion

BUS SIGNAL PRIORITY SYSTEMS – INTERNATIONAL EXPERIENCE. “Transit signal priority (TSP) installations in England and France have shown a 6 to 42% reduction in transit travel time, with only 0.3 to 2.5% increases in auto travel time. In North America, Toronto, Edmonton, Charlotte, Portland, Chicago, and Los Angeles, among others, have installations in place. In Toronto, for example, average transit signal delay reductions of between 15 and 49% using TSP has justified expansion to over 300 signalized intersections (15% of total) along four bus and five streetcar routes, all in mixed traffic. Other TSP deployments include a 2-mile stretch in Cicero, IL on Cermak Road that is the site of an Illinois Department of Transportation demonstration using wire loops at 10 signalized intersections. Chicago Transit Authority and suburban PACE buses, using transponders and absolute TSP, realized an 8-minute trip time versus 12 minutes before TSP (a 33% reduction). In Los Angeles, two projects demonstrated application of TSP in conjunction with service restructuring (Metro Rapid) at approximately 100 signals along of each corridor (14-16 miles). Results indicated an average 8% decrease in overall bus running time, and a 35% reduction in bus delay at signalized intersections.” (ITS America, 2002)

- Transit / HOV Signal Priority Systems & Queue Jumps
  Queues at either arterial intersections and/or ramp meters (signals that manage access to freeways from arterials) can significantly lengthen travel times for all travelers. When compounded with the need to make stops, signal delays often result in unacceptably long travel times for potential bus riders, carpools, and vanpools. Many metropolitan areas have implemented signal priority systems and queue jumps as one means of addressing signal delay for multi-occupancy vehicles, providing a significant improvement to travel time and/or travel time reliability for transit users, vanpoolers, or carpoolers. These demand-side strategies provide a travel time incentive for the use of high-occupancy travel modes – or the use of underutilized travel routes/times.

  FAST FACTS: The Minnesota Department of Transportation conducted a study to evaluate the effectiveness of its extensive ramp metering system, including shutting the system down. The study showed that ramp metering decreased total travel time by 24% in heavy congestion and 46% in typical traffic. Without HOV bypass lanes, ramp metering imposes a delay on buses and carpools. With HOV bypass lanes, overall travel time delay can be reduced by up to 62% in heavy congestion due to 1) reduction of freeway traffic due to ramp metering, and 2) no travel time delay on the ramps. (MN DOT, 2002)

- Preferential Parking
  This strategy reserves priority parking spaces within a parking lot for those arriving by carpool or vanpool, or even those arriving during less-congested times of the day. “Preferred” parking could include (1) covered parking that protects people and cars from the weather, (2) an assigned parking space near the building entrance, (3) a level-one spot in a multistory parking garage, or (4) priority position on a parking space waiting list. Although designating preferred parking areas is most effective where parking demand meets or exceeds supply, many travelers with abundant parking still enjoy parking closer to the building or in a designated parking space.
FAST FACTS: The City of Aspen, Colorado, provides a variety of demand-side transportation strategies to preserve the physical environment and to control future traffic impacts on the community. In order to encourage carpooling, vehicles with more than three people entering the downtown area can stop at a kiosk and receive a Carpool Parking Permit that allows that vehicle to park in a designated area free of charge all day. In 2001, approximately 16,000 daily permits were issued. Coupled with the high-occupancy vehicle lanes, the distribution of these permits is one of the most successful incentives to rideshare.

Marketing & Education
A critical element of successful demand-side strategies is often a well-designed and executed marketing and education program. Even in communities where high-quality transportation mode, route and time choices are currently available, travelers who remain unaware that these choices exist, or unconvinced that these choices are viable and/or reliable, even modest shifts in travel behavior and transportation efficiency are unlikely. Transportation marketing programs, at their most basic level, are designed to do one of three things: (1) increase awareness of available transportation choices, (2) encourage travelers to try new, more efficient travel choices for the first time, or (3) increase or maintain the frequency that people utilize more efficient travel modes, routes or times. Educational programs are designed to make travelers more aware of available transportation choices, and more aware of the specific facts related to travel choices – such as travel costs for different travel modes, travel times at different departure times, etc. Several specific strategies are emerging at the forefront of demand-side marketing and education strategies:

- Social Marketing
  Social marketing campaigns are increasingly being used by organizations around the country to encourage voluntary, socially-beneficial behavior change. “Social marketing is the use of marketing principles and techniques to influence a target audience to voluntarily accept, reject, modify, or abandon a behavior for the benefit of individuals, groups, or society as a whole” (Kotler, 2002). Using techniques similar to marketing commercial goods and services, various organizations have used social marketing techniques to encourage environmentally-friendly landscaping techniques, increase the use of seat belts and child safety seats, promote safe bicycling and the use of bike helmets, and champion enhanced exercise and physical activity. Similar approaches are increasingly being used to encourage voluntary changes in travel behavior, from reducing the number of trips made by single-occupant automobile to encouraging travel at off-peak travel times.

FAST FACTS: In 1993, North Carolina launched the “Click It or Ticket” campaign to increase seat belt use throughout the state. A social marketing campaign touted the benefits of seat belt use in conjunction with communicating a $25 fine for violations (fine revenues went to local schools). Before the campaign, only 65% of North Carolinians used seat belts. By 2000, seat belt use had jumped to 84%, among the highest rates in the nation. Highway fatalities and injuries were cut by 14%, and statewide, auto insurance rates fell. The U.S. Department of Transportation called the campaign a “model for the nation,” and it has since been replicated by states across the country. (Kotler, 2002)
• Individualized Marketing
Individualized marketing – sometimes referred to as dialogue marketing – focuses marketing efforts and financial resources on a targeted group of individuals or households, working on a one-to-one level to provide tailored information about available transportation choices and small incentives to encourage individuals to try new options. In April 2004, the Federal Transit Administration (FTA) selected four communities for a pilot individualized transit marketing project: Bellingham, WA; Cleveland, OH; Sacramento, CA; Triangle Park, NC. “The FTA’s pilot project is based on personalized, individual marketing of potential commuters who might consider using public transit, but need more information. Transit agencies in the pilot communities first identify a neighborhood (approximately 600 households) with existing transit service and those residents are contacted in writing to determine if they are interested in learning more about travel options. Interested residents are then contacted by phone to determine if they would like information on transit, bicycling or walking. The outreach continues until residents have enough information to ensure their comfort level with trying different modes of transportation. In a few cases, bus operators make ‘home visits’ to personally discuss public transportation routes and options with residents.” (FTA, 2004)

FAST FACTS: A UITP (International Public Transportation Association) project conducted in Europe, as well as larger scale individualized marketing programs in Australia, resulted in significant increases in transit ridership. The pilot project in Europe resulted in a 10 percent reduction in car usage in the targeted area, while the large-scale individualized marketing efforts in Australia yielded up to 14 percent reductions. The first U.S. pilot project in Portland, Oregon, reduced car travel by 8 percent in the first area selected for the pilot, and resulted in a 27 percent increase in travel by carpool, vanpool, transit, bicycling and walking in that same area. (FTA, 2004; Australian TravelSmart, www.dpi.wa.gov.au/travelsmart/)

Targeted Strategies
Often complementing the more broad-based, general demand-side strategies, an array of demand-side strategies are targeted to specific traveler choices – such as choices regarding travel mode or trip departure time. These targeted strategies are described in detail in the section below, and are organized around the five primary categories of choices that affect overall transportation demand.

• Mode Strategies
• Route Strategies
• Departure-Time Strategies
• Trip-Reduction Strategies
• Location / Design Strategies

Mode Strategies
The following demand-side strategies specifically target the choices of travel mode, from driving alone to bicycling to using transit:

• Guaranteed Ride Home
Guaranteed Ride Home (GRH) programs, sometimes called emergency ride home programs, provide those who do not drive into work, or other supported destination, with
a free ride home in cases of emergencies, unplanned overtime, or other unexpected issues. Rides are often provided by taxi, but GRH can also be supported through rental cars, company fleet vehicles, or other alternatives. Often sponsored by local/regional governments, or by employers, GRH programs provide a back-up travel option to prevent travelers using alternative travel modes from being stranded at their destination.

**FAST FACTS:** In a 2003, survey the Artery Business Committee Transportation Management Association in Boston found that seven percent of commuters who used to drive alone switched to transit once they found out that there was a GRH service available. Metropolitan Washington's Council of Governments (MWCOG) GRH program is listed as a transportation control measure in the area's state implementation plan (SIP). MWCOG estimates that by 2005, its GRH program will eliminate 0.76 tons per day of NOX, at a cost of $8,800 per ton of NOX reduced. (Todreas, 2004)

• **Transit Pass Programs**
  Transit pass programs provide subsidized or free passes to travelers for the use on community transit and/or regional rail, bus, ferry or shuttle transit services. Free transit passes provide an incentive for “first time” users to try using transit and simplify the fare payment process.

**FAST FACTS:** When employees in downtown Ann Arbor, Michigan were provided a discounted or free transit pass (depending on the level of employer involvement), the estimated effect was a 9.2% increase in daily bus trips and a 3.5% daily decrease in the number of private vehicles coming into downtown between 2000 and 2001. (White, 2002)

• **Shared Vehicles**
  Shared vehicles provide a flexible option to travelers who rely primarily on non-motorized and public transit travel, yet at times require a vehicle for special trips, such as grocery shopping or trips to rural areas, or to get from the transit station to their final destination. Shared vehicle concepts include:

  • **Car Sharing:** Member based programs offer 24 hour access to a fleet of vehicles (cars, vans, trucks) within a city or neighborhood. Vehicles are reserved and used for just a few hours or up to a week. Most programs offer vehicles at an hourly and mileage based rate, with prices including gas, insurance, parking and maintenance. Several vehicles are generally located at convenient locations throughout the city
  • **Station Cars:** Similar to the car sharing concept; small, low emission vehicles are available at transit stations, helping people get from the train to their final destination, used daily for the commute or on an as needed basis.

**FAST FACTS:** According to researchers at the University of California at Berkeley tracking City CarShare, a San Francisco Bay area car-sharing organization, 30 percent of users have sold one or more of their privately owned vehicles and City CarShare is saving 13,000 miles of vehicle travel, 720 gallons of gasoline, and 20,000 pounds of carbon dioxide emissions in the Bay area. (City CarShare, 2004)
Departure-Time Strategies

The following demand-side strategies specifically target trip departure-time choices:

- **Worksite Flextime**
  Worksite flextime allows employees to set their own arrival and departure time to/from work – within established time boundaries agreed to by their employer. This strategy can influence travel in several ways. In congested areas, it may encourage employees to avoid the most congested travel times, reducing the demand on roadway and/or transit systems during peak-demand periods. Furthermore, flextime programs often provide employees with the schedule flexibility sometimes needed to coordinate carpools and vanpools.

  **FAST FACTS:** From a Federal Transit Administration report on the potential impacts of flextime programs on peak-period traffic demand: “At Bishop Ranch in California, flextime policies [were] successful in shifting employee arrival times to earlier periods. A survey of 14,800 employees between 1988 and 1990 showed the percent of employees starting work before 7:00 a.m. increased from eight to 17 percent, and the percent starting work after 9:00 a.m. increased from one to 9 percent. Departure peaking also has been reduced. The percentage of workers leaving before 4:00 p.m. increased from 12 to 17 percent. The employer flextime programs were instituted as part of a broad demand management program for the area, as well as a local trip reduction ordinance encouraging reduction of peak hour vehicle trips.” (FTA, 1992)

- **Coordinated Event or Shift Scheduling**
  Scheduling the coordination and staggering of traffic to reduce the number of vehicles arriving and leaving a site at one time. This can apply to event venues, specific worksites or office parks with severe traffic congestion.

  **FAST FACTS:** Near downtown Milwaukee, Summerfest, an annual, eleven-day outdoor music festival, attracts approximately 100,000 patrons per day and over 1 million annually. Since parking on-site is limited near the venue, alternative means of providing transportation and informing festival visitors with traffic, alternative route and parking information were essential. Local ridership data for Year 2000 showed that approximately 25% of the total attendance used bus transportation.

Route Strategies

Travelers making day-to-day decisions regarding available travel routes generally use a combination of information resources to determine the quickest, or most reliable, route option. Many commuters listen to television and radio reports of traffic conditions. Others explore real-time, web-based travel-speed maps. Some simply pursue alternate routes when their normal route is unusually congested. The role of demand-side route strategies is to get the most accurate, timely information on travel conditions to people before they end up on congested facilities – allowing them to select less-congested routes and avoid “adding to the problem” by using already congested routes. Demand-side route strategies can apply to roadway, transit and other travel route alternatives.
• **Real-Time Travel Route Information**

More and more areas around the country are launching real-time travel route information resources for area travelers. Using web-based maps, en route variable message signs, wireless updates to mobile devices, and other communications mediums – travelers are better able to make the most efficient route choice, and better able to make that choice before they end on a congested roadway or transit facility. Real-time, web-based traffic maps, like the Georgia Navigator system shown in Figure 4, often use a color-coded system to display travel speeds, warning indicators to show current incident locations, and hotlinks to connect users to live camera images of existing traffic conditions (where available). Organizations implementing comprehensive demand-side strategies are working with employers, property developers and managers, and others to integrate these real-time tools into corporate intranets, lobby kiosks, and others medium – in order to ensure that people can access this information conveniently.

**FIGURE 4: GEORGIA NAVIGATOR REAL-TIME TRAFFIC MAP. www.georgia-navigator.com**

**DID YOU KNOW?** The Utah Department of Transportation's CommuterLink, a real-time, web-based traveler information system that was operational for the 2002 Salt Lake Winter Olympics, is based on the Georgia Department of Transportation's Navigator system – which was used during the 1996 Summer Olympic Games.

• **In-Vehicle Navigation Systems**

In-vehicle navigation systems are currently available in a variety of automobiles currently on the market for sale, lease and rent. These systems generally provide drivers with route guidance, vehicle position, and regional points of interest information. Historically, in-vehicle systems have relied on static data about travel times for each road segment to calculate the shortest travel time from where the vehicle is located to a point the driver inputs as the destination. As the collection and dissemination of real-time travel information – and the availability and affordability of regional broadband wireless networks – both improve, in-vehicle navigation systems will be able to provide drivers of private automobiles and transit vehicles real-time route guidance. Such guidance will encourage travelers to take advantage of underutilized travel routes and avoid non-recurring congestion caused by incidents and other emergencies.

**FAST FACTS:** Telecommunications companies are launching region-wide, broadband wireless services in cities around the country. The expansion of region-wide broadband wireless will expand the capacity to deliver real-time traffic data and other information to vehicles moving throughout a region. Telecommunications companies initiated service in Washington, DC, and San Diego, CA, in 2003. Service will expand to other major metropolitan areas throughout 2004 and 2005. (Baig, 2004)
• **Web-Based Route-Planning Tools**
  A variety of companies provide web-based travel route planning tools for roadway trips, and an increasing number of transit agencies are offering similar services for transit riders. These tools allow users to enter trip start and end locations (along with desired departure times or en route services, in some instances), and process recommended travel routes and forecast travel times. As these tools evolve, multi-modal travel route planning and the capacity for using real-time travel information to suggest less-congested alternate routes or modes is likely to emerge.

**Trip Reduction Strategies**

The following demand-side strategies are designed to reduce the need for some trips altogether:

• **Employer Telework Programs & Policies**
  Employers establish telework programs and policies at the worksite in a wide variety of ways – from structured, formally-implemented telework programs and policies to more informal telework arrangements established between individual employees and their direct supervisors. In many areas, transportation organizations – from metropolitan planning organizations to transportation management associations – have well-established telework support programs to assist employers in setting up appropriate telework systems and policies.

**FAST FACTS:** In a 2001-2002 employee survey, AT&T found that “AT&T teleworkers again reported that they gain about an extra hour of productive time each day at home, adding up to at least an estimated $65M in business benefit each year... Teleworkers appear to get more accomplished not only because of time saved by not commuting - that is, increased productivity on a per teleworker or per workday basis - but also because of increased productivity per unit hour. The ability to focus and manage time is critical for knowledge workers, and little distractions in the office add up to big costs in productive time.” (Roitz, 2002)

• **Employer Compressed Work Week Programs & Policies**
  Employers in a variety of setting establish compressed work week programs, offering employees the option to work the same number of work hours in fewer days per week, or per pay period. Development of compressed work week programs and policies involves a variety of partners, including company management and human resources staff, employee labor unions, and regional transportation organizations.

**FAST FACTS:** A 1991 study of compressed work week programs in Ventura County, CA, reports that the program was associated with a decline in single-occupant vehicle trips to work, from 82 percent to 77 percent. (Freas, 1991)
Location / Design Strategies

The location of land uses in a community – from homes, to businesses, to retail establishments – directly impacts transportation demand. Over time, as cities evolve, changes in land use development patterns lead to changes in trip-making patterns. In some areas, urban growth has led to increases in trip lengths and growth in the average number of vehicle trips per day. In other areas, a variety of land use location and design strategies have led to reductions in trip lengths and vehicle trip generation – contributing to congestion mitigation advances (R.H. Pratt Consultant, 2003). Communities, businesses, and individuals make land use location and design decisions based on a wide range of economic, social, environmental, and other factors. Transportation accessibility is also a factor in many of these decisions, and a variety of location/design demand-side strategies are available. Several specific programs are described below. A more extensive discussion of the impacts of land use and site design strategies on travel patterns is available from the Transportation Research Board: Traveler Response to Transportation System Changes: Chapter 15 Land Use and Site Design (R.H. Pratt Consultant, 2003).

• Live Near Transit Mortgage Incentives
Live near transit programs offer mortgage incentives to encourage residential location near transit facilities. The programs recognize that household transportation expenses can be lower for residences well served by public transportation, and allow homebuyers to use these transportation savings as additional borrower income in qualifying for a home mortgage. For example, Fannie Mae sponsors the Smart Commute Initiative™ in pilot cities across the country. In several of the pilot cities, the Smart Commute Initiative involves partnerships with regional planning organizations, transit agencies, and private companies to provide complementary services supporting the use of public transportation (i.e., discounted transit passes, shared-car membership programs, etc.). Fannie Mae also supports the Location Efficient Mortgage® program in four pilot cities nationally.

WASHINGTON REGIONAL SMART COMMUTE INITIATIVE.
In Washington, DC, the Smart Commute Initiative offers mortgage incentives to households locating within one-quarter mile of a public bus stop or one-half mile of a public rail station. Through the program, participating lenders will add a portion of the potential transportation savings to borrowers’ qualifying income - an addition of $200 per month for one wage-earner households and $250 per month for two wage-earner households (a potential increase in home-buying power for a typical purchaser of a median-priced home of approximately $10,000). Participants also receive discounts on transit passes and lifetime membership in the Flexcar shared-car program. (www.mwcog.org/planning/smart_commute/index.html)

• Live Near Work Incentive Programs
Live near work programs provide incentives for employees to live near their place of employment. Examples include down payment assistance, location efficient mortgages and rent subsidies. By providing housing close to employment, this program can lower the costs of commuting, lessen the pressure on infrastructure, and generate more pedestrian traffic in business districts.
DID YOU KNOW? In 1997 Maryland’s General Assembly adopted a series of growth management programs, one of which was the Live Near Your Work Program. The City of Baltimore pioneered the program and continues to partner with area “Live Near Your Work Employers” to provide $2,000 cash grants to home buyers for down payment and/or settlement expenses. (www.livebaltimore.com/homebuy/lnyw.html)

• Proximate Commute
This program involves voluntary, coordinated relocation of eligible employees who work for multi-site employers to the work branch locations closest to their home, reducing commute distances. Rather than having employees commute to distant locations, their employers help them arrange job swaps and transfers to company sites closer to home. In the mid-1990s, the Washington State Department of Transportation worked with Key Bank on a proximate commute demonstration project. A total of 500 Key Bank employees – from 30 individual branches in three counties – were found to be eligible for the program. An initial review found that 83% of the employees lived closer to an average of 10 different branches than the branch where they were presently employed. 85 of the 500 employees enrolled in the program. The result was a 65% reduction in miles traveled. (Giery, 2003)

FAST FACTS: In 2002, Boeing undertook a pilot project to itemize the jobs and home addresses of 10,000 of its non-union workers to determine if some could transfer to a plant closer to home. Preliminary research showed that 53 percent, or 42,475, of its workers share a job description with a plant that is closer to their residence. Boeing found that if those employees could be moved, it would reduce commute-related travel by 168 million miles annually, equating to 8 million gallons of gas and 5,000 tons of emissions each year. (Seattle Post-Intelligencer, 2002)

• Transit-Oriented & Pedestrian-Oriented Design, Mixed-Use
A wide range of urban form and design strategies can enhance opportunities for the use of public transit, ridesharing, bicycling, and walking. Focusing a mix of land uses – such as employment, housing, restaurants, services (banking, day care, etc.), retail, and more – in well-designed, pedestrian-friendly developments and/or near transit connections can reduce the demand for vehicle travel and reduce trip distances. A 2002 study in California demonstrated that transit-oriented developments (TODs) can yield 20 to 40 percent higher ridership at an individual transit station for both work and non-work trips, and can increase overall regional transit ridership by up to 5 percent. (Parsons Brinckerhoff).

FAST FACTS: An assessment of the impact of different degrees of land use mix on travel patterns in 57 suburban activity centers found that centers with some on-site housing had 3 to 5% more transit, bike and walk commute trips. Additionally, for each additional 10% of commercial/retail floor space in the activity center, transit and ridesharing increased by 3%.
TRAVELER CHOICES
an outline of the range of traveler choices impacted by demand-side strategies

Traveler Choices
Strategies implemented as part of a demand-side program are designed to facilitate efficient traveler choices.

Individual travelers, families, and businesses all make important decisions that collectively impact traffic congestion. These decisions include day-to-day travel choices, such as travel mode, departure-time, and travel route. They also include decisions to eliminate some travel altogether – for example, by working from home a few days a month or by using internet-based technologies to preclude the need to physically travel to a store, library, or other destination. Finally, individuals and organizations make important decisions about the location of their residence or business – often factoring in transportation-related considerations such as commute to work travel times or ease of access to public transportation services.

This section provides additional detail on five primary traveler choices:

1. Mode Choices
2. Departure-Time Choices
3. Route Choices
4. Trip Reduction Choices
5. Origin / Destination Location Choices

Mode Choices… “What travel mode will I use for my trip?”
Demand-side strategies target improvements to the availability and viability of real transportation mode alternatives for a full range of travelers, from school-age children through seniors, and for a full range of trip types, from the trip to work to the trip to the corner store. By enhancing the availability of a range of travel mode choices, travelers can select the most appropriate or efficient option for each trip. In many situations, the flexibility and convenience of the single-occupant automobile is the best option. However, for many trips, other mode choices can prove less expensive, less stressful or more predictable.
The Range of Mode Choices:
• **Single-Occupant Vehicle (SOV)**
  A single individual driving an automobile or motorized cycle with no other passengers.

**FAST FACTS:** The country’s share of commuters driving alone increased by just over 3% from 1990 to 2000 (from 73.19% to 76.31%). From the 2000 U.S. Census, the District of Columbia (40%), New York (56%), Hawaii (67%), and Alaska (69%) remain the four jurisdictions with the lowest drive alone rates. Alabama (85%), Michigan (84%), and Ohio (84%) have the highest drive alone rates. (2000 U.S. Census)

• **Carpool**
  Two or more people sharing a ride in a private vehicle. Carpooling is the most common and flexible way for travelers to share a ride, and often occurs between family members, friends, or co-workers. More informal than a vanpool and more flexible than public transit, carpools generally have two or more passengers who live in the same neighborhood, or along the same route, using a private vehicle to travel to common or nearby destinations. Carpooling often appeals most to people traveling at least ten miles or whose trip takes over 20-30 minutes.

**FAST FACTS:** While the average fare paid by bus passengers in 2001 was $0.74 per unlinked trip, vanpool passengers paid an average of $2.06. As a result, transit operators in the Puget Sound region achieve an 85% farebox recovery of capital and operating costs for their vanpool programs. In 39 cities reporting data on more than one mode to the National Transit Database (NTD) in 2001, vanpools had the lowest cost-per-passenger and cost-per-revenue-mile expense to transportation agencies. (APTA, NTD)

• **Vanpool**
  A group of seven or more people sharing a ride in a prearranged vehicle. With one or two vanpool participants typically serving as regular drivers, vanpools provide non-stop, point-to-point service. The van’s ownership and operating costs are usually paid for by the van riders on a monthly basis. Vanpools typically serve trips of 15 miles or more. Many transportation agencies complement fixed-route bus and rail transit with vanpool services to provide attractive door-to-door travel options for otherwise difficult to serve trips (i.e., suburb-to-suburb trips, trips to low-density office markets, and trips to/from smaller towns or outlying communities).

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**Case Study Examples**

**VANPOOLING - PUGET SOUND, WA.** Six large, medium and small transit agencies in the Puget Sound region include vanpool service as an integral part of their total service package. In January 2004, King County Metro operated 663 vanpool and 60 vanshare vans, Community Transit ran 210, Pierce Transit ran 228, Kitsap Transit ran 89, Intercity Transit ran 77, and Island Transit ran 43. In the Puget Sound area, vanpooling has achieved a 2% market share of the overall commuter market. Among commuters who travel 20+ miles each way, vanpooling has reached a 7% market share. King County Metro’s VanShare program provides service to bridge the gap between the commuter and a public transportation hub or terminal (rail station, Park & Ride lot and ferry dock). The agencies specifically look to vanpooling to meet demand in hard-to-serve suburban markets. For more information on vanpooling in the Puget Sound region, contact Syd Pawlowski at King County Metro, 206-684-1535, syd.pawlowski@metrokc.gov.
• **Public Transportation**
Rail, bus, shuttle or ferry transportation services provided to the general public, utilizing a paid driver and administered by public transportation agencies or private-sector companies. Services may operate along a fixed-route on a set schedule, or may utilize more flexible routing and scheduling options. Public transportation services provide critical, high-capacity access to dense-urban areas (allowing for intensified land use development without increased congestion), offer needed transportation services to those without access or unable to drive (including child and the elderly populations), and are increasingly vital to the success of special events (from major events like the Olympic Games, to recurring events like baseball games or concerts). In an effort to preserve high-value environments and enhance visitors experience, public transportation is now a key element of overall mobility and access planning at many of the nation’s parks, including Acadia and Zion National Parks.

**FAST FACTS:** Public transportation ridership has increased over 21 percent in the last six years (1998-2003), faster than highway or air travel. Every $1 invested in public transportation projects generates $6 in local economic activity, and supports approximately 47,500 jobs. Public transportation is a $32 billion industry that employs more than 350,000 people. (APTA, 2004)

• **Non-Motorized (Walk, Bike, Skate)**
Includes walking, bicycling, skating or any other mode of non-motorized travel. Often complements other modes of travel. For example, most public transportation trips begin or end with a walking trip, and many users bicycle to/from transit stops. A safe and convenient environment for pedestrians can dramatically increase the number of people walking to offices, stores, or schools during the day. Walking then enables sharing a ride or taking the bus as a realistic travel alternatives.

**DID YOU KNOW?** In 2000, the bicycle industry generated $5.89 billion in sales. Each year, nearly one billion trips are made by bicycle, and over 40 million American adults ride a bike at least once a month. Bicycling and walking represent 7% of all trips made nationally, yet accounts for 13% of all traffic-related fatalities in the country. (America Bikes, 2003). More than half of the American public (55%) says it would like to walk more throughout the day either for exercise or to get to specific places. When thinking about deciding where to live, having sidewalks and places to take walks for exercise or fun is important to nearly eight in ten Americans (79%), and “very” important to four in ten (44%). Having areas to walk in the neighborhood rates third on a list of seven items asked in the survey, behind feeling safe from crime and the quality of the public schools. (STPP, 2001)
Departure-Time Choices… “What time-of-day or day-of-week will I depart for my trip?”

Beyond day-to-day choices about travel mode, travelers also make regular decisions about the time of day, or even day of week, to depart on their trip. Travelers often adjust their travel schedules to avoid rush-hour traffic congestion, to work around childcare or school schedules, or to take advantage of reduced roadway, bridge or transit off-peak pricing discounts. Demand-side strategies use a variety of approaches to facilitate utilization of less-congested travel times, mitigating the length and duration of congested peak periods (“spreading the peak”). The enhanced use of real-time travel information increasingly allows travelers to avoid non-recurring traffic incidents by shifting trips to an earlier or later time.

The Range of Departure-Time Choices:

- **Time of Day**
  Shifting trip departure-times away from congested times of day, to avoid non-recurring traffic congestion resulting from a traffic incident, to avoid traffic congestion caused by weather, or for individual scheduling needs.

  FAST FACTS: The extra time needed for rush hour travel has tripled over two decades. According to the Texas Transportation Institute’s (TTI) 2003 Urban Mobility Report, the national average Travel Time Index for 2001 was 1.39 (meaning a rush hour trip took 39 percent longer than a non-rush hour trip). The national average in 1982 was only 1.13, a 26% increase in travel time for a rush hour trip versus a non-rush hour trip. This increasing “rush hour penalty” creates a growing incentive for travelers to take advantage of less congested travel times. (TTI, 2003)

- **Day of Week**
  Shifting trips to less-congested days of the week. In addition to more common “rush hour” times of the day in many urban areas, congested travel conditions in some communities are more frequently linked to certain days of the week. For example, travel to recreation or tourism destinations can be plagued with peak-direction congestion on Friday afternoons and Saturday mornings, followed by congestion in the reverse direction on Sunday afternoons. US 50 over the Chesapeake Bay Bridge, Highway 99 to the Whistler Blackcomb ski area, Route 6 to the Cape Cod National Seashore, and I-70 to Colorado’s many ski areas all exhibit this day-of-week congestion.

Q. Do demand-side operations programs require people to change their travel patterns?
A. Absolutely not. These programs simply aim to provide travelers with the broadest range of efficient travel choices, the best information on the choices available and how to use them, and balanced financial incentives for the most efficient alternatives.
Route Choices… “Which route will I use for the trip?”

Many travelers have several routes available to travel between Point A and Point B. Travelers wisely choose routes that get them where they need to go (including en route stops) based on experience over time that informs them of the most efficient route choices. Some travelers choose the fastest routes, while others choose routes with less-hectic or safer travel conditions. Other travelers alter travel routes from day-to-day as the result of changing travel needs (i.e., trip chaining) or as the result of non-recurring travel delays caused by traffic incidents, roadway construction, or even weather. The collective route choices made by travelers in a region affect the performance of the transportation network (“too many people using the same route at the same time”). Demand-side programs provide travelers with advanced, real-time transportation information in a variety of formats, facilitating traveler utilization of excess roadway capacity on less-congested travel routes, and limiting the magnitude and duration of both recurring and non-recurring travel delays. These strategies can also focus on shifting travel away from residential or other sensitive routes, and can shift demand away from routes with construction related delays.

The Range of Route Choices:

- **Alternative Roadway Routes**
  Shifting the roadway route utilized to travel between destinations, in order to avoid congested facilities and travel on routes with available capacity. Travelers may utilize a variety of traveler information tools – such as real-time traffic information available on websites or en route variable message signs – to determine the best available routes.

- **Alternative Mode Routes**
  Shifting the transit routes utilized in order to avoid system delays or other issues, or shifting the travel mode used (into transit, bike, walk, etc.) in response to delays on roadway systems.

**ROUTE CHOICES – CAPE COD NATIONAL SEASHORE.** Of the five million annual visitors to the Cape Cod National Seashore today, one-half arrive during a ten-week period in the months of June-August. The type and duration of tourist visits has changed over the past forty years. The two-week to a full month stay that was usual in the 1960s and 1970s has been replaced by shorter trips, usually a two to three day weekend. In order to address the long-range transportation needs of the area, planners developed the Long-Range 25-Year Plan for Alternative Transportation Systems – including transit enhancements and development of intelligent transportation systems to provide both pre-trip and en route travel information services. From the plan: “Pre-trip information can assist a driver map a route, gather information on current roadway conditions, and identify detours around planned construction. Transit users can identify transit routes, schedules, fares, and connections… En-Route Driver Information systems provide real-time information to travelers who have commenced a trip. Information on delays, accidents, weather conditions, and emergency situations can be communicated to the traveling public. Route guidance systems can identify alternative routes that are available to by-pass delays.” (Volpe, 2003)
Trip Reduction Choices... “What are my options to reduce the need for some trips?”

The demand for travel is based on the need of customers to move between two points for some purpose, whether to get to work or to the store. “Trip reduction” choices explore alternative ways to “connect” origins and destinations, using technology and other advancements to eliminate the original need for some trips altogether. As an example, “teleworking” connects people to their jobs through the information superhighway, rather than the local interstate highway.

The Range of Trip Reduction Choices:

• Telework

Simply defined, teleworking is working at home or another off-site location, full- or part-time. While employees may be hooked up to the main office via a sophisticated computer network, it’s possible to telework with as little as a pen, paper and phone. Jobs are more portable than they once were. Teleworking is increasingly used by employers to reduce the demand for office space and parking space. Additionally, teleworking is often used as a recruiting and retention tool. Across the country, part-time teleworking is on the rise, while trends suggest a gradual decline in the number of people working full-time from home. A 2003 survey by The Dieringer Research Group reported that 23.5 million Americans telework at least one day per month, a growth of 40 percent since 2001. The report found that 42 percent of these employee teleworkers work from home at least one day per week, and 22 percent of the employees work at home daily or nearly every day. (Dieringer, 2003)

FAST FACTS: 21% of working Americans teleworked in 2001. 58.8% of teleworkers say they work longer hours because they work at home. (ITAC, 2001)

• Compressed Work-Week Schedules

In a compressed work week, employees complete their required number of work hours in fewer-than-normal days per week (or per pay period). This arrangement allows employees to have one day off each week or one day off every other week, depending upon which type of compressed work week program preferred. The two most popular compressed work week schedules are the 4/40 and 9/80 programs, although other variations also exist. These options are described below:

• 4/40 Program. Employees work four 10-hour days each week, with the fifth day off. To ensure five-day coverage, some employers have half the company take Mondays off and half take Fridays off.
• 9/80 Program. Employees work 80 hours in nine days, with the 10th day off. This schedule usually translates to eight 9-hour days and one 8-hour day (this shorter day is often the Friday that the employee works). In a company with two major work groups, each group might take off alternating Fridays.
FAST FACTS: A 1995 study of 2,600 Southern California employees, conducted for the California Air Resources Board, found that “employees on compressed work week reduced their net number of trips by an average of 0.5 per week… The respondents using a 9/80 schedule drove an average of 13 fewer miles per week; those using a 4/40 schedule drove an average of 20 fewer miles per week.” (Holmes, 1995)

Origin / Destination Location Choices… “How do residential, business, shopping and other location choices impact my travel choices?”

While travel choices cover the range of alternatives about how and when to travel between an origin and destination (decisions that people make every day), individuals and businesses also make more fundamental choices about the actual location of these origins and destinations - and these “location choices” have a significant impact on the demand for transportation. People looking for a new home often consider the length and difficulty of their commute to work in their residential location choice. Companies often consider maximizing access to employee labor markets, or to central freight shipment locations, when making business location choices. Retail establishments often assess area consumer markets and ease of access to their retail location. Additionally, community land use design decisions can integrate a mix of land uses in one area, making it easier for people to access multiple destinations (work, shopping, day care, etc.) in a centralized area. All of these location choices can have a significant impact on the number of trips people make, the length of these trips, and the viability of making these trips by a variety of travel modes (driving, transit, walking, etc.).

The Range of Origin / Destination Location Choices:

- **Residential Location**
  Decisions about residential location, with consideration given to ease of access to adjacent transportation facilities (roadways, transit stations/stops, bike paths, etc.) or to travel distances to key destinations (work, shopping, schools, etc.).

- **Business Location**
  Decisions about business location, with consideration given to ease of access to adjacent transportation facilities, proximity of employee residential locations and commute distances, ease and manner of access to potential customer markets, etc.

FAST FACTS: Quantitative assessments of jobs/housing balance at the sub-regional level have shown that a good balance of jobs and housing can be associated with average commuter trip lengths lower by seven to almost 30 percent, compared to where jobs and housing are out of balance (R.H. Pratt Consultant, 2003).

Q. Do these travel choices, such as using transit or adjusting travel times, really work for everyone?

A. No, but even shifting 5-10% of travelers to a different mode or time can have a significant impact on peak period congestion in certain locations. Many travelers in urban areas note that congestion is less severe when area schools are not in session – a prime example of how small shifts in travel patterns can affect overall congestion levels and delay.
APPLICATIONS

the application settings for demand-side strategies

Demand-side strategies facilitating efficient traveler choices are tailored for a wide range of different program applications, each addressing different trip types of travel market segments.

1. Schools & Universities
2. Special Events
3. Recreation & Tourism Destinations
4. Transportation Corridor Planning & Construction Mitigation
5. Employer-Based Commute Programs
6. Airports
7. Incidents & Emergencies
8. Freight Transportation

Schools & Universities
Throughout the United States, driving children to school is as routine as the commute to work. While school bus systems exist for many school districts (particularly rural), they do not always fit student schedules (due to after school activities, etc.) or they are not even offered in some urban districts. Neighbors may form carpools for their children, however, without outside support or guidance, the reach of these carpools may be limited to groups of friends or neighbors that already know each other and that have children in the same school. “School Pool” programs are administered in many communities to share information with parents and assist in the connection of interested parties for sharing a ride. Not only do school pools reduce overall vehicle miles traveled, they also decrease congestion around the schools, which enhances safety and fosters an improved environment for children walking or bicycling to school. Often referred to “safe
routes to school,” these programs are underway across the country, in cities of all sizes. The California Safe Routes to School Clearinghouse offers a range of resources and contacts for these efforts: www.4saferoutes.org.

In university or college settings, the physical space for parking and transportation infrastructure is often limited. By making transportation opportunities abundant and flexible in nature, students, faculty, and staff are encouraged to try and eventually rely on alternatives to single occupancy vehicles. Other programs may integrate on-campus housing as part of an integrated transportation and land use strategy designed to reduce travel distances or eliminate the need for some trips altogether. Disincentives, such as an aggressive parking fee structure, often play an integral role in encouraging more efficient travel choices.

Special Events
Many communities recognize sizeable special events produce significant impacts to the transportation system. In order to curtail traffic disruptions and congestion related to events – whether they are summer festivals, sporting events or conventions – agency collaborations on traffic management plans are using available assets, including local transit and ITS infrastructure, to better manage demand. FHWA has developed a technical reference entitled Managing Travel for Planned Special Events. The reference is intended to serve as a stand-alone tool for transportation practitioners and includes successful case studies for a range of special event types.

King County, in Seattle, developed an internet-based resource for offering ridematching and other services for regional events. The website provides an updated list of upcoming special events, and facilitates ridesharing to the event locations. More information is available: www.rideshareonline.com/eventmatching/logonframepubevent.asp

Recreation & Tourism
Unique circumstances can lead to successful implementation of demand-side strategies at recreation and tourism destinations. Typical of the resort areas researched for this guide, maintaining environmental, natural, and aesthetic features of

CONTRA COSTA COUNTY, CA. The county-wide SchoolPool program has providing rideshare assistance and bus passes on local transit for five years.

UNIVERSITY OF WASHINGTON. The University created the “Universal Pass” which provides transportation options for a quarterly fee to faculty/staff.

SUMMERFEST, WI. The Wisconsin Department of Transportation demonstrated the effectiveness of “pre-planning” for large events, such as the Summerfest concert festival, attended by over one million people annually.

SEATTLE SEAHAWKS, WA. As a condition of project approval, the transportation management plan for Seahawks Stadium established goals to reduce personal vehicle trips. Based on 2002 results, mode split goals set forth in the plan have been surpassed.

ZION NATIONAL PARK, UT. In order to preserve the unique resources and recreational opportunities of Zion Canyon, the Park instituted a mandatory shuttle system during peak visitation. 75% of Zion’s annual visitors utilize the shuttle system.

ASPEN, CO. In this city, the revenue generated from the paid parking program is directly reinvested into demand-side programs and allocated for future transit investments.
the community are of necessary importance for the economic vitality of the area. As part of this guide, information has been collected on strategies to manage traffic that have been implemented in recreational and destination communities. Demand-side strategies typically focus on targeted travelers (i.e. employees, visitors, etc.) to reduce trips during congested travel times. Often demand-side programs are geared towards home-based work trips. However in an area where tourism and seasonal services occur, demand-side strategies might be particularly effective if targeted towards seasonal employees often priced out of living close to their employment center or visitors who are accustomed to paying for services and already expect a unique experience from visiting the area. The case studies highlighted in this guide describe a collection of programs undertaken by various sponsors (i.e. local jurisdictions, transit authority, non-profit organizations) as part of a collective effort for their community.

**Transportation Corridor Planning & Construction Mitigation**

Planning and preliminary engineering of major corridor investment projects presents significant opportunities for the coordinated integration of demand-side programs. In more and more projects around the country, these programs are being developed as an integrated component of each “build” alternative assessed in the corridor planning process. There are three prime opportunities for integration of demand-side programs into the corridor planning and construction process:

1. **Project Phasing.** In corridors where major capital investments are selected as part of the “preferred alternative,” the final implementation of these investments is often 5-10 years down the road. Demand-side programs often take much less time and money to implement, and can provide valuable transportation services in the early years of implementation. Systems management strategies can achieve near-term, incremental improvements to traffic flow. Demand-side measures can enhance available travel choices and establish key partnerships with corridor businesses.

2. **Construction Mitigation.** The (re)construction of major corridor infrastructure projects often takes many years to complete. During this time period, transportation capacity in the corridor is often degraded and access to businesses limited. Demand-side programs provide critical mitigation strategies to reduce the negative impacts of construction, including:
   - Providing traveler information regarding construction activities like ramp closures, and offering details and assistance on alternative travel modes, travel routes and travel times.
   - Working with corridor employers and other businesses to provide traveler information and to develop access alternatives, such as transit, vanpooling, flexible work hours or telework.
   - Working with transportation agencies to adjust existing transportation facilities and services, such as adding temporary HOV lanes or adding additional transit services.
3. Complementing Build Alternatives. Demand-side programs often play an important role as a complement to a build alternative, in two key ways:

A. Maximizing the utilization of build alternatives. Strategies implemented vary, based on the nature of the build alternative. For example:
   - For corridors adding HOV lanes, appropriate strategies might include partnerships with employers for promotion of transit and ridesharing, development of incentives, education and marketing of associated travel time and travel cost savings for HOV lane use, information on lane access times and locations, etc.
   - For corridors adding transit systems, appropriate strategies might include working with employers to improve connections to the transit stops/stations, development of transit pass programs, marketing and education of transit routes, stops and schedules, real-time transit schedule information, etc.

B. Providing enhanced travel choices for trip patterns not well served by the major investment. For example, construction of new general purpose lanes and a rail transit line along a north-south corridor may not provide significant benefits for east-west travel patterns in the area. Transportation management strategies can augment the major north-south investment with systems management strategies to improve traffic flow and demand-side programs to provide enhanced travel choices for east-west trips. These same programs also enhance access to major north-south investments.

Employer-Based Commute Programs
As a travel market, work-related trips tend to reflect the highest percentage of peak-period trips made within a region. Typically, commute trips occur regularly and are sometimes easier to arrange for a consistent alternative to driving alone than other trip types. For this reason, many demand-side strategies are implemented through employer-based and work site specific programs that encourage employees to switch from driving alone to carpooling, vanpooling, or using some other alternate means of travel. Often programs deployed at a work site level encourage employees to ad-
just work schedules or even reevaluate the need to travel (i.e. telecommute). Regional demand-side programs also focus on commute trip reduction strategies that complement local transportation programs and facilities such as light rail, regional bus service, and rideshare programs. As an incentive, employers are typically eligible for tax benefits by providing certain qualifying transportation benefits.

**Airports**

In recent years, increased attention has been given to transportation systems supporting airports both locally as well as internationally. Airports are vital to local economies and therefore should be given due diligence for continued and orderly expansion. Transportation management efforts, whether or not expansion is on the horizon, include internal circulation plans, overall master planning efforts, and regional transportation infrastructure investments. Planning efforts should take a critical look at airfield capacity, terminal and parking space and access issues. Besides encouraging travelers to use alternative means to travel to, from and within airport property, successful planning efforts have incorporated transportation options for airport employees. Since the terrorist events on September 11, 2001, transportation infrastructure as it relates to maintaining airport security has also been taken to a level of elevated importance and scrutiny.

**Incidents & Emergencies**

Strategies to improve traveler awareness of an unplanned event and to expedite the response to incidents on the roadway network are essential for maintaining freeway operations. Traffic incidents are a significant cause of freeway congestion. When an incident occurs, roadway capacity is typically reduced by blocking a lane or introducing a distraction in the traveling environment that causes motorists to reduce travel speed. Considerable documentation is already available on incident and emergency management programs throughout the country. FHWA has numerous publications, including the Benefits Brochures series, highlighting technology for incident and emergency response. AASHTO has published the Connecticut Department of Transportation (CONNDOT) Incident Management System (IMS) as one of their highlighted Success Stories. CONNDOTs IMS, like many throughout the country, monitors traffic operations at a traffic operations center, dispatches and coordinates interagency emergency response, adjusts traffic signal systems to manage flow, and supports highway service patrols. Transportation management plans are also critical to emergency preparedness planning efforts for natural disasters and other major, unexpected occurrences.
Freight Transportation
Considering that commercial vehicle traffic typically comprises a steady percentage of daily traffic on state highways and the interstate system, further research on non-commute demand-side strategies would benefit from a more detailed discussion of freight management and commercial transportation. As a function of their size, freight trucks have been attributed with adding to congestion, road surface degradation and traffic accident severity. Commercial vehicle travel reductions can provide benefit to both the highway system and local roads utilized for delivery. There are a number of programs around the country that have been implemented to streamline commercial vehicle operations. FHWA has also documented the benefits of commercial vehicle electronic screening in their Benefits Brochures series. Besides streamlining operations, perhaps the most effective way to manage commercial vehicle travel is to encourage off-peak travel or alternative routes. Improving scheduling and truck routing processes can contribute to a reduction in freight vehicle mileage.

DEMAND-SIDE FREIGHT STRATEGIES – LONG BEACH, CA. The Los Angeles region has 16 million residents, 9 million jobs, and one of the busiest freight ports in the world. In the Los Angeles area, the Long Beach port moves close to 13,000 20-foot long containers each day. To better manage this high level of goods movement, Intelligent Transportation Systems can be used as a tool to implement Transportation Demand Management concepts traditionally seen in personal commuting. TDM concepts in goods movement include better scheduling, better routing and reduction of bottlenecks at check points.

On December 10th, 2003, the Marine Terminal Operators (MTO) introduced a new truck identification technology that has potential to reduce air pollution and relieve truck congestion around the port. The two tracking devices currently being considered are radio frequency identification tags (RFID) and Real-Time Locating System tags (RTLS). Both systems are similar to electronic toll collection devices currently used in private automobiles across the country. At the MTO’s expense, these devices will be installed in over 30,000 trucks that use the Long Beach terminal.

The new technologies will help reduce congestion in several ways. First, it allows the MTO to identify and register trucks without the need for them to stop at port entrances. Electronic identification also will reduce the entrance gate personnel requirements for the MTO, making off-hour deliveries less expensive and more realistic. Increasing off-hour deliveries has the potential to shift delivery schedules to times of the day that experience less commuter congestion. Thirdly, the new technologies could locate lost truck drivers and facilitate route finding back to the terminal. Finally, electronic identification provides an excellent tool to gather data on truck contributions to local highway congestion.

The Vice Mayor and City Councilman of Long Beach, Frank Colonna is excited about the potential to reduce the impacts of truck congestion on neighboring communities. Mr. Colonna has said, “I like the initiative. It will provide a pathway to better manage truck traffic, minimize congestion, [and] reduce air pollution...” The MTO intends to have the system up and running by March 2004. For more information contact: Port of Long Beach, (562) 437-0041, info@pobl.com.
SUMMARY OF CASE STUDY EXPERIENCE
this section reviews the case studies collected and key lessons learned from the case study exploration

*Mitigating Traffic Congestion* provides over 25 in-depth case examples of demand-side programs implemented in a rich and varied range of locations, including the following (with corresponding page numbers):

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- Contra Costa County SchoolPool - CA ........................................................... 63

**Special Events**
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- Seahawks Stadium (Qwest Field) - Seattle, WA ............................................ 67
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**Recreation & Tourism Destinations**
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**Transportation Corridor Planning and Construction Mitigation**
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- I-25 & I-225 Reconstruction - Denver, CO ...................................................... 79
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**Employer-Based Commute Programs**
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**Location / Design Strategies**
- Metropolitan Seattle Transit-Oriented Development and Flexcar - Seattle, WA. 105
- Orenco Station Mixed-Use Development - Hillsboro, OR .............................. 107

**Variable Pricing**
- Lee County Variable Bridge Tolls - Lee County, FL ........................................ 109

**Advanced Traveler Information**
- Commuter Link - Salt Lake City, UT ............................................................. 111

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Demand-side programs have also been applied to major employment centers, new development sites, airports, freight movement, and to entire regions (via road pricing and travel reduction regulations).

This shows the diversity of applications for demand-side strategies, some focused on the traditional commuter market and others applied to school, recreation, and other types of travel. The common theme is the desire to reduce peak period travel by managing demand and removing cars from the most congested places (parking lots, roads, highways) and the most congested times. This is accomplished by facilitating efficient traveler choices of the mode of travel used, the time of departure, the route used, and by reducing the need for some trips altogether.

Another commonality is the use of demand-side strategies to address very specific problems, such as:

- Inadequate parking or road space for employees, visitors, fans, customers, etc.
- Harmful effects from automobile emissions.
- Employee tardiness or absence due to travel delays or lack of travel options.
- Recruitment and retention of skilled workers with minimal stress from commuting.

The more targeted the problem and travel market, the better chance that demand-side programs can provide an effective solution or be part of a package of solutions.

All of these problems impose a tangible cost on travelers, on business, on government, and on society as a whole. The benefit-to-cost ratio of many demand-side programs is quite high, as is discussed below.

**What Works Best? A Review of International Experience**

Several seminal research projects and guidance reports have been produced since the 1993 FHWA report “Implementing Effective TDM Measures” (COMSIS, 1993). This body of knowledge includes studies performed at the regional, state, national and international levels. Considerable research has been performed in U.S. regions that require employer trip reduction programs (e.g., WA and AZ); in states that embrace TDM (e.g., Florida); among research organizations (e.g., TRB and TCRP); and federal agencies (FHWA, FTA, EPA). Among the more important recent references is the TCRP Report 95, the “Traveler Response to Transportation System Changes,” which documents the impacts of various demand management strategies in chapters covering: HOV facilities, vanpools, pricing, parking management, and employer TDM (R.H. Pratt Consultant, 2003).

An example of this research comes from another TCRP project, B-4, “Cost Effectiveness of TDM Programs,” that evaluated some 50 employer-based demand management programs in the U.S., but provides insight into demand management effectiveness in both commute and non-commute applications. The study estimated that the average reduction in vehicle trips among all these “successful” programs was 15.3% (at a cost of about $0.75 per trip reduced). However, programs that focused on information/promotion alone exhibited no measurable decrease in trips. Programs that provided enhanced alternatives, such as vanpools or shuttle buses, realized a 8.5% reduction in trips. Programs that focused on financial incentives and disincentives realized a 16.4% reduction of trips and
programs that combined enhanced alternatives with incentives/disincentives for their use, realized a 24.5% reduction in vehicle trips. (COMSIS, 1994).

Evidence also suggests that the number of strategies implemented, or the size of the budget, does not positively correlate with higher effectiveness. Some of the simplest, albeit politically controversial, measures involve pricing of automobile travel and subsidies for high occupancy modes. So, one researcher concluded: “It’s more what you do to influence commute behavior (the strategies/incentive utilized), more than how you market the program or how much you spend” (ESTC, 1998).

Another important study, the Congressionally-mandated review of the Congestion Mitigation Air Quality (CMAQ) federal funding program performed by the Transportation Research Board, revealed that four of the five most cost-effective strategies (measured as the cost per pound of emissions reduced) funded by CMAQ were demand-side strategies, including: regional rideshare programs, charges and fees for drivers, vanpool programs, and “miscellaneous TDM” programs, (TRB 2002).

Many other recent research projects have documented the effectiveness of TDM strategies to reduce automobile travel for school trips, recreation and special event trips. This was accomplished by increasing auto occupancy (which is already higher than work travel) and providing quality shuttle service and traveler information.

The scope of demand-side strategies has evolved over the past 30 years in the U.S. However, these measures (referred to as Mobility Management in Europe and some other regions of the world) are a growing phenomenon in other countries and are even integrated into national policy in places like:

- **Sweden.** Where a region must consider demand management solutions before considered new road capacity.
- **The Netherlands.** Where travel reduction goals have been set and TDM is an integral part of the program to meet these goals.
- **United Kingdom.** Where all regions are required to have “green travel plan” capabilities and integrate TDM into land development approvals (AMOR, 2003).

Many other innovative applications of demand-side strategies have been tested, evaluated, and documented in Europe, Australia, Canada, etc. In Europe especially, demand-side strategies are being applied to non-commute travel markets (tourists, schools, special events) in a conscious effort to address the growth in automobile use that is affecting most countries of the world. The E.U.–funded project MOST (MObility STrategies for the next decades) provides comprehensive findings from over 30 pilot projects (AMOR 2003). A recent study by the Organization of Economic Cooperation and Development (OECD), “Road Travel Demand: Meeting the Challenge,” documents world-wide experience with demand management strategies (OECD, 2002). The resource section of this report provides references and links to related websites.
LESSONS LEARNED FROM THE CASE STUDIES

all the research on, and experience with, demand-side pro-
grams and strategies cannot possibly be summarized in
10 brief points. However, a few common findings and les-
sons can be offered here

1. **Demand-Side Strategies Are About Choices** – As the term implies, demand-side strategies intend to modulate the demand for travel in a way that is based on choices (mode, time, route, etc.), and incentives for using alternatives to driving alone and avoiding the most congested conditions. A good example of this is the I-15 FasTrak program in San Diego, which allows solo drivers to pay to use the HOV lanes and allows those sharing a ride to use the lanes for free, but does not force a fee on any driver or require anyone to use a particular facility (OECD, 2002).

2. **Time and Financial Incentives Are Most Effective** – Time savings for alternative mode users (such as HOV lanes), financial incentives (such as vanpool subsidies or tax incentives) and financial disincentives (such as parking or road pricing) are consistently cited as the most effective demand-side strategies. These intervening influences help to balance out the perceived convenience and speed of driving alone (ITE, forthcoming).

3. **Incentives and Disincentives Require Good Alternatives** – Time and financial incentives and disincentives are most effective when they support good travel alternatives, such as transit service, vanpool formation, carpool matching, bicycle facilities, etc. The TCRP B-4 study, cited earlier, provides tangible evidence of this symbiosis by showing that the most effective programs combined financial incentives (such as transit subsidies) with improved alternatives (such as more frequent and convenient bus service (COMSIS, 1994).

4. **Managing Demand Can Be a Cost-Effective Tool** – Many studies that have compared mobility and air quality strategies have concluded that demand management strategies are among the most cost-effective in that they can reduce a trip, mile of travel or ton of emissions for a relatively modest amount of money. Demand-side strategies may not be the primary solution to these problems, but if they are applied in the right situation, they can help address traffic and air pollution problems in modest, yet very affordable ways (TRB, 2002).

5. **Information Technology Enhances Demand-Side Programs** – While incentives and disincentives are perhaps the key to effectiveness, much of managing demand relies on good information about travel conditions and alternatives. Advances in information technology make managing demand more effective by providing real-time, accurate information on travel options, traffic conditions, alternative routes, and even dynamic matching of travelers into shared ride arrangements.
6. **The Implementing Organization Should Match the Scope of the Strategies** – The organizational home for demand-side programs should match the scope of the application. For example, strategies to reduce congestion around employment centers or in corridors might be managed by Transportation Management Associations, whereas regional traveler information and ridematching services might better be implemented by regional agencies with access to appropriate resources and information. Multiple organizations are often involved in a given urban area, calling for coordination and cooperation to maximize impacts.

7. **Packaging Demand-Side Strategies Can Create Synergies** – Research indicates that the greatest potential for demand management lies in strategic grouping of measures into “programs” of reinforcing actions. For example, limiting parking in a high-density commercial development served by convenient, reliable transit can do more to reduce vehicle trips than can solely limiting parking supply (ITE, forthcoming). One study concluded that “packaged, complementary solutions are usually more effective than a single measure” (OECD, 2002).

8. **Expectations Need to Be Realistic** – Demand-side programs are not a panacea for all social ills or a cure-all for traffic congestion problems. However, they can have a significant impact on travel. If the correct incentives and disincentives are used to facilitate shifts to alternative modes, demand-side strategies can reduce vehicle trips and VMT 10%-20%. Most decision-makers, however, are reluctant to adopt certain disincentives (such as parking pricing) to change travel behavior in a significant way. In the absence of these strategies, most demand management programs should only be expected to reduce travel by 0% - 5% (COMSIS, 1993). At the same time, it is important to recognize that the goals for demand-side programs often extend beyond reducing VMT to include mobility, accessibility, environmental, and other outcomes.

9. **Plans for Managing Demand Should Be Integrated into Overall Transportation Plans** – Demand-side strategies should be considered a set of measures to better manage existing infrastructure, but they still need to be well-planned. Demand management actions should be considered simultaneously with related transit, traffic engineering, and land use plans (ITE, forthcoming). Since many metropolitan planning organizations and regional councils now fund and oversee demand management efforts, it is important to integrate demand-side strategies into long-range plans, as well as shorter-term management and operations actions. It is also important to evaluate the impacts of actual demand-side measures, as implemented, to better inform future decision-making.

10. **Demand-Side Strategies Are Practical** – Demand-side strategies are compatible with sustainability, transportation-land use interaction, and other longer-term goals. Yet, it is most applicable to managing demand for finite travel markets, to solve real problems that provide tangible benefits to users and implementers. Travels are smart consumers and, when faced with tangible changes in out-of-pocket costs and travel time, will change their travel behavior in immediate and significant ways (ESTC, 2003).
This report offers a new, broader perspective on demand-side strategies. These programs can be a critical component of a comprehensive transportation improvement program to improve the efficiency of the current transportation system, and they can also be an integral part of longer-term transportation and land use plans in order to change the fundamental influences on demand for the single occupant vehicle traveling at peak periods on congested roads. Ultimately, demand-side programs can be a critical factor in “decoupling” the link between economic growth and transportation growth. Economic growth creates new demands for travel and not all of this new demand can be accommodated on current or future roads (OECD, 2002).

Demand-side programs, in their traditional form of commute trip reduction, were born from energy crises of the 1970s as a response to fuel shortages. In the new millennium, managing demand extends to all types of travel, be it parents walking a group of kids to school in a “walking bus,” visitors to a National Park leaving their cars off-site and using clean shuttles, new residents opting to live in “transit-oriented developments” to avoid the need for an extra car, or shippers coordinating deliveries to avoid congested roads and clogged city streets.

This is all demand management. Many of the tools used today by transportation planners, traffic engineers, and traffic operations managers are designed to modulate the demand for travel (by mode, route, location or time) rather than provide more capacity in the system to accommodate more trips. This new perspective on demand-side programs can still benefit from some of the findings from the 1993 FHWA report, “Implementing Effective TDM Measures.” That report discussed the “economics of TDM” by estimating that the average cost to society to accommodate a one-way daily solo commute trip was $6.75, whereas the cost to employers to reduce a commute trip was $1.33. Carpooling cost commuters $1.92 per trip, whereas driving alone cost $4.81. (COMSIS 1993) These economics are as compelling today and they were ten years ago. Perhaps as the “demand for TDM” grows and is applied to other travel markets, the economics are even more compelling.

In the future, the role of demand-side programs in solving specific problems and contributing to larger goals will be even greater as our inability to squeeze more cars into a limited road system compels us to look for ways to do things “smarter” and to focus on moving people, goods, and information rather than cars and other vehicles.
ADDITIONAL RESOURCES & CITATIONS
a collection of organizations, publications and internet resources, along with citations from this publication

GENERAL RESOURCES
Association for Commuter Transportation – www.actweb.org
America Bikes – www.americabikes.org
American Planning Association – www.planning.org
American Public Transportation Association:
   Homepage – www.apta.com
   APTA Transit Resource Guides – www.apta.com/research/info/briefings/
Best Workplaces for CommutersSM – www.bwc.gov
Better Environmentally Sound Transportation (BEST) – www.sustainability.com/best
Commuter Choice – www.commuterchoice.com
Institute of Transportation Engineers – www.ite.org
International Telework Association & Council – www.telecommute.org
National TDM and Telework Clearinghouse, National Center for Transit Research –
   www.nctr.usf.edu/clearinghouse
Northwest TDM Resource Center – www.wsdot.wa.gov/Mobility/TDM/default.htm
Promotional Materials Clearing House at F.S.U.’s The Marketing Institute –
   http://nctr.cob.fsu.edu/
Smart Card Alliance – www.smartcardalliance.org
Surface Transportation Policy Project – www.transact.org
Victoria Transport Policy Institute, Online TDM Encyclopedia – www.vtpi.org
M I T I G A T I N G  T R A F F I C  C O N G E S T I O N

U.S. Department of Transportation (DOT):
ITS Benefits & Costs Database – www.benefitcost.its.dot.gov/


International Experience

Association for Commuter Transport (United Kingdom) – www.act-uk.com


European Union, MOST, Mobility Management Strategies for the Next Decade – http://mo.st

European Commission, PORTAL (Promotion Of Results in Transport Research And Learning) – www.eu-portal.net

European Platform on Mobility Management – www.epomm.org

International Association of Public Transport – http://www.uitp.com

National Travelwise Association (United Kingdom) – www.ntwa.org.uk/

VM2, Vereniging Mobilitietsmanagement (The Netherlands) – www.vm2.nl


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Davis, Donald D., Ph.D. and Karen A. Polonko, Ph.D. *Telework America 2001 Summary.* Old Dominion University, October 2001.


University of Washington - Seattle, WA

Large University Grapples with Growth
The University of Washington’s (UW) Seattle campus of 643 acres is the heart of the University District, the City’s second largest employment and activity center outside of the central business district. In Fall 2002, student enrollment was over 39,000 and faculty and staff nearly reached 22,000. According to 2002 Campus Master Plan efforts currently underway, the Seattle campus is projected to grow by 1,000 students and 2,000 additional faculty and staff by 2012 triggering significant development and transportation demands.

The “Universal” Solution: U-PASS
The current Transportation Management Plan (TMP), U-PASS, demonstrates a strong, collaborative partnership between the University, the City of Seattle and transit providers, King County Metro (Metro), Snohomish County’s Community Transit (CT) and the regional transit authority Sound Transit. In the late 1970’s, University transportation goals were conceived and then formalized in 1983 as part of the City-University Agreement. Specific goals included maintaining 1983 traffic volumes traveling to or from campus during peak periods and limiting UW parking supply to 12,300 while making certain that additional spill-over parking would not occur within the surrounding neighborhoods.

As part of the 1989 General Physical Development Plan (GPDP) for the campus, it became clear that forecasted population growth and development would trigger a significant increase in vehicle trips and a loss of approximately 1,700 surface lot parking spaces to new construction. As part of the GPDP planning process, a task force was formed to develop, guide and oversee the implementation of a new TMP. The task force recognized the importance of transportation incentives as well as complementary disincentives (i.e. parking rate increases).

In 1990, the task force pitched the U-PASS as a “universal pass” providing card holders with a range of transportation options and incentives with one pass, the U-PASS. The U-PASS Program began as a three-year pilot program in 1991 with a budget of $17.4 million. In 2002, the U-PASS annual budget was approximately $11.3 million. Since its inception, the most significant cost of the U-PASS Program is related to transit service. Currently, user fees cover 50 percent of the Program costs while the remaining revenue is generated from parking fines, fees and other UW sources.

Removing the volume discount provided by a quarterly parking pass, the variable rate method favors infrequent users. In other words, the more you park, the higher the fee.
Today, U-PASS provides an array of transportation options for a quarterly fee to eligible students ($35 in 2003) as well as faculty and staff ($48.96 in 2003). Record sales in Fall 2002 indicated that nearly eight-six percent of the total student population participated. Transportation alternatives and programs included with a U-PASS include the following:

- Full fare coverage on Metro Transit, Sound Transit, CT and Sounder commuter train service,
- Free carpool and vanpool parking,
- Vanpool subsidies,
- Discounted "occasional" parking permits,
- Local merchant discounts,
- Ridematching services,
- Reimbursed rides home for faculty and staff, and
- Evening neighborhood shuttle service.

Considering all the transportation options U-PASS provides, it is most frequently used for transit service on Metro Transit, Sound Transit and CT. Transit agencies have preserved and stimulated ridership by increasing capacity and introducing new routes as user needs change. Today’s U-PASS is less than half the price of the traditional bus pass of 1990. Since 1991, 91 million vehicle trips to or from campus have been eliminated by U-PASS transit riders.

Managing traffic demand through pricing has been documented as a key component of U-PASS Program success. Besides quarterly and daily parking rate increases, UW has developed a number of flexible parking features to compliment other U-PASS program components and alternatives to single-occupancy vehicle (SOV) travel including the Pay Per Use Parking (PPUP) program. Basically, PPUP participants are tracked each time they use the West Campus Garage and are subject to a variable parking rate structure. Removing the volume discount provided by a quarterly parking pass, the variable rate method favors infrequent users. In other words, the more you park, the higher the fee.

**U-PASS Success Leads the Way**

Immediately after implementation, U-Pass was a success in reducing vehicle trips and parking lot occupancy on campus. The Program is continually monitored and evaluated through a series of surveys, traffic counts, parking utilization studies, and individual U-PASS component monitoring. As a result, comprehensive measures of effectiveness are available. As reported in the 2001-2002 U-PASS Annual Report produced by the UW Transportation Office, U-PASS has been attributed with the following:

- Prevented the need to build 3,600 new parking spaces saving considerable capital cost,
- Reported 86% U-PASS user satisfaction, a 13% increase over Year 1992, and
- Reduction of 33% in parking permit purchases since October 1990 indicating that users are finding another way to school or work.

In addition, 2002 traffic counts indicate that morning peak period traffic was 18 percent below the 1983 traffic levels, a goal set forth in the City-University Agreement.

As a result of the success of the U-PASS Program on UW’s Seattle campus, similar but fiscally-separate programs have been implemented at UW Bothell, UW Tacoma, and Harborview Medical Center. In addition, Metro has developed FLEXPASS for metropolitan Seattle employers and commuters using the U-PASS as a model. As a tribute to U-PASS success, the Program has been heavily awarded both locally and nationally.
Identifying the Problem – Outside of the Classroom

The SchoolPool program serves western, central, and eastern Contra Costa County, in the northern California Bay Area. Very few schools in Contra Costa County offer bus service for their students. As a result, traffic congestion within the communities surrounding the schools presents a significant mobility challenge. The average one-way trip length to or from school within Contra Costa County is about 4.3 miles. Similar to other parts of the country, crowded classrooms are forcing students to attend a school “across town” instead of in their own neighborhood.

Offering Options for School Trips

The SchoolPool program is administered by staff at the Contra Costa Commute Alternative Network (CC CAN) and has been in operation for 5 years. The goal of the SchoolPool program is to provide parents with information on neighboring students who are interested in carpooling to and from school, and to encourage the parents to establish a carpool. Carpooling is voluntary and no financial incentive is offered to the parents. Carpool ridematch lists are provided to parents with students attending the same school(s) to encourage carpooling. It is promoted among residents who have children in all public and private schools throughout the County (kindergarten through college).

For the 2002 school year (July 2002 – June 2003), carpool ridematch forms were sent directly to 150 participating schools and in turn were distributed in Fall registration packets to over 157,000 school children. Additional program outreach efforts included presentations to Parent Teacher Associations (PTAs) and school administration.

As ridematch applications are received, rideshare matches within the same district are found and sent within three days to the applicant. For the 2002 school year, approximately four ridematch lists were sent to each parent during the course of the first three months of the school year. Additional ridematch lists were sent throughout the year as new parents moved into the school area, or as parents’ commute patterns changed.

Parents who were unable to find a carpool partner were encouraged to have their children try transit instead of driving. To encourage participation, a $20 bus pass was provided for the student’s use. CC CAN Staff worked with County bus operators to develop bus schedule brochures for each school district. In turn the brochures were distributed with free tickets so that parents could see and experience which routes and schedules serviced their schools.
SchoolPool requires a full time employee for 6 months or a half-time employee on an annual basis. The most intense time is between April and October when registration forms are generated and distributed and most of the outreach occurs. The total program cost for SchoolPool during the 2002 school year (July 2002 to June 2003) was $95,000.

**Setting a Good Example**

For the 2002 school year, 710 individual ridematch requests were received from parents. Of these, 174 included siblings (essentially duplicate requests) who were also riding in the carpool, which resulted in a total of 536 unique ridematch requests. In general, parents must make two round trips to the school (one each morning, and one each afternoon) to pick up their children. These two round trips equate to four one-way trips. Allowing for 25% of the trips to be drop-offs on the way to work, it is estimated that three one-way trips are saved for each non-sibling, which in this case is a reduction of 1608 one-way trips per day.

A follow-up survey was conducted to determine the usage and satisfaction of program participants from SchoolPool 2001/2002. Of the participants who were contacted, 27% indicated that they have continued to carpool resulting in continued reduction of 816 one-way trips per day.

In addition to the carpool riders, another 1,932 students received bus passes in 2002. These passes were given to students whose parents indicated that they usually drive the student to school. Nearly 2,000 bus riders equates to a reduction of around 4,000 one-way trips per day.

Collectively, the three groups discussed above, new carpools, 2001 carpools still ridesharing, and bus riders have contributed to an annual one-way trip reduction of 1.13 million trips and a vehicle miles traveled (VMT) reduction of 3.96 million.

In addition, due to additional school bus cutbacks in the summer of 2003, the SchoolPool Program had over 3,000 bus riding participants. The construction of a new school without bus service (even public bus service) has resulted in additional rideshare requests topping the 2002 totals.
Recurring Event Traffic Management
Southeastern Wisconsin is host to various special events throughout the year ranging from sporting events to rock concerts, all attracting a large number of visitors from around the region. In particular this case study will focus on two events, both being music festivals/concerts. Summerfest is an annual music festival that takes place at the Henry W. Maier Lakefront Festival Grounds near downtown Milwaukee and within a close proximity of several major freeways. The second highlighted event is the Grateful Dead Tour that took place at the Alpine Valley Music Theatre in the rural Wisconsin city of East Troy in Walworth County.

Combining Resources and Integrating Technology
In 1995, a number of key components added to the local transportation system as part of an Intelligent Transportation System (ITS) early deployment package, MONITOR, set the stage for special events planning and traffic management in the future. Also in 1995, the Traffic Incident Management Enhancement Program (TIME) was conceived consisting of four inter-related components: 1) special events and construction, 2) emergency response, 3) corridor traffic management, and 4) public information. TIME has been the catalyst of multi-jurisdictional coordination and collaboration regarding regional transportation issues.

The importance of special event transportation planning was recognized through a review of incident management procedures and programs. Wisconsin DOT (WisDOT) and planning partners began to collaborate on traffic issues related to recurring events such as Summerfest (attracting 1 million people over the course of eleven days), the State Fair and professional sporting events. Planned special events have tangible elements of time, location and content that lend themselves to early coordination unlike unpredictable, unplanned incidents such as a major traffic accident.

Throughout the process, additional challenges have been recognized such as the compounding effect of numerous events, even if they are small in scope, occurring at the same time

Summerfest
Summerfest is an annual, eleven-day outdoor music festival that starts during the last week of June and lasts through the Fourth of July weekend. Summerfest attracts approximately 100,000 patrons per day and over 1 million annually. It’s been estimated that approximately 45% of all attendees are out of town travelers.
Since parking on-site is limited near the venue, alternative means of providing transportation and informing festival visitors with traffic, alternative route and parking information were essential. In order to manage the steady influx and departure of Summerfest attendees, several Wisconsin DOT field components and other regional resources were utilized. Managing traffic for Summerfest requires high level interagency coordination on the part of WisDOT, Milwaukee County Sheriff’s Department, City of Milwaukee Public Works and Police departments, MCTS, and Summerfest Staff. A scenario based Traffic Management Plan was in place to inform travelers of traffic conditions and detour information.

For Summerfest, several transit enhancements were deployed including expanded transit and shuttle bus service. Temporary access improvements including bus only access to closed freeway ramps as well as bus only lanes and one way traffic patterns increased transit effectiveness and reliability during the event. Other operational measures such as providing round trip fares and separate staging areas for expanded shuttle service expedited passenger loading.

**Grateful Dead Tour**

The Grateful Dead Tour in 1989 held at the Alpine Valley Music Theatre in East Troy, Wisconsin was attended by nearly six times as many people as expected (200,000 instead of 35,000). At the time, a coordinated Traffic Management Plan was not in place. Attendees arrived earlier and stayed later than the venue itself and damages to personal property, severe congestion on local roads, and inadequate emergency access were consequences of the 1989 Tour.

Thirteen years later, local law enforcement officials requested the assistance of the Wisconsin DOT to create a Traffic Management Plan that would reduce or possibly eliminate the congestion and problems experienced in 1989. On June 26, 2002, a Concert Management Plan was created after approximately 5 weeks of planning time consisting of four sub-plans, 1) Traffic Management, 2) emergency government, 3) weapons of mass destruction, and 4) emergency medical.

The plan implemented several traffic control measures to guide and control traffic including portable VMS, type 3 barricades and traffic cones, portable lighting units, ATV/bicycle/equestrian patrols, HAR, and a significant law enforcement presence. In addition, a nearby permanent WisDOT Rest Area was temporarily utilized as a remote command center for Walworth County Sheriff Department and a WisDOT remote TOC.

**Indicators of Successful Event Planning**

Special events planning in southeastern Wisconsin has lead to the development of a number of tools including the Severity Level Matrix. Developed in coordination with local law enforcement and event sponsors, the Excel-based Matrix indicates anticipated level of response based on event criteria such as predicted attendance and road closures.

WisDOT continues to work with local agencies and event planners on special event transportation planning. While mitigating traffic congestion for special events is often limited by transportation facilities or time of day, agencies continue to give due diligence to safe, efficient, and informed traffic management. Throughout the process, additional challenges have been recognized such as the compounding effect of numerous events, even if they are small in scope, occurring at the same time.

**Summerfest**

Quantitative effectiveness data for the Summerfest Traffic Management Plan is limited. However, MCTS ridership data for Year 2000 listed below provides an indication of success:

- Approximately 25% of the total attendance utilized bus transportation.
- The Downtown Shuttle provided 100,000 rides.
- 300,000 riders utilized the Freeway Flyer service from 13 park-and-ride lots.

**Grateful Dead Tour**

The two-day Grateful Dead reunion took place on August 3-4, 2002 without serious incident. Approximately 37,000 people attended the reunion, not the expected 100,000. Attendees and residents followed the traffic guidance. During the entire two-day event, 123 citations were issued for various charges and 15 arrests were made, which is a significant decrease compared to 1989. Public information campaigns, “If you don’t have a ticket, don’t come” and national media attention were successful in detouring impromptu concert goers without tickets from loitering the venue.

As a result, Walworth County adopted an ordinance (Ordinance No. 232-11/02 Sec. 10-28 a) stating that an event licensee is responsible for reimbursing the County for the cost of providing extraordinary governmental services required as a result of an event. Grateful Dead Tour promoters were required to pay the County $15,000 in additional fees.
A New Stadium for Seattle

In the late 1990s, as plans for a new football and soccer stadium began to take form, public agencies and the private sector acknowledged the importance of a balanced Transportation Management Program (TMP). The TMP needed to be consistent with the region’s approach on engaging stakeholder involvement and preserving the quality of life and the natural environment.

In 1998, Washington voters approved Referendum 48 allowing the use of public funds to build the stadium, an adjacent exhibition center and a parking structure. The referendum also created the Public Stadium Authority (PSA) to provide public representation as part owner. The new Seahawk Stadium is west of I-5 and north of Seattle Mariner’s Safeco Field. The site is where the former Kingdome stood within Seattle’s Pioneer Square neighborhood. In 2000, the Kingdome was imploded and construction began. Two years later, the facility was completed within the $430-million budget and ahead of schedule. Seahawk Stadium was designed to host professional football and soccer games with a seating capacity of 67,000. The adjacent exhibition center typically hosts non-sporting events with up to 15,000 attendees.

The TMP is explicit regarding roles and responsibilities for TMP planning and implementation by assigning responsibility in one of four ways: exclusive, lead/coordination, partner, or advocate.

TMP Sets the Stage

As transportation and parking mitigation for the Environmental Impact Statement (EIS) prepared for the project, the Transportation Management Program (TMP) was born. The Seattle Department of Construction and Land Use (DCLU) required that the conceptual TMP contained in the Final EIS be further developed and committed to as a condition of project approval. The TMP has built on the success of other local projects including the TMPs for prior Kingdome Stadium, the new Safeco Field, and the Seahawk’s temporary use of the University of Washington’s Husky Stadium during construction. The TMP was designed to minimize personal vehicle use to and from the site by supporting other transportation modes thereby minimizing negative transportation-related impacts to visitors as well as the immediate neighborhood. A number of goals were set as guiding principals for the TMP concerning area residents and businesses. Specific goals included minimizing the impact of event parking on adjacent neighborhoods as well as minimizing access delay and confusion for neighboring residents and businesses prior to, during, and following events. The TMP is flexible in nature with the ability to adapt to tenant changes, travel pattern variations, and transportation improvements as they occur in the vicinity.

The development of the TMP was a collaborative process engaging key stakeholders through a series of meetings including the re-establishment of the Parking and Access Review Committee (PARC), a group previously organized to address transportation and parking issues associated with construction of nearby Safeco Field.
Input on the TMP was obtained from all affected agencies including King County METRO, the Seattle Department of Transportation, the Seattle Police Department, the Washington State Department of Transportation, and the Port of Seattle. The TMP was subsequently approved by the stakeholder groups and forwarded to the DCLU for final approval, which was granted in early 2002 allowing enough time for implementation prior to the stadium opening in August 2002.

The TMP is organized into four strategic program groups, which include: 1) Traffic and Parking Demand Reduction, 2) Management of Resultant Vehicle and Pedestrian Demand, 3) Event Management and Public Information, and 4) Implementation and Monitoring. The TMP is explicit regarding roles and responsibilities for TMP planning and implementation by assigning responsibility in one of four ways: exclusive, lead/coordination, partner, or advocate.

Transportation options for Seahawk Stadium include, but are not limited to, regular Metro transit service, Metro Express Bus Service from Park and Ride lots, charter buses, Sounder train service, and Event Match ridematching service.

**Settling the Score**

In order to evaluate the effectiveness of the TMP, it was important to have measurable criteria. Recognizing that personal vehicle use and parking have a significant impact on area traffic circulation and congestion, an index was developed to measure the reduction in personal vehicles traveling to and from events. The index has been defined as the number of personal vehicles per 1,000 persons attending an event.

The index is directly affected by the use of transit and other alternative modes of travel and average vehicle occupancy for the personal vehicles that do travel to the event. Based on historical travel data for the Kingdome and applying performance assumptions for each program contained in the TMP, an estimated mode split was derived that was then used as the basis for performance goals for the new stadium in terms of cars per 1,000 attendees. The index-based approach has proven to be well-suited as an evaluation tool since it allows for varying degrees of attendance and time of day. The table below indicates performance goals (less than or equal to) for a single event occurring at any given time.

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<tbody>
<tr>
<td>Stadium Weekend</td>
<td>340</td>
<td>319</td>
<td>298</td>
<td>277</td>
</tr>
<tr>
<td>Stadium Weeknight</td>
<td>370</td>
<td>349</td>
<td>328</td>
<td>307</td>
</tr>
</tbody>
</table>

Although scheduled events at Safeco Field, Seahawks Stadium and the exposition center were never to occur concurrently or even within four hours of one another, an additional set of goals were established for dual events. Prior to the City of Seattle's approval, a “Dual Event Agreement” was established eliminating the possibility of having two events with a combined attendance of over 58,000 occurring within 4 hours of each other without a special TMP.

An initial review of 2002 results indicate that mode split goals have been surpassed. The non-auto mode split was surveyed at between 25% and 30% which exceeded initial projections of 20%. Success can not be directly attributed to any single mode of travel, but is reflective of the range of options available including Park and Ride facilities, transit service, ferry and rail services as well as bicycling and walking.
A New Downtown Ballpark for the SF Giants

Pacific Bell Park, the San Francisco Giants 41,000-seat “downtown ballpark,” opened in March 2000. The ballpark is located alongside San Francisco Bay, approximately one mile (1.6 km) south of the center of downtown San Francisco. The ballpark is located in the South of Market Area (SOMA) of San Francisco, a former warehouse district that in recent years has become a popular location for new technology firms and high-density residential development. The ballpark site is relatively small and is bounded by water on two sides. Unlike most sports stadia, PacBell park and its parking lots were constructed almost entirely with private funds. As a result, very little funding (about $1.5 million) was available for off-site transportation improvements, such as improved roadway, transit or pedestrian facilities. However, the Giants promoted the downtown site, in part, because of its proximity to regional transit and existing commuter-oriented parking supply. Additionally, the ballpark planners also hoped that many downtown workers would walk or ride bicycles to PacBell park on weekdays. Traffic concerns included the fact that weekday afternoon ball games would be over within close proximity to the start of the evening rush hour.

TMP Required by City

Due in part to concerns of local residents and businesses about traffic congestion, particularly for weekday afternoon games, the City and County of San Francisco required a Transportation Management Plan (TMP) be developed and approved to assure efficient transportation operations and minimal impacts to the surrounding neighborhoods. A Ballpark Transportation Coordinating Committee (BTCC) was appointed to develop the TMP and garner buy-in from affected parties. One key objective of the TMP was to maximize the use of non-auto modes by baseball fans, particularly public transit.

The TMP included the promotion of existing and new transit services:

- Caltrain commuter rail service terminus adjacent to the ballpark.
- A new LRT line from Caltrain to BART Embarcadero station.
- Nearby BART regional rail under Market Street.
- New ferry service to the adjacent China Basin Ferry Terminal.
- Various SF Muni bus lines and regional bus service to the Transbay Terminal.

The Giants and regional transportation agencies educated fans on the potential traffic and parking problems and the range of convenient and affordable transit options.
PacBell has 5,000 dedicated parking spaces in lots located across Mission Creek. New residential area parking restrictions were imposed and several streets and lanes closed during games (including access routes to the parking lots and regional transit service).

Finally, a set of transit promotional activities and incentives were part of a comprehensive marketing campaign called “Your Ticket Home” and were funded by the Giants, the Metropolitan Transportation Commission, and several corporate sponsors. The campaign was designed to entice first time user to try transit and included the following components:

- A pocket-size pocket information guide for fans and all season ticket holders.
- A transit information hotline answered by the regional ridesharing organization.
- The opportunity to purchase transit tickets by mail (resulting in over $100,000 in advanced fares purchases).
- An incentive program that rewarded Giants fans points toward their fan appreciation program for purchasing transit tickets.
- Promotion of the Your Ticket Home campaign on Bay Area trains and buses serving the ballpark.
- The deployment of “Transit Ambassadors” to answer questions and guide new riders through transfers and fare collection particulars.

**Better than Expected Results**

The primary measures of success were the proportion of fans arriving by transit and the severity of traffic and parking congestion. During the first year in PacBell Park (renamed SBC Park in 2004), the ballpark and its TMP achieved a 50% non-auto mode split and the dedicated parking lots never reached capacity.

Part of the evaluation of the TMP’s effectiveness was a comparison of the first year operation of PacBell Park with 3Com (formerly Candlestick Park). Some key comparisons are provided below and bear witness to the success of the TMP:

<table>
<thead>
<tr>
<th></th>
<th>3Com Park</th>
<th>PacBell Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seats</td>
<td>58,000</td>
<td>41,000</td>
</tr>
<tr>
<td>Dedicated Parking Spaces</td>
<td>8,800</td>
<td>5,000</td>
</tr>
<tr>
<td>Parking Fee</td>
<td>$6</td>
<td>$15-20</td>
</tr>
<tr>
<td>Other Nearby Parking Spaces</td>
<td>10,000</td>
<td>2,000-3,000</td>
</tr>
<tr>
<td>Percent on Transit</td>
<td>3-4%</td>
<td>34-41%</td>
</tr>
<tr>
<td>Percent Walking</td>
<td>0%</td>
<td>5-8%</td>
</tr>
<tr>
<td>Percent in Autos</td>
<td>96%</td>
<td>48-58%</td>
</tr>
<tr>
<td>Average Auto Occupancy</td>
<td>2.5 fans per car</td>
<td>2.8 fans per car</td>
</tr>
</tbody>
</table>

Half of Giants fans arrived by non-auto modes and parking lots were never full to capacity due to the effectiveness of the TMP.

What do the Giants and City of San Francisco attribute the high transit usage and lack of parking and severe traffic problems? First, pre-opening public information not only educated fans as to the lack of parking and congested downtown streets, but one the range of affordable transit options. Pre-paid transit ticket opportunities and a high proportion of advance payment season ticket holders provided fans with ample time to plan their trip to the ballpark and reduce spur of the moment travel (more commonly made by car). A significant percentage of fans at weekday (32%) and weeknight (28%) games came to the ballpark directly from work.

The high level of transit use at PacBell can be attributed to the following factors: 1) availability of reliable, efficient, and affordable mass transit; 2) commitment to quality transit service by regional providers and the Giants made possible by predictable ridership; 3) high parking costs and limited availability; 4) close proximity to a large downtown population base; a well developed and executed transportation management plan; and 5) public expectations as to the severity of traffic and parking problems.
FAST FACTS ABOUT: Zion National Park - UT

Types of TDM: Mode Choice
Keywords: national park, shuttle system, sustainable practices, parking restriction, road closure, alternative fuel vehicles
Area Demographics: Utah’s first national park, annual visitation of 2.61 million in 2002.
Program: Mandatory summer shuttle system since 2000 serving Zion Canyon and Springdale. Parking is restricted on Scenic Drive.
Results: 75% of Zion’s annual visitors use the system. In 2000, the shuttle system reportedly reduced nearly 1,200 vehicle trips per day and almost 11,000 vehicle miles traveled per day.
Cost of Program: $12 million for the initial capital investment and approximately $2.5 million in annual operating costs.
Contact: Ron Terry, Zion National Park

Protecting Assets

Zion National Park, located in southwest Utah, was designated as the state’s first national park in 1919. The Park, associated with deep canyons, dramatic cliffs and the Virgin River, is nearly 230 square miles although most of the visitation is focused on Zion Canyon. The Park is accessible from the south, west and east with the southern access through the town of Springdale. The usual approach to the southern access is from the west via State Route 9.

In the early 1990s an escalated number of visitors to the Zion Canyon made it increasingly difficult for visitors to find parking along the Zion Canyon Scenic Drive. In 1999, the annual visitation was 2.4 million. Increased visitation resulted in traffic congestion, inadequate parking, destruction of natural resources and a diminished visitor experience in the 6-mile upper portion of the Zion Canyon. On an average day during the peak season up to 5,000 cars including tour buses were using the Scenic Drive. Only 400 parking spots were available along the scenic roadway and as a consequence visitors typically double and triple parked destroying vegetation.

Bold Idea for Zion

Several alternatives were considered by Park officials prior to implementing the existing shuttle program. Alternatives considered but rejected included increasing parking in the Canyon, closing the scenic drive once the parking filled, and providing a voluntary shuttle system. The selected alternative included the implementation of a mandatory shuttle system using propane-powered vehicles during the peak tourist season.

The shuttle system began operation on May 26, 2000 allowing only the Park’s shuttle busses to operate north of the Zion Canyon Visitor Center during the peak summer season. An exception has been given to allow employees and guests of the Upper Lodge to continue using the Scenic Road although they are encouraged to use the shuttle system once their vehicle is parked. Parks Transportation, Inc. currently operates 30 NPS-owned propane-powered shuttle buses. Approximately 20 of these buses operate exclusively within the park with attached trailers capable of holding a total of around 66 passengers each. The shuttles have operated daily from the beginning of April though the end of October since 2000. Personal vehicle access is only permitted from November to late March on the Scenic Drive except for Upper Lodge employees and guests.

The shuttle system operates in two loops. One route makes six stops within the town of Springdale and the other has eight stops along the Scenic Drive. The Visitor Center is the central transfer point for both the Zion Canyon route and the Springdale Loop. Although parking is permitted at the Visitor Center, it is typically full by late morning during the peak season. Parking at the Visitor Center is equivalent to the 400 spaces that used to be available to visitors on the Scenic Road prior to implementation. Some of the Scenic Road parking has been converted to bus stops, but most of the spaces remain providing general parking during the off-peak season when the road is again accessible to all.
Visitors are encouraged to park in Springdale and use the shuttle system to access the Park free of charge. Springdale has provided approximately 1000 parking spaces for Park visitors. Shuttles operate within the Canyon at 6 minute headways during the middle of the day and approximately every 10 to 15 minutes in the morning and evening. Between 6:30 - 7:30 AM and 9:00 – 11PM frequency is reduced to every 30 minutes. Each full shuttle bus, which has a capacity of 66 people has the potential to replace 25 cars.

The shuttle system is an integral component and was the catalyst of a large-scale improvement project including the construction of a new Visitor Center and a bus maintenance facility, as well as a 3-mile pedestrian path, the Pa’rus Trail. Additional streetscape and safety improvements near shuttle stops were also included in the project. The Visitor Center showcases award-winning energy efficient design and sustainable development practices. Like a number of other National Parks, Zion is also testing alternative fuel vehicles to assess environmental impacts. Zion has two electric trams each holding up to 36 passengers.

The total cost of the improvement project was $27.4 million, including $9.4 million for shuttle buses and trailers. The bus maintenance facility cost an additional $2.6 million. Annual operating costs of the shuttle system are estimated to be $2.5 million, or about one dollar per visitor. The street, landscaping, and sidewalk improvements surrounding the Springdale shuttle stops were financed by federal enhancement funds secured by the Utah Department of Transportation.

Benefits Started on Day One

The shuttle system has had a significant impact on traffic operations and the natural environment within the Canyon. The 2000 operational period lasted from the 26th of May until the 29th of October, during which more than 1.5 million passengers utilized the system. The effectiveness data below indicates the marked success of the system during its’ first year of operation.

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**Year 2000 Shuttle System Effectiveness**

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<tbody>
<tr>
<td>Shuttle Passenger / Day</td>
<td>2,994</td>
</tr>
<tr>
<td>Reduction in Vehicle Trips / Day</td>
<td>1,183</td>
</tr>
<tr>
<td>Reduction in Vehicle Miles Traveled / Day</td>
<td>10,877</td>
</tr>
</tbody>
</table>

*Source: 2001 Draft Report on Air Emissions Inventory for Zion National Park*

Current estimates indicated that about 75 percent of the 2.5 million annual visitors ride the Zion Canyon shuttle. In the programs second year, 2002, annual shuttle boardings (2.35 million) almost equaled park visitation (2.61 million).

The shuttle system has been attributed with eliminating much of the vehicle congestion, parking conflicts, and aesthetic and noise related issues associated with vehicle use in the Park. Research is underway to quantify the effect that propane-powered shuttle buses have had on reducing noise levels. Prior to implementing the system, a noise impact assessment concluded that a considerable portion of the Canyon noise was a result of commercial tour bus traffic which is now prohibited north of the Visitor Center.

The town of Springdale has directly benefited from their Partnership with the Park on the shuttle system. Today, over half of the system operates within Springdale thereby providing free transit service to the residents. Likewise, the Park has also benefited from collaborating with Springdale. Without the partnership, the Park would have had to invest in additional roadway and parking infrastructure to support the shuttle system. The partnership has been attributed with reducing Park roadway construction needs by 40% and parking development by 54%. Aside from providing a transportation alternative for Park visitors and staff as well as Springdale residents, the shuttle system has indirectly promoted the local economy. Springdale experienced a 5 percent increase in retail sails during the first year of shuttle operation.
Aspen at the Top
Aspen, Colorado is recognized as a premier recreational and resort destination in the western United States. Located approximately 220 miles west of Denver, Aspen is home to less than 15,000 permanent residents. Visitors push the seasonal population to 25,000 during the winter peak ski season. Aspen is home to the Aspen Skiing Company (ASC) which operates two luxury hotels and 15 restaurants. At the peak winter season, ASC employs 3400 people, and is the largest employer in the Valley.

Aspen is accessible via Colorado Highway 82 (CO 82), which is currently under construction. The CO 82 project is a 40-mile corridor improvement from Glenwood Springs, Colorado at I-70 to Aspen. A key project component includes the installation of high occupancy vehicle (HOV) lanes. When completed, the HOV facility will stretch 16 miles from Basalt to Aspen. The HOV lane has also served as a construction traffic impact mitigation tool, reducing the number of vehicle trips passing through the construction zones along CO 82. By using temporary signing and striping during construction, the Colorado Department of Transportation (CDOT) was able to start providing a time-saving advantage to HOVs.

Aspen has implemented transportation goals to preserve the physical environment and control future traffic impacts on the community. The 1993 Aspen Area Community Plan adopted a transportation goal to limit the traffic entering Aspen to 1993 volumes. Traffic volume counts are taken continuously at Castle Creek Bridge and are summarized monthly to ensure that the goal is being met. The goal has been met every year since. The City of Aspen has adopted several transportation goals besides limiting traffic volumes such as reducing parking occupancy rates downtown and offering viable alternatives to driving alone.

Program Description - Complementing Strategies
Aspen exemplifies the cohesion of a range of demand-side strategies, in most cases implemented by a number of different organizations (local transit agency, non-profit, local jurisdiction, etc.), successfully contributing to vehicle trip reduction. The section below highlights a few of the Aspen’s programs although success is difficult to attribute to only one or two strategies.

Area-wide Rideshare - The City of Aspen coordinates the local rideshare arrangements. The distribution of daily Carpool Parking Permits provides an indication of the success of their ridesharing program. To encourage carpooling, vehicles with more than 3 people entering the downtown area can stop at a kiosk and receive a Carpool Parking Permit that allows that vehicle to park in a designated area free of charge all day. Approximately 16,000 daily permits
are issued annually. Coupled with the high-occupancy vehicle lanes and transit signal priority, the distribution of these permits is one of the most successful incentives to rideshare.

**Transit Service** - The Roaring Fork Transportation Authority (RFTA) provides daily fixed route and demand response transit services. RFTA operates partially on a local sales tax. The local jurisdictions including Aspen and Glendale contribute proportionately to the transit service they receive. During the summer, RFTA operated the Maroon Bells shuttle service to the Maroon Bells National Recreation Area. Personal vehicle traffic is restricted between 9:00 AM and 5:00 PM daily allowing access only to shuttles and those with special needs. The combined June and July 2003 ridership was over 40,000 passengers.

**Park and Ride Lots** - Highway 82, the main north-south roadway has eight P&R lots available to commuters. The lots range in size between 10 and 150 spaces. The neighboring Town of Snowmass hosts an aggressive intercept parking program in which perimeter parking lots are available to leave vehicles and use transit. The alternative to intercept parking in Snowmass is to buy a parking permit to park in the core area.

**Employer-based Support Programs** - The Transportation Options Program (TOP) is comprised of 32 businesses and over 6000 employees. Participating employers provide an employee transportation coordinator (ETC), nick-named TOP Dogs, to attend meetings and disseminate information to employees. TOP has also negotiated the creation of the Zone Pass with Roaring Fork Transit Association (RFTA), which enables individualized transit options to encourage employers to purchase transit passes for their employees. Other TOP incentives include schedule display boards, email traffic alerts, and monthly newsletters. TOP is operated on funds from the paid parking program. All TOP services are free.

**Parking Incentive Programs** - The paid parking program, Pay and Display, has been implemented with the highest rates charged downtown. One Pay and Display ticket covers the entire block with a maximum of two hour parking. Aspen also has traditional parking meters. Money generated from Aspen parking programs is applied directly towards other transportation management programs.

**Marketing** - Find Another Way Day is an annual marketing campaign to encourage commuters to try another mode of travel. For the last 7 years, the City of Aspen has sponsored this event to encourage people to leave their car at home and use another means to get around town or commute to work. Find Another Way Day events include entertainment, food, prizes and free bicycle safety checks. In 2001, a Customer Appreciation event was also added to Find Another Way Day to enable citizen’s not living and working near the downtown core area to participate. In 2003, the event became Find Another Way Week with daily events happening throughout the Valley. In 2002, the City implemented “Carpool Patrol” in cooperation with local radio stations by interviewing and giving prizes to carpoolers who stopped at the kiosk.

**A Decade of Success**

The City of Aspen has designated one full-time individual to demand-side programs. The program is evaluated yearly and considers a documented goal and outcome plan. Aspen has found it fruitful to track quantifiable measures of effectiveness such as the number of transit passed sold, Carpool Parking Permits distributed and traffic volumes as well as performing annual reviews with their employer participants to ensure that their needs are being met. Each year, specific goals are outlined and later the outcome is documented.

The programs highlighted above have collectively but not exclusively contributed to achieving transportation goals. As of 2003, revenue generated from the paid parking program generated $600,000 for program support and $300,000 for future transit investment. This program is also attributed with reducing parking occupancy downtown by 10%. The City has also displayed flexibility with their programs to ensure that goals are met. For example, in 2003, parking rates were increased to cover higher transit costs as well as to preserve the parking occupancy rates downtown. In 2003, the City of Aspen became the first and only city in the nation to be awarded best workplace for commuter status by the US EPA. The City’s program also received the 2003 Outstanding Service Award from the Association for Commuter Transportation.
Area Characteristics

The Lake Tahoe Basin incorporates two states and five counties between the Sierra Nevada and Carson mountain ranges. Approximately two-thirds of the Basin is in California and one-third in Nevada. The area can be characterized as mountainous with limited areas of level terrain. Lake Tahoe itself is twenty-two miles long and 12-miles wide with 72-miles of shoreline.

The population of the Lake Tahoe Basin consists of residents and visitors. The Basin economy is significantly dependent on resort, recreational, and gaming industries. The resident population lives and works in the basin, and the influx of visitors arrive during the winter ski season (December through March), and the summer seasons (June through August). However, the month of August has the highest travel demand in terms of peak hour traffic volumes on the roadways. Currently (according to 2000 census data) about 56,000 people reside year-round in the Basin. Population growth through 2010 is expected to be modest in contrast to the rest of the four counties of which the Tahoe Basin is a part. The land use restrictions and the physical carrying capacity of the Basin will tend to maintain steady linear trends in population growth.

The roadway network within the Basin consists essentially of a “ring road” with a handful of regional access points. Most of the roadway network supporting the Basin can be classified as 2-lane highway and local collectors and arterials. Traffic entering the Basin has access from several points. The most direct access route to the City of South Lake Tahoe from points west and east is U.S. 50. State Route (S.R.) 89 and S.R. 267 provide access from Truckee and the I-80 corridor on the north. S.R. 89 through Tahoe City consistently maintains the highest traffic volumes entering the Basin both during the peak month and yearly. Except for U.S. 50 from the east, all the access routes are two-lane highways.

In response to the TRPA air quality threshold standards, the 1992 Regional Transportation Plan (RTP) established a VMT threshold standard to reduce vehicle miles of travel (VMT) by 10 percent of the 1981 base values. A number of demand-side programs have been implemented in an effort to obtain the VMT threshold.

Public and Private Transportation Investments

The Tahoe Basin is served by two publicly operated transit systems, tourist oriented trolley services, and a number of privately operated shuttle systems. Demand response service is offered by many agencies, and subsidized taxi services are also available. Basin agencies have realized investment in existing infrastructure
with comprehensive studies concluding with detailed recommendation for pedestrian and bicycle facilities as well as enhancements to the existing ITS initiatives. Highlighted below are a few of the innovative programs and TDM measures that the Basin has successfully implemented in recent years.

**Visitor-based Trolley Service** - In addition to the two established local transit agencies operating in the Basin, there are two successful summer trolley systems operated by the local Transportation Management Associations. The north shore service, Tahoe Trolley, is free at night but requires a minimal fare during the day. Service is available for approximately 60 days during the summer. In 2001, 18,000 riders used the service despite a 25% service cutback due to the limited availability of drivers. The south shore of Lake Tahoe supports a separate trolley system called Nifty 50. As a tourist-focused system, Nifty 50 operates approximately 80 days during the summer months from 10AM to 10PM. In 2001, 70,000 passengers used the service.

**Privately Operated Shuttle Service** - Several privately operated shuttle services also operate in the Basin. Casinos and hotels offer daily shuttle services while the major ski areas offer shuttle services either on a contract basis or privately during winter months. Services are available on both the north and south shore areas. As documented, the casino shuttles offer a significant service providing nearly 500,000 one-way passenger-trips per year. North shore ski areas to the south shore also provide service. Coordination of services between the public transit system on the south shore and the ski shuttles is afforded by use of common bus stops. The Tahoe Queen operating out of the Ski Run Marina also provides a waterborne ski shuttle service between the north and south shore areas.

**Heavenly Ski Resort Gondola** - In 2000, Heavenly Ski Resort installed a gondola providing direct access from the hotels, casinos and center of South Lake Tahoe to the resort. The gondola affords mountain views covering 2.4 miles for the 17-minute scenic ride. The new gondola recently won the Silver Eagle Award from the National Ski Areas Association, recognizing the improvement the gondola has made to the resort and community in reducing vehicle trips while minimizing visual impacts and environmental disturbances. Heavenly reports that 20% of their winter visitors access the ski resort via the gondola, which has helped reduce traffic congestion in South Lake Tahoe.

**Transportation Management Associations** - Over the last ten years, a number of measures have been implemented in the Basin through two community-based transportation management associations (TMAs).

The Truckee/North Tahoe TMA (TNT/TMA) has been a local leader in addressing transportation issues as well as disseminating information and providing transportation alternatives. One of their most successful programs is the Tahoe Trolley, which provides a summer season service (approximately 60 days) in and around north shore communities, resort areas, and to Emerald Bay providing a link to the south shore transit options. In addition, the TNT/TMA has taken the lead in coordinating expanded winter transit service for the north shore. Currently, one full-time and one part-time employee operate the TMA with an annual budget of about $160,000. 44% of the required revenue is generated from member contributors including local jurisdictions and area resorts.

Serving South Lake Tahoe, the South Shore TMA has focused primarily on appealing to the visitor market of the Basin. Formed in 1994, the TMA initiated the successful summer trolley program, Nifty 50 Trolley. The TMA is responsible for maintenance, drivers and securing funding as well as all other logistical matters related to the service. The South Shore TMA is actively involved with local planning efforts and is leading the effort to institute the coordinated transit system (CTS), which would combine both public and private transit services of the south shore. The South Shore TMA and NDOT are also working on securing funding to expand the existing seasonal shuttle service and to provide service to employees commuting between the Tahoe Basin and the Carson Valley.

**Measures of Effectiveness**

Programs highlighted above contribute positively to the overall transportation and visitor experience within the Tahoe Basin. Summarized below are indicators of program performance provided by project sponsors:

- **Seasonal Trolley Service Ridership (Summer of 2001):**
  - 18,000 passengers on Tahoe Trolley, north shore.
  - 70,000 passengers on Nifty 50, south shore.
- 500,000 one-way passenger trips per year provided by private casino shuttles.
- 20% visitor using the gondola to access Heavenly from South Lake Tahoe versus arriving by vehicle.
Area Characteristics

The Utah Department of Transportation (UDOT) completed the 17 mile reconstruction of I-15 in July 2001. The project was completed in four and a half years at a cost of about $1.52 billion. Instead of rehabilitating segments of the highway, UDOT decided to rebuild the entire corridor. To meet an aggressive schedule and, in particular, aiming to finish construction before the 2002 Olympic Games, UDOT completed the project using a design/build approach.

The original I-15 infrastructure, built in the 1960’s, was designed to support half the traffic capacity it served in 1997. This capacity-enhancing project included adding two general purpose lanes, two high occupancy vehicle (HOV) lanes and auxiliary lanes between interchanges. Project components also improved access to downtown Salt Lake City, provided railroad grade-separations, replaced deficient bridges and utilized single-point interchange design. The project mitigated conflicting merging traffic movements and significant traffic congestion.

Program Description

UDOT recognized that the project would have significant consequences to traffic circulation and operations during all project stages. The contractor was required to maintain two lanes of traffic in each direction during peak commute periods as well as preserve critical freeway-to-freeway movements and access to downtown at all times. When interchanges and cross streets were closed, no two adjacent interchanges were inaccessible at the same time. Incident Management programs were expanded and supplemented by contractor-required courtesy patrols. As part of the reconstruction, emergency pullout locations were constructed along the corridor since limited shoulders were provided for disabled vehicles.

UDOT used a combination of demand-side strategies to maintain traffic during reconstruction. The ITS system (CommuterLink) was installed in three major pieces: 1) the Traffic Operations Center (TOC) including the physical building and internal networking equipment, 2) the control software, and 3) field equipment including VMS signs, cameras, and signal controllers. The comprehensive system includes a 511 Traveler Information Line, coordinated signals, ramp meters as well as speed, volume, weather and pavement sensors. UDOT installed the bulk of the $70 million worth of ATMS equipment using a design-build procurement method. CommuterLink was funded mostly by state funds ($52 million) with local ($1 million) and federal ($17 million) contributions.

ATMS technology enabled jurisdictions to monitor construction impacts, respond to traffic accidents faster, and communicate with the motoring public. The UDOT TOC is directly linked to both the Salt Lake City and Salt Lake County Traffic Control Centers and the Utah Transit Authority (UTA) Radio Center to provide seamless communication between jurisdictions.
UDOT also undertook a marketing campaign recognizing that one of the best ways to minimize traffic conflicts and delays on the interstate during reconstruction was to reduce the number of vehicles on the road. Employers and employees were encouraged to participate in ridesharing opportunities provided by UTA and commuter transit services, the Telecommuting Directive, and the Corridor Business Program. Informational services included the use of the internet, highway advisory radio, media outlets, signing, seminars and open houses. The importance of ridesharing and trip reduction was reiterated and promoted by such programs as Skip-a-Trip.

Evaluation of the 2002 Winter Olympic Games

The ATMS was put to the test for the 2002 Winter Olympic Games which was the largest Winter Games held to date. In total, the Games utilized twelve venues across the region. With 1.5 million tickets purchased, the travel needs were unprecedented. After the conclusion of the Games, an assessment was made on program components.

A number of goals and programs were established specifically for the Games TDM Plan depending on the venue and transportation user group. The two primary user groups considered were spectators and residents. For example, a specific TDM Plan goal was established to reduce background traffic by at least 20%. The strategies implemented to achieve this goal included transit, carpools, shifting work hours and travel routes and times. A follow-up survey with residents concluded that approximately one-fifth of residents changed travel patterns during the Games. Most residents offered that the change was related to an adjustment in daily work hours as opposed to a change in mode or route. In addition, a reduction in day-time truck traffic reduction between 30 -45% indicated by limited date from UDOT’s Automated Traffic Recorder (ATR) system also contributed to reducing background traffic. The Olympic Spectator Transportation System (OSTS) was developed to address the transportation needs of the spectator population and included 19 park and ride lots served by shuttle buses, the TRAX light rail system with overflow parking lots and publicly - subsidized shuttle services to mountain venues.

Athlete and media transportation needs were also identified and addressed. A shuttle service was created exclusively for 11,000 members of the media, which operated on fixed routes 24 hours a day. The Athlete Transportation System served 3,300 athletes and officials housed in Olympic Village. The System included over 500 passenger vans, 50 cargo vans, 44 coach buses which operated 24 hours a day. Both media and athlete services were encouraged to use alternate routes.

Measures of Effectiveness

CommuterLink has already demonstrated its effectiveness. During its first years of operation, CommuterLink has been attributed with the following successes:

- Increased peak hour freeway speeds by 20%,
- Decreased freeway delay by 36%,
- Decreased traffic signal stops by 15%, and
- Decreased Intersection delay by 27%.

Considering the efficiency measures above, CommuterLink is projected to save Utah more than $100 million annually.

An evaluation of the ATMS and TDM Plan components specifically for the Winter Games provide the following results:

- 80,000 unique visitors visited the CommuterLink web site during the Games,
- 511 Traveler Information line daily usage peaked near 4000 calls. By comparison, 511 usage on a typical day in 2002 was around 300 calls.
- Over 2.5 million passenger-trips were recorded on public transit during the Games.
- Park and ride shuttle buses carried one-third of the transit passenger trips.
Area Characteristics

The I-25 corridor in metropolitan Denver is one of the most overburdened sections of roadway in Colorado. Over the past twenty years the region has experienced intense residential and employment growth leading to increased travel demand and congestion along the I-25 corridor.

In an effort to confront congestion along I-25, the Colorado Department of Transportation (CDOT) and the Regional Transportation District (RTD) initiated a multi-modal design-build project known as the Transportation Expansion Project, or T-REX. The design-build approach compliments T-REX project goals, which are:

- Minimize inconvenience to the public,
- To stay within the $1.67 billion project budget,
- To provide a quality product, and
- Complete the project on time (2008).

The project is ahead of schedule and is estimated for completion in 2006.

The T-REX project includes both light rail construction and highway capacity and safety improvements. T-REX, a design-build project, will add many new elements to the transportation system including 19 miles of double track light rail, 13 light rail stations (all but one with park & Ride lots), 34 additional fleet vehicles, and a new maintenance facility. The project will also provide additional lanes on both I-25 and I-225 within project limits as well as other safety improvements associated with save ingress and egress.

Program Description

T-REX owners recognized the potential impact that the large-scale project could have on the motoring public and took steps to minimize inconvenience associated with the reconstruction project. The TransOptions program was formulated in consultation with key community stakeholders as a construction mitigation program designed to assist employers and commuters in dealing with the challenges of traveling to, from and through the corridor during construction. CDOT and RTD dedicated $3 million to the TransOptions program, which included transit and vanpool subsidies, community outreach and education on construction and transportation options.

TransOptions has been recognized as a key element of construction mitigation by providing commuters and employers with incentives to use alternative modes to, from and through the corridor. TransOptions builds on the success of the TMAs and TMOs and established demand-side programs implemented by local jurisdictions including the Denver Regional Council of Government’s (DRCOG) RideArrangers.

Facilitative leadership has helped avoid roles and responsibilities pitfalls. For continued success, it will be important to communicate the role of agency partners to ensure focused but collaborative efforts through established and new partnerships.
Due to the fluid nature of a design-build project and the foresight of those involved, a number of recent project features have been deployed to manage travel demand during construction. In November 2002, T-REX opened a temporary bus/HOV lane on I-25 to promote the benefit of higher occupancy modes. In May of 2003, T-REX launched a real-time instant email alert system utilizing project ITS components as they became operational. In May of 2003, TransOptions was honored with a TDM Award presented by the Southeast Business Partnership for its continued commitment to and success with construction related transportation management to date.

**Measures of Effectiveness**

Recently, the T-REX TransOptions program has undergone an evaluation of its first two years (2001 and 2002) utilizing a variety of measures including documentation review, stakeholder interviews, e-mail surveys, and quantitative analyses of program data. The evaluation identifies strengths and weaknesses of the TransOptions program, as well as opportunities and threats for the future of the program.

By reducing daily vehicle miles traveled (VMT) along the T-REX corridor, the TransOptions program is contributing to T-REX's goal of minimizing inconvenience along the corridor. As part of recent analysis conducted by UrbanTrans Consultants, Inc., TransOptions contributed to VMT reduction was measured. Collectively, transit and vanpool subsidies provided by TransOptions have reduced daily VMT by 74,800. The following successes have been cited as contributors of VMT reduction based on analysis completed to date:

- 14 employers purchased Eco Pass which resulted in over 1,200 employee Eco Pass holders,
- 66 commuters purchased ValuPass,
- 318 commuters purchased subsidized transit pass products at 4 Sales Pass Outlets established with T-REX support,
- 80 commuters utilized Commuter Checks to purchase transit products,
- 179 Vanpool riders received T-REX TransOptions subsidies, and
- 9 Vanpools were formed.

A number of TransOptions strengths were documented as part of the evaluation and are seemingly applicable to all highway reconstruction projects. Collaborative, responsive leadership of the TransOptions staff is imperative for the continued interest of project team members including the TMA/TMOs, DRCOG, RTD and the TransOptions TDM Committee. Facilitative leadership has helped avoid roles and responsibilities pitfalls. For continued success, it will be important to communicate the role of agency partners to ensure focused but collaborative efforts through established and new partnerships. Program credibility continues to be strengthened by the presence of a public relations firm on the TransOptions team. Marketing and public relations outreach of the TransOptions program resulted in increased employer and employee awareness of transit, vanpool and carpool. Success is evident measured by the implementation of over 300 events, attended by more than 20,000 persons by the end of 2002. In addition, just as important as providing employers and commuters with subsidized transit and vanpool products, it was necessary to enable the TMA/TMOs and DRCOG the tools to effectively provide those products. TransOptions is flexible in nature, adjusting to user needs.
Area Characteristics

The Springfield Interchange Improvement Project, a major reconstruction project sponsored by the Virginia Department of Transportation (VDOT), is currently mid-way through construction. The multi-phased, $350 million project began in March of 1999 and is scheduled for completion in 2007. The pre-project interchange, where I-95, I-395 and I-495 met, was nearly a mile long linking the three major interstates and serving nearly 400,000 vehicles a day. The original interchange was constructed in the 1960’s and was not equipped to handle current or future transportation needs. Traffic forecasts projected volumes to double by 2020. Project improvements include building more than 50 bridges and flyovers, 30 ramps, and installing nearly 200 guide signs and 20 electronic message signs. Among a number of goals, VDOT undertook the Project to improve safety and access while increasing throughput capacity. A main project feature is to barrier-separate HOV lanes, through lanes and local lanes on I-95 to reduce weaving conflicts.

Program Description

VDOT has worked with federal and local agencies to create a comprehensive Congestion Management Plan ($28 million) including incident management, traffic operations, and demand management. The program allocation is $10 million over 8 years. Specific Plan goals were established to reduce 1,000 vehicles per peak hour and 2,500 vehicles per peak period.

Incident management components include the use of an on-site mobile command vehicle, equipment to respond to hazardous waste spills and traffic incidents of all degrees as well as increased patrols by the police and safety service units. Operational improvements include the installation of cameras to monitor traffic flow proximate to the interchange, a coordinated construction phasing plan, and information dissemination regarding alternate routes and emergency routes. In addition, signal timing adjustments and spot intersection improvements (installing or lengthening turn pockets) were also made. Infrastructure improvements also included capacity enhancements at intersections along parallel routes to accommodate diverted trips. Other specific TDM investments included a 10% increase in Park & Ride spaces, expanded commuter rail service, OmniRide bus enhancements, telework centers, fare discounts for both bus and rail service, and the promotion of vanpools, carpools, and private buspools of more than 30 passengers.
The region has numerous transportation management associations (TMA)s and ridesharing organizations available to users. Currently, bus service proximate to Springfield is free of charge thanks to a state-funded program conceived by the Northern Virginia Transportation Commission, Fairfax County, and the Washington Metropolitan Area Transit Authority (WMATA).

The Project maintains a project website, an information line and utilizes media for public outreach. Commuters or other travelers are encouraged to stay informed about project conditions. VDOT has enhanced information dissemination to the public by opening the nation’s first formalized retail Information Center (IC), which is located in the Springfield Mall to help disseminate project information. The storefront station is equipped with monitoring cameras and can provide rideshare assistance and transit information and passes. Additional project elements promoting TDM include High Occupancy Vehicle (HOV) lanes, including the two-lane reversible facility running north to south and roadway operational improvements.

**Measures of Effectiveness**

The use of transit, carpooling, and vanpooling in the I-405 corridor has been consistently high due in large part to the success of the HOV lanes and Metrorail line. The challenge of the Congestion Management Plan was to provide additional services that would encourage drivers to change their behaviors. An early survey of single occupant drivers determined the most effective improvements to entice people out of their cars. Demand-side strategies were formulated based on these improvements. With HOV lanes already in place, VDOT was able to offer a time-savings advantage. The public outreach component is proving to be a success. As of May 2003, over 230,000 motorists had visited the Information Center in the Springfield Mall.

The Springfield Interchange Improvement Project is currently in Phase 4 and 5 and continues to operate the Congestion Management Plan established for the Project. As of June 2002, the Congestion Management Plan had been through three evaluation processes and has not been substantially modified. Minor shifts in programmed funds have occurred, but the majority of demand-side strategies are performing at or above their anticipated goals. Even during reconstruction, the original number of through travel lanes is maintained during peak hours.
Vanpooling: A New Idea Presents Itself

Bal Harbour Village is a small, upscale resort town located in South Florida. With a population of 3,309, the Village has implemented strict growth management policies since its incorporation in 1946. Today, the Bal Harbour Village Manager seeks out ways to sustain Bal Harbour’s appeal to both Village employees and in turn to visitors. Despite good bus service, Bal Harbour Village employees are not avid bus riders. The presence of free parking for employees may be one explanation for low bus usage. Residential location may be a second explanation. Most of Bal Harbour Village’s employees commute from outside the town limits and prior to August 2001, a great majority of them drove alone.

In August 2001, the Village Manager received a flyer advertising the South Florida Commuter Services (SFCS) vanpool services. SFCS works with the South Florida Vanpool Program (SFVP) to provide vanpool services and programs. SFVP works directly with employers to design a vanpool program, present vanpooling options to employees and manage the program from the start-up through implementation. The Village Manager’s interest was peaked and he scheduled an employee vanpool presentation.

Immediate Vanpool Formation

The presentation concluded with high employee interest in starting a vanpool. Immediately, eight Bal Harbour employees signed up to form a vanpool. In addition to presenting the Vanpool program to employees, the Village Manager began researching subsidies and payment options for employees. In order to tap into employee motivation, the Village Manager leveraged a subsidy paid by Miami-Dade County with funds from the Village of Bal Harbour to establish the first vanpool. The employee and Village divided the remaining vanpool costs.

Employees that participated in the first vanpool began to report reduced commuting costs and influenced other employees to consider vanpooling. Not long after the first van formed, the Village Manager acquired enough employees to sponsor a second vanpool. In just 2 years, 12% of Bal Harbour Village’s employees are vanpooling. Due to the vanpool popularity, the Miami-Dade County subsidy and new transportation tax proceeds, the Village of Bal Harbour is able to pay 100% of the vanpool costs. Thus, as of Summer 2003, employees pay only the cost of gas to vanpool. All vanpoolers are eligible to participate in the County’s Guaranteed Ride Home program.

Results

The Village Manager’s interest in promoting alternative mode choices to employees has resulted in the formation of a strong vanpooling program. Today, Bal Harbour’s mode split reflects the high interest in vanpooling. 12% of employees vanpool, 2% telework and 48% drive alone. The remaining 38% are police officers that work irregular shifts.
FAST FACTS ABOUT: Calibre - Alexandria, VA

Types of TDM: Modal Shift, Location Shift
Keywords: Transit Subsidy, Parking Management, Shuttle, Relocation, Parking Cash Out, Telework, Lease Negotiation
Employer Demographics: Located in Alexandria, VA near Washington, DC in an area well served by subway, commuter train and bus
Program: $65 transit, bike or walk subsidy, $65 parking cash out, carpool subsidy, telecommute
Cost of Program: $99,000 - $30,000- transit subsidies, $5,500 Telecommute program administration, $64,000 TeleworkVA! subsidy
Staff: 2 (Benefits Coordinator and HR Director)
Results: 2% carpool, 12% transit, 5% telework
Contact: Michelle Voisinet Caylor, Benefits Coordinator mcaylor@calibresys.com

Company on the Move

CALIBRE is an employee-owned government information technology and management services firm headquartered in Alexandria, Virginia. CALIBRE’s transportation program is a reflection of company objectives to “Take Care of Our People”, “Manage Our Company” and “Be Good Citizens”. CALIBRE opened its Falls Church, Virginia office with 44 employees in 1989. Over the next seven years, the company added two offices in the Virginia area. By May of 2001, company management recognized the benefits of consolidating Metro Washington, DC area staff into one office and began searching for appropriately sized office space. To assist the company in selecting a highly accessible location, the company looked at where employees lived and estimated employee commute times. The company found that relocating corporate headquarters to the Alexandria/Springfield, Virginia area would equalize commute time.

In addition to equalizing commute time, the company wanted to relocate to an area better served by a variety of transit modes. The Metro Park area of Alexandria provides access to the Franconia-Springfield station, which serves both the DC Metrorail and Virginia Railway Express (VRE). The new facilities accommodated staff from the three Virginia offices and provided ample room for predicted growth.

Pulling the Pieces Together

Prior to relocating to the Alexandria/Springfield Area, a landlord-operated shuttle to and from the Pentagon, a major CALIBRE client, was the extent of the transportation benefits program. Today, CALIBRE’s transportation benefits program is flexible towards a variety of transportation modes. All CALIBRE employees in the National Capital Area are eligible to receive subsidized parking or participate in the Metrochek program. CALIBRE’s corporate headquarters employees may also receive parking cash out benefits. Metrochek, a transit program sponsored by WMATA, provides employees with vouchers from $65-$100 for approved transit costs. The
voucher can be applied to most forms of public transportation. The parking cash out program provides employees who opt out of their parking space and do not utilize transit, a subsidy of $65.00 a month. Cyclists and walkers can utilize the subsidy to defray the costs of commuting on bike or foot. CALIBRE employees who choose to carpool receive parking cash out of $32.50 a month. Additionally, employees outside the Metropolitan Washington Area may identify local transit programs for consideration in the Commuter Transit Benefits program.

In addition to transit, bike and walk subsidies and the parking cash out program, CALIBRE supports both flextime and telecommuting. As a high tech company, CALIBRE recognized that employees did not need to work from the office to be productive. In June of 2002, CALIBRE began a pilot program with TeleworkVA! a public and private partnership that promotes telecommuting. TeleworkVA! assisted CALIBRE by mapping out a telework policy plan highlighting how best to work with employees that telework. CALIBRE’s telework plan requires employees interested in telework to first gain support from their supervisor and then together, submit a telework application. Employees are required to set up a home office, send in a photo of the office, pass a safety check and attend telework training with their supervisor. The training focuses on communication expectations, offers suggestions on supervising from a distance, and provides tips on avoiding telecommuting pitfalls. To provide seamless phone access, CALIBRE upgraded their phone system to allow for a telework employee’s home phone to ring when their office number is dialed. The company reimburses employee expenses incurred from telecommuting and requires the employee to come into the office at least twice a week. Although supportive of the telework concept, the inter-connectedness and teamwork qualities of the CALIBRE culture necessitate the presence of employees at least twice a week.

Marketing the Program
Prior to hiring employees, CALIBRE invites the potential hire to an offer interview at which, a Vice President explains the CALIBRE culture and employee benefits, including telework, parking cash out and subsidized transit passes. Because of the offer interview, employees are aware of the transportation benefits before they accept the job. Once at CALIBRE, employees attend a new hire orientation where the transportation benefits program is reintroduced. In addition, information on the program is always available via the company’s intranet. This has proven to be an effective marketing and outreach strategy as more new employees take advantage of the program than existing employees.

The Benefits Coordinator at CALIBRE includes the transportation program and any upcoming regional events in the monthly employee newsletter. She works with the local rideshare agency to host transportation and telecommuting fairs at the office. The Benefits Coordinator has recognized that the motivation to try transit stems primarily from an employee’s experience and frustration with a long commute. Employees who first choose parking often decide commuting via Metro and commuter rail may be more time efficient and cost effective. Therefore, the program allows employees to switch from parking to subsidized transit at any time.

Results
CALIBRE evaluates the success of their program in a simple yet effective manner. As long as the number of transit users grows, the program is deemed successful. Upper management is concerned with stalling the parking demand issue as far into the future as possible. Continued growth in the transit pass and parking cash out programs assists CALIBRE in meeting this goal. If participation in the transportation benefits program decreases, management will re-evaluate the program’s effectiveness. At that time, a new program or a more aggressive parking management program may emerge.

After 2 years of program implementation, 2% of CALIBRE’s employee’s carpool, 12% utilize transit (bus, rail, subway) and 5% participate in the telework program. Although 81% of CALIBRE employees continue to drive alone, many of them utilize the nearby Metro to travel to and from work-related meetings and trips during the week.
Strategic Relocation

CH2M HILL is an employee owned, engineering, construction, and operations firm serving a variety of public and private clients throughout the world. CH2M HILL’s mission states, “We are a global project delivery company making technology work to help our clients build a better world.” Fulfilling this mission begins with CH2M HILL’s commitment to fostering healthy employees and leaving as light an environmental footprint as possible. An example of this commitment to the environment and employees is reflected in the firm’s transportation benefits program.

CH2M HILL has 165 offices throughout the world with both corporate headquarters and regional operations located in Denver, CO. Prior to 2002, CH2M HILL’s corporate and regional employees were scattered in four locations throughout Denver. CH2M HILL’s executive leadership team decided to relocate employees to one campus-style office park. Prior to choosing the location of the new corporate and regional Denver offices, the leadership team plotted where employees lived and made relocation decisions based upon accessibility. After careful consideration, CH2M HILL chose an area south of Denver, along the I-25 corridor. The Meridian International Business Center, located less than 20 miles south of Denver and 30 miles north of Colorado Springs, boasts easy access to multiple east-west and north-south highways. The campus is in a traditional suburban business park setting featuring ample parking and sparse bus service.

Roadway convenience and employee residential locations were not the only factors driving CH2M HILL to relocate to Meridian. In 2001, the Colorado Department of Transportation and the local Regional Transportation District (RTD) began to move forward with plans for a massive corridor-wide roadway expansion and light rail project. The corridor construction project, entitled Transportation Expansion or T-REX, included plans for a Denver light rail system with a station near CH2M HILL’s then-anticipated campus. The Leadership Team was keenly aware of the positive opportunities for increased mass transit use by the firm’s employees as a result of this new transportation infrastructure.

Corporate TDM: Telework and Flextime

At a corporate level CH2M HILL has established an aggressive Telework and Flextime program. CH2M HILL’s Telework Program Policy views telework as a “mutually beneficial work arrangement designed to attract and retain employees and reduce company costs.” Participation in the company’s telework program is based on job suitability, suitability of the employee’s skill sets, job performance and suitability of home work site. Employees must obtain supervisory approval to participate in the firm’s Telework Program. Once approved, employees are required to complete a two-hour telework training that covers IT and ergonomic aspects of teleworking. The teleworker is responsible for defining a safe and appropriate workplace using the tools provided by the company. CH2M HILL provides specific equipment and software tools and reimburses employees for appropriate office supplies and voice and data connectivity charges. While CH2M HILL is supportive of both full-time and part-time/occasional telework arrangements, only full-time teleworkers receive financial support. The company provides
in-house “hoteled offices” or carrels within the CH2M HILL office, which come equipped with phones, networking capabilities and office supplies. Employees who telework on a full-time basis can utilize these workstations if and when they are required to work from the office. CH2M HILL also recognizes the need to provide employees with work hour options.

**Regional Denver Office TDM: “Look Before You Leave”**

Because the culture within CH2M HILL leans toward decentralized decision-making, there is no corporate mandate to offer transportation benefits. There are offices, (such as the Seattle, Washington office), which are required by the state to provide transportation benefits. Despite the lack of such a mandate in Colorado, CH2M HILL’s Denver office initiated an innovative TDM program. As the company moved forward with office relocation plans, recruitment and retention were forefront in managers’ minds. Management recognized commute times would increase for a number of employees either by virtue of the office relocation or by the up-coming T-REX project. Either way, they did not want highly valued employees dissatisfied with working at CH2M HILL due to the impending traffic, congestion and construction. To complicate matters, transit service to the new campus was severely limited as was bike accessibility.

With support from management, an employee in the Denver office asked other co-workers to volunteer their time to assist CH2M HILL in addressing transportation related concerns. Soon the T-REX Tamers Transportation Team was formed with the intent of helping managers create new services and programs aimed at improving accessibility and mobility to, from and around office locations all of which were in the direct path of the T-REX project. Utilizing employee survey results, the T-REX Tamers were able to focus efforts down to the types of information and programs that employees would respond to the most. First, they chose a TDM program theme: “Look Before You Leave” which encourages employees to look at traffic conditions before leaving home and/or work. As employees began to “look before they left” they were presented with the information they needed to make intelligent transportation decisions, including the decision to not drive at that specific time.

The central feature of the program is a transportation Intranet featuring current traffic updates, planned closures, T-REX project information (closures, construction updates), links to Denver International Airport, subscription service to a traffic alert service provided by MyTrafficNews.com and driving directions using popular websites. Employees can also access links to Denver Metro’s transit provider (RTD), carpool and vanpool information and rideshare matching services, bike to work information and links to company telework and flextime policies. The Intranet also provides links to local businesses that provide pickup and delivery of dry cleaning, meal delivery and car maintenance services. Finally, the site offers information on learning and professional development opportunities. Employees faced with a congestion-filled commute can opt to stay and earn CH2M HILL professional development credits. A transportation fair was held to heighten awareness of the T-REX project and introduce the new tools and alternatives available to employees.

**Results**

CH2M HILL evaluates success through two main efforts. First, periodic surveys are provided to employees to learn more about travel modes and commuting concerns. Second, alternative mode users are encouraged to register with Teletrips, a web-based alternative mode data gathering resource. Employees who register with Teletrips receive a weekly e-mail survey requesting information about their commute and in return receive a aggregate report on the amount of pollution they reduced, number of drive-miles avoided and an estimate of time saved by teleworking, using the bus, carpooling or vanpooling. Additionally, CH2M HILL receives a company-wide profile, which generates air pollution credits through the e-Commute program. In 2002 alone, 81 Denver campus employees reported the following results: 115,130 miles saved, 3,689 hours saved, 61,325 lbs. of carbon dioxide saved and 3,497 lbs. of carbon monoxide not created.

CH2M HILL has been successful at getting 17% of its employees out of single occupant vehicles. A little more than 8% of employees take advantage of CH2M HILL’s Telework and Flextime programs; 5% carpool; 3% take transit and .5% bike commute. Given CH2M HILL’s remote location, lack of bus service and the on-going construction project, a 17% mode shift is a solid start. Furthermore, the light rail segment of the T-REX project includes a stop near the Meridian International Business Center. CH2M HILL provides solid stepping-stones to assist in further employee transit usage.
Georgia Power Company - Atlanta, GA

FAST FACTS ABOUT: GEOrgia Power Company - Atlanta, GA

| Types of TDM: | Modal shift, Location shift |
| Keywords: | Company sponsored vanpools, Fleet vehicles, transit subsidy, telework, intranet |
| Employer Demographics: | Program: Smart Ride commuter options program. Offers a variety of commuter options to employees |
| Results: | 15% Compressed/flex time, 13% Vanpool/Carpool, 5% Telework |
| Cost of Program: | Staff: 3 FTE. 1 Project Coordinator, 2 Corporate Facilities Analysts |
| Contact: | Jane Franklin, Project Coordinator 404-506-1967 |

Summer Olympics + Increased Parking Demand + Poor Air Quality = New Commuter Benefits

Georgia Power, an investor owned utility that serves customers across the state, boasts office locations throughout the State of Georgia. 5,500 of the approximately 8,800 Georgia power employees are located in the greater Atlanta metro region. Executives at Georgia Power were concerned that there was not enough parking at the downtown Atlanta Georgia Power Headquarters location. As such, in 1994 they decided to provide the commuter benefits to downtown employees. The commute options program, titled SmartRide, included subsidies for Metropolitan Atlanta Rapid Transit Authority (MARTA) transit tokens. Initially, the SmartRide program was only available at the downtown Georgia Power facility but eventually expanded to other regional offices.

With the upcoming 1996 summer Centennial Olympic Games in Atlanta, employers throughout the greater Atlanta region were concerned with the impact the Games would have on traffic congestion and employee accessibility to the workplace. Additionally, in 1996 Georgia Power was consolidating two downtown offices into one building. Given these two pressures, executives at Georgia Power opted to increase the types of transportation programs offered. Unfortunately, in 1997 the consolidated downtown building experienced serious parking problems. Georgia Power also responded to pressure from the 1998 Voluntary Ozone Action Program, which encouraged state agencies and major corporations to reduce vehicle miles traveled by 20%. To reduce demand for employee parking and assist in reducing Atlanta’s worsening traffic congestion and air pollution, Georgia Power redesigned their SmartRide program.

Vanpool Becomes Mode of Choice

In 1998 Georgia Power extended their SmartRide program from a downtown focused transit subsidy program to an extensive regional commute options program. The program featured company sponsored vanpools, fleet vehicles, free MARTA passes, telework, flextime, alternative work locations, free and preferential parking for vanpools and first come first serve preferential parking for carpools. Of the commute options benefits offered, the company sponsored vanpool is the most popular among employees.

As of summer 2003, approximately Georgia Power supports over 50 vanpools involving over 500 employees. Fifty percent of vanpools travel to the downtown headquarters office and fifty percent travel to regional offices. The vanpool program is offered to all employees, including temporary contract employees. Currently, the longest vanpool trip documented is 160 miles round trip from Rome, Georgia to a North Atlanta metro regional office.

Fleet vehicles are available to employees who use alternative transportation to get to work. This is an important transportation strategy the company offers because employees do not feel “trapped” in the office once they carpool, vanpool or use transit.
**Additional Program Details**

Fleet vehicles are available to employees who use alternative transportation to get to work. This is an important transportation strategy the company offers because employees do not feel “trapped” in the office once they carpool, vanpool or use transit. Employees are allowed use of a fleet vehicle to run errands or go to meetings during the work day. Keeping with its desire to be good environmental citizens, the Georgia Power vehicles are either powered by electricity or ethanol.

To keep track of employee usage of transportation options, an internal alternative mode tracking system was developed for Georgia Power. Also called SmartRide, the software provides employees with a web-based reporting portal that offers a user friendly way to track carpool, vanpool and transit use. Separate internal timekeeping software is used to report when employees telework, work at an alternative location, or work an alternate schedule.

Georgia Power participates in the Guaranteed Ride Home (GRH) funded by Commute Connections, the regional rideshare agency. Employees who use alternative transportation have access to a free ride home in case of an emergency or unplanned overtimes. If there are any overages in the program, Georgia Power supplements the program.

In previous years, the program was highly marketed through e-mail, and messages on televisions monitors around the downtown campus. Employees received information from management and letters from the CEO that encouraged individual travel behavior changes. Additional program marketing and outreach was done in conjunction with the smog alerts season which initially lasted from May to October but eventually became a year round event. Given budget cuts, Georgia Power currently markets the transportation program through human resource orientations, word of mouth and occasional e-mail messaging. Georgia Power attempts to increase awareness of the transportation benefits program during smog alert season but to a much more limited extent.

**Measuring Success**

The main goal of the commuter options program is to get as many cars off the roads as possible. Georgia Power has been successful in accomplishing this goal as the company boasts over 1.2 million VMT reduced each month. Even with a downturn in staff, participation in the programs has been steady with 13% of employees carpooling or vanpooling, 15% working compressed or flex time schedules, 5% using transit while another 5% telework.

The success of this program is also measured by employee reaction. Employees recognize this as a good benefit and management sees it as a recruitment and retention tool. Georgia Power’s efforts have been recognized with a host of awards from local, regional and national organizations since 1997. As recipients of the 2001 Clean Air Campaign’s HOViE Award, Georgia Power’s program was acknowledged for encouraging the use of HOV lanes through carpooling, vanpooling and/or alternative fuel vehicles. The company has also been honored as a designated US EPA Best Workplace for Commuters, and was awarded the 1999 Outstanding in the Field Award from the Southeastern Association for Commuter Transportation.
Hennepin County - MN

**FAST FACTS ABOUT:** Hennepin County - MN

| Types of TDM: | Modal Shift, Location Shift |
| Keywords: | Transit subsidy, Pre-Tax benefits, Legislation |
| Employer Demographics: | Hennepin County, Minnesota, has 130 offices and facilities dispersed throughout the county with differing levels of transit service at each site. About 10,000 County employees are located in downtown Minneapolis and are well served by transit. |
| Results: | Estimated 60% drive alone, 15% carpool, 2% vanpool, 15% bus, 3% telework, 5% flextime |
| Cost: | $559,000 bus subsidy + $14,000 vanpool, parking and administration costs = $573,000 - $109,000 FICA Savings = Total Cost: $464,000. |
| Staff: | Minimal staff time and staff costs once program was set up. |
| Contact: | Mike Bastyr, Sr. Human Resources Representative, 612-348-4640 |

**Local and Federal Legislation and Policy Impacts**

Since 1960 the City of Minneapolis’s growth management policies concentrated office and retail use in a downtown core and limited parking to areas just outside the core. These policies have resulted in high bus service and ridership in the downtown core, where most of Hennepin County’s employees work.

Like many other US cities, Minneapolis is recently experiencing a resurgence in downtown growth and development. As Minneapolis’s downtown core continues to grow, city and county officials have become concerned about increasing congestion and decreasing air quality.

In 1999 Minneapolis expanded the smart growth policy in their City Comprehensive Plan to include more emphasis on transit. Per the plan, “Minneapolis will follow a policy of ‘Transit First’ in order to build a more balanced transportation system than the current one.”

In addition to the local “Transit First” policy, federal legislation passed in 1999 encouraged employers throughout the United States to reevaluate their transportation benefits programs. Internal Revenue Code Section 132 (f), allows employees to exclude certain transportation fringe benefits from gross income. In 1998, these pre-tax fringe benefits were limited to $65.00/month for transit or vanpool and $175.00/month for qualified parking. In 2000, the benefit limits were increased to $100/ month for transit or vanpool and $195.00/month for qualified parking.

The convergence of local policy and federal legislation provided the impetus for Hennepin County to reevaluate its 20-year old bus pass program.

**Pre-Tax and Creative Use of Savings**

Hennepin County’s pre-tax transit pass program, available to all 13,000 employees, immediately increased transit usage by 400-500 employees spread throughout the County’s dispersed offices.

Soon after Hennepin County’s introduction of the pre-tax transit program, MetroTransit, introduced a metro pass. Although employees voiced interest in the metro pass, the cost was too high for Hennepin County. Instead, in 2000, the County enhanced the transit pass program by providing a 40% discount on transit pass purchases. The combined subsidy and pre-tax status of the transit pass reduced costs for the employee. Transit purchases increased to over 1,900 by January 2003.
As an employer, the pre-tax bus and parking program saved the County money on FICA payments. The County decided to filter the FICA savings back to offset the subsidy program. Doing so defrays 30% of the cost to provide the subsidy. From June 2000 through January 2003, the subsidy, less the FICA savings, totaled $666,464.

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<tr>
<td>Other (Vanpool Parking)</td>
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<td>Total</td>
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<td>FICA Savings</td>
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<tr>
<td><strong>Total Budget</strong></td>
<td><strong>$464,000</strong></td>
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**Results and Challenges**

Due to the high level of bus service in the downtown core, Hennepin County’s marketing and outreach is focused on encouraging bus ridership. The combination of subsidies and pre-tax incentives captured the attention of employees and increased bus ridership by almost 900 employees in one year. Success for Hennepin County is measured by increased participation in the transit subsidy program. Since the changes in the program, SOV rate has reduced to approximately 60% with an estimated 15% of employees carpooling, 2% vanpooling, 3% teleworking, 5% using flextime and 15% utilizing transit.

Despite the initial success of the transit subsidy/pre-tax incentive program, employees complained about the confusing pre-tax parking process. As the pre-tax parking benefits operate differently than the popular and familiar flexible spending accounts, employees became frustrated.

Hennepin County’s Benefits Unit kept an open-door policy and sought and responded to feedback on a regular basis. County newsletter articles and e-mail announcements were used to both inform and clarify the program to employees.

One employee responded to a newsletter article with an e-mail stating, “Pre-tax parking is confusing and stupid.” That quote was used as the title for an employee mailing that explained changes that made the program easier for employees to use. Feedback loops and consistent updates increase the appeal to employees, and therefore participation.

The local MetroTransit group recognized Hennepin County’s innovative funding model with a transportation benefits program award.
1987-1990s: The Early Years of the Transportation Program

In 1987 Johns Manville, a leading manufacturer and marketer of premium-quality building and specialty products, moved from a spacious location in the Foothills outside of Denver, Colorado to a transit-convenient location in downtown Denver. Despite the expense, management guaranteed employees free parking for the first five years at the new location. For employees that did not want to drive, the company paid all but the taxes on either a monthly transit pass or up to four coupon books of transit tickets. Employees opting for the monthly pass could choose between purchasing a subsidized Local, Regional and Express bus pass. The individual employee’s commute lengths determined the type of pass they preferred.

Johns Manville extended their parking subsidy after five years and continued to pay 100% of parking costs for employees until 1998. On October 1, 1998, Johns Manville capped the employer paid parking expense at $110 per month. Employees had the option of parking on the roof for no extra expense or parking under cover for an additional $15.00 per month. For those who chose covered parking, the additional $15.00 per month was deducted through payroll at $7.50 per pay period. Both rooftop and covered parking costs increased through the next four years. Effective March 1, 2002, rooftop parking increased to $131.30 and covered to $146.40. Current lease requirements include a 1% increase in parking costs per year, which Johns Manville passes down to employees. Currently, Johns Manville continues to subsidize all parking at $110.00 a month.

Pre-Tax Benefits and Light Rail

A provision amended by the Transportation Equity Act for the 21st Century increased the limits for public transit to $65 dollars per month (Federal, tax free) in January of 2000. The allowed pre-tax amount exceeded the cost to ride the bus and therefore, the employee was no longer taxed as part of the program. This legislation encouraged Johns Manville to reevaluate their transportation benefits program. Cost-effectiveness and bottom line good business sense became the main motivations for Johns Manville.

In 1994, Denver welcomed its first light rail line which included a stop in front of Johns Manville’s Denver office. The opening of the rail line attracted additional employees to transit. It became cost effective for Johns Manville to purchase the local annual employee bus pass, the Eco Pass, when over 30% of employees started riding light rail and transit.
passes for 30% of employees became far more expensive than purchasing the Eco Pass for all employees. Additionally, upper management recognized the financial benefits of providing an Eco Pass program for employees as annual parking costs were significantly reduced as the number of employees choosing light rail and transit increased.

In 2000, Johns Manville worked with the local transit district, RTD, to provide the Eco Pass to all employees. The company received a variety of incentives and “first-time-Eco Pass” subsidies that further convinced upper management to expand the transit program. Despite the short-term incentives, the company recognizes the need to provide choices to employees and is committed to providing the Eco Pass as long as the benefit is cost-effective when compared to parking. Johns Manville pays 100% of the Eco Pass cost.

Employee Choice

Due to the fact that Johns Manville subsidizes each parking space they require employees to choose between a parking space and the Eco Pass, employees cannot have both. Given the “either-or” policy, Johns Manville recognized the need to provide flexibility within the program. Therefore, employees are free to try one form of commuting for a short term in order to make the best decision between driving and utilizing transit. Additionally, all employees that chose an Eco Pass are eligible to participate in the Guaranteed Ride Home Program and can receive up to 12 free parking days a year. Finally, Johns Manville’s transportation program also provides $110/month in vanpool subsidies for interested employees. Given the close proximity to transit and rail, only two employees currently participate in a vanpool program.

Results

Since 2000, when the Eco Pass program started, Johns Manville’s transportation benefits program has resulted in the following mode split: 55% drive alone, 44% bus/rail, .5% vanpool, .5% walk.
Nike Bucks

The Nike Corporation has a history of supporting alternative mode usage through the creation of aggressive employee transportation benefits. In 1991, when upper management decided to relocate Nike’s World Headquarters (WHQ) to a suburb outside of Portland, Oregon, they recognized the opportunity to save money by building fewer parking spaces and promoting carpool, vanpool and the overall use of alternative modes. In 1992 when Nike moved its WHQ to Beaverton, Oregon they introduced the incentive based Nike Bucks program. Alternative mode users could choose between receiving $1.00 a day in a Nike Buck voucher or a $21.00 bus pass subsidy. The Nike Buck vouchers could be used at on-site cafeterias, shops and Nike stores. The Nike Bucks program was initially only available to employees housed at the new WHQ, but due to its popularity, the program was expanded to include Nike’s Portland area retail stores and Portland’s Niketown. Ensuring employees outside the WHQ were indeed utilizing alternative modes became more and more difficult. By 1996, management began to question the overall effectiveness of the program as it became more difficult to manage and monitor.

1996: Mandates, Economics and Reevaluating Programs

At the same time Nike management began to reevaluate the Nike Bucks program, the State of Oregon’s Department of Environmental Quality (DEQ) established a commute trip reduction mandate (titled the Employee Commute Options program or ECO) aimed at employers in the Portland area with more than 50 employees reporting to a single work site. Beginning in 1996, affected employers were required to provide incentives and programs for employee use of alternative commute options. Employers were now required to reduce single-occupancy vehicle commuting by 10 percent over three years. As 5,000 employees reported daily to Nike’s WHQ in Beaverton, Nike was affected by the new mandate. By the time the mandate became law, Nike had been working on reducing SOV commuting for three years. After consultation with the DEQ, Nike was given permission to utilize their 1992 levels of SOV usage for base line data purposes.

Layered upon the growing difficulty of monitoring the Nike Buck program and the new local mandate was the 1996 Asian economic downturn’s impact on Nike. The Asian economic downturn resulted in huge layoffs at Nike as well as a corporate-wide reevaluation of every Nike program. As such, management questioned whether or not the hard to track $250,000 a year Nike Buck price tag was the best way to encourage alternative mode usage.

A New Program

With upper management’s support, Nike’s Employee Transportation Coordinator (ETC) gathered employees from various departments to create a new, cost-effective and easy to manage transportation benefits program. With management’s support, they decided to retain an incentive based program but to alter the incentive to a...
large quarterly drawing with smaller monthly drawing. At first employees that participated in the Nike Bucks program were resistant to changes and the alternative mode usage decreased when the new prize-oriented program was implemented. The ETC marketed the program through a transportation fair, newsletters, flyers and posters and soon, interest in the prizes and utilizing alternative modes increased. The ETC and employee planning group named the new program TRAC.

In addition to the prize incentives, Nike also developed transit subsidies and carpool incentives. Since 1996, all WHQ employees have been eligible to receive a transit pass for the local bus and light rail system. Nike subsidizes the cost of an annual bus/rail pass by 72% and the WHQ are well served by both bus and light rail service. To encourage rail usage, Nike sponsors a shuttle to transport employees to and from the light rail station, which is located about 1/2 mile from the WHQ campus. All bus pass holders are eligible to participate in the Guaranteed Ride Home (GRH) program, which is administered by the local transit authority, TriMet. The ETC promotes carpooling through the use of an in-house rideshare matching list and the presence of preferential carpool parking. Nike also supports a flextime policy allowing employees to work with their supervisors to determine the best schedule most appropriate for them and their workload.

**Commuting by Bike and Building Amenities**

Nike’s ETC provides a variety of services for bike commuters, and interested bike commuters. Upon request, the ETC will work with employees to map out the safest bike route, provide regional and local bike resources and information to assist with their commutes, and promote bike specific events to all employees. Nike has two fitness centers for employee use and bike commuters can easily access the showers and locker room. Nike also provides bike racks scattered around the campus and bike cages in the fitness center area. Furthermore, employees are allowed to bring bikes into the building and store them in their offices. Bike commuters are eligible to participate in the monthly and quarterly drawings.

In addition to the two fitness centers, Nike’s WHQ features a variety of on-site amenities designed to limit SOV and vehicle usage during the workday. Nike employees can access quality childcare at one of the two on-campus childcare centers. Employees that need childcare for only a short time can utilize the Nike Tykes drop off program when regular care is unavailable. Nike’s WHQ campus also features two sundry stores, dry cleaning service, beauty salon, an ATM and on-site movie ticket sales.

**Goals and Evaluation**

Nike’s extensive transportation benefits program and the presence of a variety of on-site building amenities stems from the company’s commitment to environmental leadership and sustainable practices. Although Nike is affected by local commute mandates, their commitment to promoting alternative mode usage existed prior to the mandates. Today, Nike’s goals revolve around the ECO mandate, which includes reporting progress towards meeting the specific mandate goals every two years. Additionally, Nike tracks awareness of and participation in the TRAC program through a newly developed in-house technology. This new technology allows alternative mode users to report their commute mode on a weekly basis. The ETC can utilize information garnered from the employees for both evaluation and targeted marketing. Additionally, the employees are automatically entered into drawings each time they register their commute modes.

**Results**

Nike’s SOV rate in 1992 was 98%. Since moving the WHQ’s and implementing the Nike Buck and TRAC programs, Nike’s SOV rate has reduced to 78%. 10% of employees carpool, 2% bike, 5% use bus and rail and 5% use flextime. Employees provide the ETC with feedback and ideas for program improvement and the ETC is given flexibility from upper management to make appropriate changes when necessary. Nike’s ETC is actively involved with the local TMA and is on the MPOs TDM subcommittee. Nike’s transportation programs have resulted in numerous recognitions and awards including recognition as a “Best Workplace for Commuters” by the EPA.
FAST FACTS ABOUT: Overlake Christian Church

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<td>Employer Demographics:</td>
<td>Located in the City of Redmond, WA, Overlake Christian Church has ample free parking and receives minimal bus service.</td>
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<td>Program:</td>
<td>The transportation benefits program provides up to 16 hours of paid time off per year to employees utilizing other forms of alternative transportation and $20 a month financial subsidy for public transportation.</td>
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<tr>
<td>Results:</td>
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<td>Staff:</td>
<td>1 FT with other various responsibilities including transportation program and 1 FT Director with only oversight of program.</td>
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<tr>
<td>Contacts:</td>
<td>Nancy Thorgeson, Director of Human Resources, <a href="mailto:nancyt@occ.org">nancyt@occ.org</a>; Barbara Graef, Human Resources Administrative Assistant, <a href="mailto:barbg@occ.org">barbg@occ.org</a></td>
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Community Driven

The Overlake Christian Church broke ground in 1968 with a handful of members and even fewer employees. By the mid-1990’s, its growth resulted in the need for a new, larger church. Church leaders selected a 27-acre site in Redmond, Washington and oversaw the construction of the 250,000 sq. ft. campus located minutes from Microsoft. The Overlake Christian Church (OCC) development included the construction of a parking lot necessary to accommodate the 2,000 plus vehicles for attendees and employees. In November 1996, OCC opened the doors to its new campus for 3,500 plus attendees and 109 employees.

OCC was driven to provide commute benefits to employees by the desire to set an example to other employers and the opportunity to be a role model in the community.

With assistance from the Greater Redmond Transportation Management Association (GRTMA), the OCC chose to voluntarily comply with Washington State’s Commute Trip Reduction (CTR) law. The CTR law requires that all employers with more than 100 employees traveling to work during peak morning times provide commute alternative programs. These programs must reduce the number of single-occupancy-vehicles (SOV) on the roadway during the busy morning commute. Though over 100 employees worked at OCC, not all traveled to and from work during the peak morning commute times. Nonetheless, OCC was driven to provide commute benefits to employees by the desire to set an example to other employers and the opportunity to be a role model in the community.

Carpool and Take Time Off

OCC is located in an area of Redmond that receives minimal transit service. This, combined with the availability of ample free parking, led OCC to develop a carpool-oriented transportation program. Upper management supported the program by providing opportunities for creativity and innovation. They also set aside funds and assigned transportation benefits program management responsibilities to a staff member. As such, the Human Resource Director and the Employee Transportation Coordinator (ETC) developed an incentive based program.

In 2001, OCC unveiled its unique and award-winning transportation benefits program. Utilizing the GRTMAs rideshare matching software, OCC provides internal rideshare matching services to connect employees with one another. Employees that choose to carpool on a regular basis can earn up to 16 hours of paid time off.
a year for carpooling. Time is earned on a quarterly basis and is based on the number of days per week an employee commutes using an alternative commute mode. As a further benefit, carpoolers receive the best parking spaces at OCC.

Recognizing carpooling isn’t for everyone, the program also provides a $20.00 a month transit and ferry pass incentive. OCC has set up a telework program, supports flextime and alternative work schedules and provides bike racks, showers and covered bike parking for cyclists.

Marketing, Partners and Results
The ETC utilized a thorough marketing campaign to educate employees about the new program. Presentations to new and existing employees throughout the year, as well as a transportation benefits program piece on the OCC Intranet ensure all employees are informed of the program. The transportation program is also shared at OCC’s regular chapel meetings and all-staff lunches and via email notification.

OCC partners with the GRTMA to leverage marketing and outreach materials produced by them for employers throughout the Redmond area. GRTMA also sponsors multiple regional events throughout the year, including Bike to Work day and other alternative commuting campaigns. The ETC works diligently to ensure OCC’s employees are aware of and involved in the various local, regional and state campaigns, events and activities.

Despite the presence of free and ample parking and the low level of bus service, Overlake Christian Church has created a successful model transportation benefits program. From 2001-2003, Overlake Christian Church’s program has reduced SOV travel by employees from 84% to 52%. 31% of employees participate in the program, 26% carpool, 12% utilize flextime, 8% telework, 1% use transit and 1% bike to work.

Overlake Christian Church has won numerous awards including the Diamond Award from Commuter Challenge (the local employer commute assistance program), the City of Redmond’s Commute Trip Reduction Program Award and recently the Washington State Governor’s Commute Smart Award.
Student Meetings at the Parking Garage

Simmons College is a small, nationally recognized, private university located in the Longwood/Fenway neighborhood of Boston. Surrounded by a variety of universities, cultural institutions and medical facilities, Simmons College is well served by the Massachusetts Bay Transportation Authority's (MBTA) transit and subway service, otherwise known as “the T”. Though parking is limited in the area, Simmons College attempted to stand by a “low-cost-parking-for-all-faculty-and-staff” policy.

Most of Simmons’ 740 faculty and staff prefer to drive to work, park in the Simmons owned lot and come and go at their leisure. In an effort to maintain popular parking benefits, Simmons College provided faculty and staff a parking spot on request. A year of parking cost employees a mere $200, far below the cost of utilizing transit or the nearby subway. As parking demand grew, the College recognized the need to change their parking policy. Yet, limiting parking or raising rates were not options under consideration.

In 1998, as parking demand increased, the parking situation became critical. Staff and faculty often waited in the parking garage entrance for a half hour before getting a space. Faculty began scheduling student meetings in the garage while they waited. Others used cell phones and laptops to remotely work from their vehicles. Frustration escalated and college leadership began to fear losing employees. As the situation worsened, the Director of Auxiliary Services researched similar problems and uncovered possible solutions. The research pointed to the economic reality that given a fixed supply of parking, demand could be influenced by changing price. By raising the cost of parking while simultaneously increasing the attractiveness of transit, travel behavior could be changed and the parking crises could be quelled. Yet, upper management remained opposed to increasing parking costs.

Incentives and Disincentives

In 1998 leadership at the college changed and support for a parking management program grew. The Director of Auxiliary Services met with the new Executive Management staff and demonstrated that the parking crisis could not be solved without raising rates and supporting alternative modes. The College began to slowly increase the cost to park and also introduced a 25% transit subsidy, or T-Pass. Unfortunately, these techniques did not change travel behavior. The transit subsidy appealed to existing transit users and the parking increase was not enough to discourage parking. Over the next five years the College continued to both increase parking costs and transit subsidies. Eventually they got to a price point where transit was more appealing. Today, faculty and staff are eligible for a 60% T-subsidy (up to $65.00 a month) and parking has increased from $200 a year to $1200 a year.
Program Goals:
Two main goals drive the Simmons College transportation benefits program. First, Simmons leadership is committed to reducing vehicle miles traveled. Few parking structures exist in the Longwood/Fenway neighborhood and the large medical center presence results in the need for ample patient and visitor parking. Furthermore, the City of Boston’s strict parking development requirements inhibit future growth in parking. Therefore, Simmons College and other nearby institutions have made a community commitment to each do their part in reducing vehicle miles traveled and manage parking well.

Second, Simmons College strives to be a good employer by providing a wide array of employee benefits. The transportation benefits program compliments other employee benefits and promotes the College’s commitment to employees. All new employees are introduced to the employee transportation benefits and the transportation coordinator sends out newsletters and bulletins reminding employees of their transportation options. Employees can opt for the T-subsidy at anytime.

Program Details:
Faculty and staff of Simmons College must choose between paying for a parking space or receiving the T-Pass. Simmons College provides a 60% Subsidy for all MBTA transit passes, with a limit of $65.00 a month. This provides plenty of support for most of MBTA’s pass programs and only those with commutes from New Hampshire accrue out of pocket costs. If faculty and staff opt to drive to work, they can pay $1200/year for a parking space in the faculty/staff parking garage.

All T-pass holders, carpoolers and cyclists are eligible to participate in one of two Guaranteed Ride Home programs. As part of the transportation benefits program, Simmons created their own Guaranteed Ride Home (GRH) program. The Simmons program is open to any employee in need of an emergency ride home. Additionally, due to a partnership with the local transportation organization, MASCO Commuter Works, a second GRH program is included in the benefits program. Though rarely utilized, the MASCO Commute Works GRH provides an added resource to commuters. In addition to the GRH programs, Simmons College provides 15 free-park day vouchers for T-Pass holders. Many faculty and staff take advantage of educational benefits and/or teach night classes. The vouchers allow employees to drive on those days, park and get home safely.

Additionally, as a member of the local TMA, MASCO Commute Works, Simmons College faculty, staff and students can utilize Commute Works’ shuttle system. The shuttle system features six shuttles serving the Longwood/Fenway area, Cambridge, Chestnut Hill, University of Massachusetts and other destinations. Simmons College pays 60% of the shuttle pass for staff and faculty. Two shuttles transport commuters to and from the Ruggles and JFK T-stops. These shuttles are fully supported by MASCO Commute Works and are free to all riders.

The hiring of a professional parking management company rounds out Simmons College transportation program. During the first week of classes, on graduation day and on other days throughout the school year, Simmons College experiences peak period parking issues. The parking management company manages parking during these peak periods by providing valet parking and other parking services. Additionally, the company limited parking in the parking garage to faculty and staff. The surface parking lots became student parking lots. Frequent in and out student trips are easier to manage on a surface lot. The parking management company works closely with Simmons College and neighboring institutions to minimize parking problems.

Results
Simmons College utilizes two tools to evaluate the success of their program. As the transportation coordinator works with the parking management company to track the parking demand. The ability to manage the lot and keep up with demand is a key indicator of success. To date, they have had far fewer parking problems and the demand has reduced by 20% over the last five years. The transportation coordinator also includes a few parking and transportation related question in the annual employee satisfaction survey. Negative comments regarding the T-Pass program rarely appear on the surveys, implying the program is working. The coordinator is open to feedback and constructive criticism about the T-Pass program. The transportation benefits program has significantly reduced drive-alone parkers at Simmons College. Today, 41% of faculty and staff park on campus, 27% use transit and the remainder carpool, walk or ride their bike to work. Although no one currently uses vanpool, the transportation coordinator is open to supporting any non-single occupancy vehicle mode usage with the 60% subsidy (up to $65.00 a month).
Benefits Before and After State Mandate

Swedish Medical Center, in Seattle, WA, is comprised of three separate campuses spread throughout the greater Seattle area. Swedish’s 7,000 employees and 2,000 physicians are accustomed to the irregular work shifts and on-call realities of hospital work. Despite the challenges inherent in scheduling and transportation, Swedish has supported transportation benefits since the 1980’s. Carpools with three or more Swedish staff received free parking at the Swedish campus and those with two or more received a 50% parking subsidy. Employees were also eligible for a 25% transit pass subsidy. In 1986, Swedish Hospital’s growth resulted in the need for a new building. At the time, the City of Seattle began to require all new construction and development plans whose fulfillment would result in adverse effects on traffic and mobility to include a transportation management program (TMP). The TMP included traffic and mobility mitigation plans as well as reporting requirements and schedules. In 1986, Swedish chose to focus their TMP and therefore, transportation benefits, on carpool and transit benefits. Swedish continued to provide free parking for vanpools, subsidized carpool parking and they extended the transit subsidy to 50%.

In 1991, Washington State passed the Commute Trip Reduction (CTR) law. The CTR law requires employers with more than 100 employees traveling to work during peak morning times to provide commute alternative programs. These programs must reduce the number of single-occupancy-vehicles (SOV) on the roadway during morning commute times. Thus, since 1991, Swedish has been required to develop programs that encourage employees to utilize alternative, non-SOV modes of transportation for their commutes.

Motivation and Program Details

In addition to adherence to the CTR law, Swedish views their transportation benefits program as a recruitment and retention tool. Hospitals all over the country are experiencing nursing shortages and Swedish strives to be an employer of choice. Given these motivations, Swedish worked with the local rideshare and transit organization, to develop and implement a variety of incentives and disincentives to driving alone. Through the leadership of Swedish’s Employer Transportation Coordinator (ETC), Swedish expanded the initial program to one that provides extensive transit, ferry and rail subsidies, preferential parking and vanpool subsidies.
Swedish tailors its transportation benefits for each of the three campuses and for night and day shift employees. All day and evening shift employees at each campus are eligible to receive a fully subsidized area transit and rail pass, called a Flexpass, or a Washington State Ferry pass. The Flexpass can be used on each of three adjoining county transit systems, the regional transit system, regional commuter rail and the soon-to-be-built monorail.

All employees with a Flexpass are eligible to participate in a county-sponsored vanpool program. Each of the three adjoining counties, King, Pierce and Snohomish, operates an extensive vanpool program. Swedish provides a $63.00 a month vanpool subsidy for all employees. Given that most vanpools do not exceed a cost of $63.00 a month, the vanpool subsidy is often 100% for employees. All alternative mode users who receive their Flexpass are eligible for the Guaranteed Ride Home (GRH) program that includes 16 free taxi-rides home a year. Additionally, all Swedish employees that work a 12-hour shift are eligible to participate in a unique taxi service Swedish provides. Every weekday between 6:00-7:00pm, employees with a Flexpass can take a taxi to specific park-&-ride. The taxi service is an extra bonus designed to assist employees achieve a quick and easy commute home after a long, over-time shift.

Parking

Bus service and parking availability is different at each of the three campuses. The First Hill campus features fewer parking spaces and higher levels of transit service than either the Ballard or Providence location. Thus, the First Hill campus has limited all day shift SOV parking to upper management since July 1990. SOV parking costs $70/month; carpool parking is $12.50 per person per month and vanpools park free. Both carpools and vanpools receive access to the best parking spaces at the First Hill campus. Given the need for flexibility and the on-call realities of hospital work, carpool and vanpool passengers receive four free SOV parking days a month. Night shift employees at First Hill receive free parking but are not eligible for a Flexpass. Instead, night shift employees are eligible to receive a WA State Ferry pass and/or a dollar value Puget Pass that covers their specific commute. The Puget Pass can be used on all local and regional transit but is not valid for use on the ferries.

Neither the Providence nor Ballard campuses receive high levels of bus service. Additionally, parking is more plentiful at each campus. Therefore, Swedish charges SOV’s $60 a month and carpools $12.50 per person per month to park at the Providence Campus. Parking at the Ballard campus, the smallest of the three campuses, is $30 a month for SOV parking and free for carpoolers.

Role Modeling and Marketing

When the ETC was asked to take on full-time transportation benefits and CTR reporting responsibilities, she responded by relinquishing her SOV commute. Since then, she has tried most of the commute alternatives Swedish provides and is able to use her own experience and understanding of the process of commuting via vanpool, carpool and/or transit to encourage employees to at least give it a try. To market the program, the ETC sends out a fact sheet with bus route information, parking requirements and costs, and Flexpass, carpool and vanpool benefits to each employee when they are hired. This fact sheet is delivered to the employee’s home along with two free transit passes to encourage transit usage on their first day of work. Additionally, the ETC utilizes the intranet, employee newsletters and new employee orientations to market the various program elements. Swedish’s intranet includes information about local merchant discounts for Flexpass holders, all transit, rail and ferry schedules and services, adverse weather notices, links to the regional Rideshare organization and parking pricing information.

Results

Swedish Medical Center strives to be a best workplace, recruit and retain high quality nurses, doctors and hospital staff and abide by the local and state mandates. Their efforts have resulted in the following modal splits:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Providence</th>
<th>First Hill</th>
<th>Ballard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Alone</td>
<td>50%</td>
<td>34%</td>
<td>55%</td>
</tr>
<tr>
<td>Carpool</td>
<td>19%</td>
<td>23%</td>
<td>14%</td>
</tr>
<tr>
<td>Vanpool</td>
<td>4%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>Bus/Rail</td>
<td>22%</td>
<td>32%</td>
<td>15%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>1%</td>
<td>1%</td>
<td>6%</td>
</tr>
<tr>
<td>Walk</td>
<td>3%</td>
<td>5%</td>
<td>8%</td>
</tr>
<tr>
<td>Other (flextime, compressed work week)</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>
Recruitment and Retention

Located just southwest of Houston, Texas in the Texas Medical Center, Texas Children’s Hospital (TCH) is the largest pediatric hospital in the United States. A full-care pediatric hospital, the hospital’s medical staff consists of more than 1,580 primary-care physicians, pediatric subspecialists, pediatric surgical subspecialists and dentists. In addition, Texas Children’s boasts a nursing and support staff of more than 6,000. TCH’s mission “to create a community of healthy children” is leveraged by the CEO’s commitment to assist employees balance work and home life.

Given the nursing shortage and limited supply of high quality doctors, recruiting and retaining top notch employees became difficult for TCH. Therefore, in an effort to increase TCH’s recruitment and retention, the CEO convened a focus group in 2001. Vice Presidents and Directors of various departments participated in a brainstorming session and discussed ideas on how TCH can continue to function as a “world class” facility and attract and keep top notch employees.

Brainstormed ideas included providing free uniforms to staff, offering $2,500 per year tuition subsidy, and instituting free parking, bus passes and carpool allowances. All of the ideas were implemented at the cost of $5.7 million for the first year. Highlighted among the benefits was the flexible employee transportation benefits program.

Flexibility is Key

Recognizing the changing needs and schedules of hospital employees, TCH’s upper management is committed to providing flexible employee transportation benefits. Among the many benefits Texas Children’s offers are transit subsidies, rideshare matching, vanpool subsidies, parking management programs, pre-tax benefits, bike/walk incentives, a telework program, flexible work schedules, a Guaranteed Ride Home program, and shuttle service. Most of the programs are flexible from month to month and all employees are eligible to participate. Due to the CEO’s emphasis on home and work life, he wanted to make sure the program maintained an “ease of use” with the program. Employees feel like they own the program because they can pick and chose which options are best for them at different times. For example, in the summer months, more employees use alternative transportation modes. These employees are eligible to receive transportation benefits strictly for the summer months.

Incentives for Options

Management believed the presence of a subsidy would increase participation in the transportation benefits program.

Previous to the 2001 brainstorming session, the hospital subsidized transit subsidies at less than 15%. After the brainstorming session, both the number of transportation options supported by TCH and the amount of subsidies provided increased. Management believed the presence of a subsidy would increase participation in the transportation benefits program. The table below summarizes TCH’s program options and corresponding subsidies. Subsidy ranges shown are based on employee commute distance and cover 100% of vanpool and METRO transit costs.
### Commute Option

<table>
<thead>
<tr>
<th>Commute Option</th>
<th>Subsidy Offered by TCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanpool</td>
<td>$40 - $170/ month</td>
</tr>
<tr>
<td>METRO Vouchers</td>
<td>$35 - $110/ month</td>
</tr>
<tr>
<td>Woodlands Express Pass</td>
<td>$165/ month</td>
</tr>
<tr>
<td>Remote Parking</td>
<td>100% cost (increases 10% each year. Currently $53/ contract)</td>
</tr>
<tr>
<td>Carpool Allowance</td>
<td>$20/ month</td>
</tr>
</tbody>
</table>

### “Free Rides”

While not heavily marketed, when the commute options program is advertised the messages are simple, “Free Rides” or “Manage your home and work life”. Information about the program is given to new hires during orientation along with free one-day passes from METRO. Enrollment forms and information about the programs can be found on TCH’s intranet. Additional commuter option information is published in the company newsletters and are placed on bulletin boards in general employee areas. TCH also works with Commute Solutions, the regional commute alternatives program, to help get the word out to employees. Commute Solutions offers brochures, training and a telework program to TCH employees.

TCH has been challenged by the “it’s too good to be true” employee mentality. Often, employees do not believe that these programs are free. They are looking for a catch or think this is a one time only subsidy. Once TCH management is able to clearly explain the transportation benefits program, employees are hooked.

### Make the Employees Happy

The program at TCH does not have set quantifiable goals to measure success. Success of this program is based on employee reaction. Management does not “worry” about the program unless there are negative reactions to it, which has not occurred to date. TCH management strives to ensure employees are provided with as many available commuter options and that the program remains flexible and open ended. Surveys about the TCH benefits package are performed regularly. The results of the survey are compiled and given to the Vice President of the institution on a monthly basis.

Currently, survey results show 20% of TCH employees participate in the commute options program. Of that population, approximately 10% carpool or vanpool, and 10% ride transit.

In addition to changing employee travel behavior, the employee benefits program has contributed to improving TCH’s recruitment and retention numbers. Before program implementation, the population at TCH was 3,700. After implementation, with the addition of 1.2 million square feet to the facility, an additional 1,800 persons were hired. TCH’s management praises the transportation benefits program and the other employee benefits (free uniforms, tuition) as an important recruitment and retention tool.
Area Characteristics
The City of Seattle, King County, Sound Transit, University of Washington, surrounding jurisdictions and private developers have committed to trip reduction by introducing a number of complementary programs and projects throughout the region. This case study will focus specifically on public-private partnerships that foster a complementary relationship between land use, transit, parking availability, and transportation demand. The success of transit oriented development (TOD) projects and Flexcar, the County’s car sharing program, is due in large part to the willingness of program sponsors and participants to try something different. In addition to the programs highlighted below, three other case studies within this report are from the Seattle metropolitan region, the University of U-PASS Program, the Swedish Medical Center, and Seattle Seahawks Stadium.

Program Description
King County Transit Oriented Development (TOD) Program
Developed in 1998, TOD efforts began by assessing established park-and-ride sites for development potential. Following a series of analysis efforts, a number of TOD projects have been completed, are under construction or are currently under study. Each success has led to a continued investment in infill development, affordable development and design practices that maximize the viability of alternate modes of travel besides single occupancy vehicles. Since 1999, the Program has received an annual $1 million appropriation for staffing, consulting fees, and project development. Summarized below are three completed TOD projects developed at park-and-ride lots throughout metropolitan Seattle.

The Village at Overlake Station, Redmond, WA - As the first suburban “pilot” program, the Overlake project includes 308 apartments, a daycare facility and a shared parking structure open to park-and-ride users with spaces reserved for Flexcar. As a condition, the developer was required to provide one bus pass per apartment.

Northgate North, Seattle, WA - Northgate North opened in October 2000 as a four story retail project requiring a new access road which resulted in a loss of a portion of the park-and-ride lot. As a condition, the developer was required to provide replacement parking in its parking structure. In March 2002, the County purchased additional adjacent land to provide an additional 500 parking stalls. Negotiations continue regarding the ultimate outcome of the site which is only partially developed.
Renton Transit Center, Renton, WA – The Renton site is home to 90 apartments and a new parking structure with 150 new park-and-ride stalls. The apartments have all been rented and staff research indicates one third of the tenants travel by transit.

As the TOD programs continue to grow, a number of lessons learned have emerged. Although it might be challenging to agree on terms of shared parking arrangements, it introduces a substantial benefit to the viability of the site as both a TOD and park-and-ride facility. It has also been beneficial to evaluate existing park-and-ride demand and suggest consolidations where appropriate.

Flexcar
In 1998, King County Metro, the County’s transit provider, initiated efforts to make the case for car sharing as a viable alternative to personal vehicle ownership. A number of successive events occurred leading up to the actual implementation of the program including the development of Business and Marketing Plan, the Request for Proposals to secure a vendor, and the explicit identification of roles and responsibilities among jurisdictional participants. From the onset, a number of distinguishing features were recognized as contributors to the program’s success including the expectation of rapid growth, utilizing a multi-market approach, and the presence of political support.

In January 2000, Flexcar was implemented in Capitol Hill, Seattle’s highest density neighborhood with four vehicles. According to 1990 Census data, Capitol Hill was home to 16,250 residents of which 37% did not own a personal vehicle. Within the first year, Flexcar grew to over 900 members with 19 vehicles with presence in five neighborhoods. Today, Flexcar operates more than 100 vehicles in over twenty neighborhoods. As a company, Flexcar continues to expand with operations in six metropolitan areas throughout the U.S. (Seattle, Portland, Washington D.C., Los Angeles, San Diego, and Denver). In a report summarizing the first six months of Flexcar based on 146 responses to a new member survey it was determined that the majority of the members work in a managerial or professional occupation and 79% were college graduates. 55% of members indicated that they lived in a rental property.

Like other car sharing programs, Flexcar participants pay an annual fee and select a rate plan that suits their needs. Rate plans are offered hourly or monthly and fees are incurred based on time and distance driven. In return, user costs such as vehicle maintenance, gasoline, and insurance are paid for through the rate plans. Vehicles are parked within a reasonable distance from residential and employment centers. Reservations are made by phone or on-line.

Measures of Effectiveness
As an indicator of TOD and Flexcar success, both programs have received awards and recognition as innovative strategies with a positive impact on regional travel. It’s also evident that the two programs complement each other as car sharing has been included in development plans, including some King County TOD projects.

By requiring developers to provide bus passes and making transit and light rail highly accessible to tenants, the TOD program has been able to obtain a variance in the parking requirements for new multi-family construction. Instead of requiring 2.5 parking stalls per apartment, the ratio has been dropped to 1 stall per apartment as is the case at Overlake. Since tenants are required to register their car for the site, the actual stall usage per apartment ratio was able to be measured. On average, .6 of a stall is being utilized per apartment. It’s also been inferred that a third of the tenants use transit, which is three times greater than a typical suburban multi-family apartment complex.

Currently, Flexcar program effectiveness is being analyzed by the University of Washington.
FAST FACTS ABOUT: Orenco Station - Hillsboro, OR

**Types of TDM:** Mode Choice, Location Choice  
**Keywords:** light rail, transit-oriented design, housing, zoning, community design  
**Area Demographics:** Master-planned community at Orenco Station proximate to Tri-Met Westside MAX light rail within metropolitan Portland, Oregon.  
**Program:** Transit-oriented development featuring a varied housing selection and pedestrian-friendly amenities. Free transit passes are offered to all new tenants for one year.  
**Results:** 53% increase in transit usage after Westside light rail opened. Reduced need to travel outside of immediate community for discretionary trips.  
**Contact:** www.orencostation.com

**Area Characteristics**

The developers of Orenco Station call it America’s most awarded new community. As the winner of the National Association of Homebuilders Master Planned Community of the Year (1999), there are many good reasons why. The 206-acre, transit-oriented development has many planning and design features that make it one of the most livable new communities in the U.S. Located on the Westside Light Rail line outside of Portland, Oregon, Orenco Station is a pedestrian-friendly, mixed-use development with all the fundamental features of a successful neo-traditional community including a menu of housing choices, a town center with a main street corridor, ample park and recreation amenities and a variety of transportation options including light rail.

Although the Orenco Station site was originally zoned for industrial use and later for subdivision housing, the site was ultimately designated as a “town center” in the Portland Metro Area 2040 Plan. The Plan specifies legally binding requirements for all Westside station areas, and mandates features such as minimum densities and residential density targets at varying distances from light-rail stops, mixed-use development in station areas, pedestrian oriented buildings, prohibitions on auto-oriented land uses, and reduced parking. A special zoning ordinance was customized for Orenco Station establishing design guidelines to allow for and ensure an urban mix of housing types and land uses not typically found in the suburbs.

**Demand Management by Community Design**

One of the benefits of being a transit-oriented development is the provision of transportation alternatives. The community was designed to be a “complete community”, meaning residents could work, shop, recreate and live within it, thereby reducing the need for travel outside of it. Orenco residents are located within a quarter mile radius of groceries, restaurants, and professional services.

The other defining transportation feature is the development of pedestrian pathways, and open space that all culminate at the Orenco Station stop of the Tri-Met Westside MAX light-rail line. This region-wide light rail system is one of the key features of the Portland region’s livability. Orenco residents may walk to the station and have access via light rail to downtown Portland, the Portland International Airport, Hillsboro’s high technology industrial center and other parts of the metropolitan region. The development team consciously biased towards pedestrians to encourage walking to transit and local commercial development and to encourage a more community-oriented life style.

The community was designed to be a “complete community,” meaning residents could work, shop, recreate and live within it, thereby reducing the need to travel outside of it.
generous adjacent pedestrian facilities. In addition, a new grocery store and retail kitchen store will be opening in the fall of 2003. Housing units are also located above the retail spaces.

Several design features were employed in the residential areas to reinforce the pedestrian- and community-orientation of Orenco Station. Residential streets within Orenco generally allow for parking on one side with widths held to 25 feet. To further reduce the impact of automobiles, Orenco’s site design provides alley-accessed parking, thereby eliminating front garages, curb cuts, and driveways.

The community was designed to provide a variety of housing options, all of which are made for compact development: single-family homes, townhouses, accessory units, loft units, and apartments. The single family detached units are relatively small, ranging from 1,400 to 1,700 square feet; but all units have a dedicated home-office space and features to reduce the amount of commuting in the community. Unlike more traditional subdivisions, the three- and four-unit townhouse structures are integrated with single-family detached housing. The loft units have many of the architectural features of single family homes. Apartments and lower price condominiums are also available in the development to offer more affordable options. All residential unit sales have been strong since the beginning.

At Orenco, all new tenants are provided free transit passes for one year with other tenant marketing materials. Intel and other large employers adjacent to Orenco provide transit passes through an arrangement with Tri-Met.

A special zoning ordinance was customized for Orenco Station establishing design guidelines to allow for and ensure an urban mix of housing types and land uses not typically found in the suburbs.

Measures of Effectiveness

The planning and design of Orenco have been noticed by community residents and is reflected in their attitudes and behaviors. A Pilot TOD Pass Program was implemented in September 1998 to test the effectiveness of transit pass incentives. Under the program, new tenants were provided free transit passes with other tenant marketing materials. Some key findings include:

- Whereas only 30% of respondents reported using transit prior to the Westside MAX opening, 83% reported that they used transit in May 1999 (after the opening).
- From September 1998 to May 1999, transit use for commuting purposes increased 22%.

Although the Pilot program has expired, all new residents continue to receive free 1-year passes.

According to a recent Lewis and Clark College study, transportation practices were also affected by the design and planning of the Orenco community. The study suggests:

- 70% of those surveyed shop in the Town Center at least once a week.
- 85% of respondents stated that the close proximity of neighborhood businesses and amenities has reduced the need to drive elsewhere to purchase necessities or for entertainment.
FAST FACTS ABOUT: Lee County Variable Bridge Tolls

Types of TDM: Value Pricing, Off-peak Travel Time Shift
Keywords: Value pricing, variable pricing, electronic tolling, flexible work arrangements, off-peak travel time shift, discounts, incentives
Area Demographics: Lee County, Florida (Cape Coral and Fort Myers); 400,000 residents
Program: 50 cent discounts on tolls for use of off-peak travel times on two principal bridges accompanied action to raise overall bridge tolls to $1 (from 75 cents)
Cost of Program: $9.7 million grant awarded by Federal Highway Administration for technology installation, demonstration, implementation, and evaluation; additional $7.0 million set aside as "emergency revenue reserve"
Implementer: Lee County Public Works
Results: 5% shift from peak to off-peak travel
Contact: Chris Swenson, CRSPE, Inc., crs@crspe.com

Providing Choice in Tolling

Lee County, Florida, is a pioneer in using variable tolls as a way to manage congestion, provide traveler choice, and spread traffic away from the peak period. The principle behind this objective is that commuters will make rational choices if those decisions are based on balanced cost incentives. The Leeway project provides another measure of choice – price choice – to the mix of Transportation Demand Management (TDM) strategies.

Background

Lee County is located in southwest Florida. Approximately half a million people live in the metropolitan area comprised of Ft. Myers and Cape Coral, with an additional 1.7 million tourists visiting per year. The Caloosahatchee River separates these two cities, and the County provides only three bridge crossings. Two of these crossings, the Cape Coral Bridge and the Midpoint Bridge, are the most relevant to commuter traffic, and were the focus of the Variable Pricing Program.

A toll of $1.00 was levied on both bridges in 1997. In order to convince the public to accept the higher $1.00 toll, over a previous $0.75 toll, Lee County Commissioners endorsed an innovative concept of varying the level of the toll based upon the time of day. In the “shoulders of the peak period” (6:30 – 7:00 am, 9:00 – 11:00 am, 2:00 – 4:00 pm, and 6:30 – 7:00 pm), patrons received a 50 percent discount on the toll if they utilize the bridge’s electronic toll collection (ETC) system. Due to a popular “frequent user” program, this discount varies in value from either $0.25 to $0.50 each trip.

The objectives of the variable pricing program were to provide travelers with:
• an incentive to shift from peak periods
• an opportunity to lower out-of-pocket costs
• a reason to use ETC (which provides for better traffic management at toll plazas)

Challenges

There are a variety of challenges involved with the variable pricing program. The two principal concerns were:
• marketing the benefits of variable pricing in an area with relatively low levels of congestion, and,
• ensuring sufficient funds are generated to repay bonds and cover operating/maintenance costs
Lee County does not experience significant levels of congestion. In fact, most of the main arterials and highways operate at free-flow even in the peak hour. The challenge to Lee County officials was how to market the new off-peak travel discounts, when shifting travel was not likely to significantly short the likely travel time. Lee County responded to this challenge by marketing the convenience of electronic tolling and the cost savings provided by using off-peak periods. A variety of media was used to market the service, with multiple points of presence throughout the County. Media coverage of the concept also was high, since there is appeal in the innovation of variable pricing. Within a year, the project had over 40 articles in print media and 150 news stories in televised media.

In addition to convincing travelers to use the program, Lee County also needed to convince employers to offer employees flexible scheduling and variable work hours. Without the ability to shift the commuter’s travel time, the off-peak discount program would not be successful. In order to accomplish this, the County conducted outreach to medium and large size businesses in Ft. Myers (the principal employment node).

The issue of ensuring sufficient funds was critical to implementing the program. In 1996, Lee County applied for, and received, a grant from the Federal Highway Administration’s Value Pricing Pilot Program. The $20 Million grant provided a $7 Million set-aside to compensate for lost tolls under the variable pricing program. The set-aside was necessary to alleviate concerns about the potential loss of revenue.

**Results**

The variable pricing program has been successful in meeting the program’s objectives. Approximately 7 percent of all eligible participants indicate the variable pricing program causes them to alter their tripmaking behavior. According to a telephone survey of eligible drivers in late 1999, half of respondents indicated they always or sometimes considered the discounts prior to making a trip across the bridges. Finally, the variable pricing program is well known in Lee County, with over 90 percent of travelers familiar with the program. Altogether, these show that travelers are aware of and consider the option provided to them from the variable pricing program.

In three years of the implemented project, as reported by Mark Burris at the Center for Urban Transportation Research (“Lee County Variable Pricing Project: Evaluation Report”, January 2001), use of the bridges increased in the off-peak times and decreased during the peak periods. Traffic data near the bridges indicate that variable pricing had caused no measurable change in vehicle speeds, queue lengths at toll plazas, average vehicle occupancy, transit ridership, or accidents.

Over time, more and more travelers have utilized the electronic toll collection technologies, reducing the average cost per transaction. Lowered transaction costs on the bridges have partially offset the loss of revenue from the toll discount, as has the natural increase in daily traffic. It should be noted that the program continues to this day (September 2003), well after the expiration of the Federally funded toll revenue guarantee.

Evidence for this case study has been provided by numerous evaluation reports conducted by Mark Burris (Center for Urban Transportation Research) and Chris Swenson (CRSPE, Inc.).
Background Information

The CommuterLink system design was based on Navigator, the Georgia Department of Transportation’s Intelligent Transportation System, which was used for the 1996 Summer Olympics in Atlanta. With a deadline to have the system operational by the 2002 Salt Lake City Winter Olympics, UDOT staff felt it was better to go with an older model that had been tested than to trouble shoot newer technology and deliver less than adequate service to travelers during the Olympics. UDOT employees customized Georgia’s software to address their needs and added the feature that automatically disseminates alerts via email.

Advanced Traveler Information System Issues

**Timing**- Traffic reports on commercial radio stations are provided at specified intervals of time. Most often, traffic reports are not broadcast more frequently than every 10 minutes during peak rush hour. If an incident is reported one minute after the last traffic report is given on that station, it will be 9 minutes before commuters hear about it in the next report. That interval of time is often when commuters initiate their trip and make their decisions on which routes to take. Thousands of commuters may have made different travel choices had they heard the information. Instead they are choosing a route that will take them to and contribute to worsening delays at the incident. Receiving the traffic report as soon as the incident is reported gives commuters more opportunity to avoid it and lessen impacts of it.

**Simplicity**- Radio stations often have to cater to their regional audience, and therefore provide traffic reports on all of the roads in the region. This is often rushed and confusing to listen to. If for some reason you were distracted when they said something about your route, it will be ten minutes before you can hear it again.

Solutions

UDOT recognized that in order to effectively manage traffic it is as important to allow travelers to manage their own demand. This can be done by providing travelers with information when and where they need it. UDOT in partnership with numerous other organizations developed CommuterLink as a centralized system to manage travel in the region.

Description of CommuterLink Website

In addition to traffic monitoring and incident detection, CommuterLink also provides a user friendly format to relay the information detected and monitored to the traveling public. This is done through the CommuterLink Website. The CommuterLink Website (CLW) is operated by UDOT, on computer servers located at the TOC. CLW provides a map of the freeway system and the major surface streets, where most of the surveillance equipment is installed. CLW offers three primary types of information to the traveler:

1. Traffic conditions (speeds, incidents)
2. Roadway closures and construction
3. Weather (including pavement conditions)
Traffic information is presented in a number of ways. To display congestion conditions, the speed on each freeway segment (about one-half mile long) is shown as color-coded band (red = 0-30 mph, yellow = 31-50 mph, and green = 51 mph and above). Incidents are denoted with a red triangle; if the user clicks on that symbol, further information about that incident is displayed on a small portion of the screen, in the lower left corner. Visitors to CLW can also view video footage of real-time traffic conditions by clicking on the cameras located on the map.

Roadway construction and closures are displayed as a color-coded triangle, near the location involved. Yellow triangles denote current construction and/or closures; blue triangles identify future construction or closures.

Weather conditions are displayed as a cloud near the roadway where road conditions are provided.

Alert System
The CLW also enables individual users to subscribe to an “Alert” system, which automatically sends an email message in the event of an incident that falls within user-specified parameters (time of day, day of week, severity of incident). CommuterLink provides information only about the routes with a traffic impact level that concerns the subscriber at a time when it concerns them. The criteria for which an individual can subscribe can be seen at right.

When an “Alert Subscriber” presses the “Create Profile” button they are added to the CommuterLink database. Every half hour subscribers who checked that “Notification Timeframe” box are activated. Within that half hour, CommuterLink captures information about travel speed on regional roadways every 20 seconds. If travel speed on any of those roadways indicates an incident, CommuterLink sends an email is sent to the subscriber. A sample message would be, “Crash I-15 at 1500N SPGVL on right shld.”

A variation on receiving this information is an email account allows users to receive this information on their cell phone or pager using text messaging. This provides them with the information they need, when they need it, wherever they may be.

By receiving emails at work before they leave to get in their car, commuters can make a decision to delay their departure until incident is cleared or plan an alternative route to avoid the incident. In either case the traveler is not adding to the problem created by the incident and able to use their time more productively. Similarly, by having the information sent to their pager or cell phone, commuters can receive information about an incident before they leave the office or while they are on the road. If they receive it early enough they can receive the same benefits listed above.

Quick Facts*

- CommuterLink initiated email subscriptions in late 2000.
- In March 2004, CommuterLink had 6,652 commuters subscribing for traffic incident information to be sent to their email account.
- CommuterLink had 121,117 visitor sessions during March of 2004. Averaging 3,907 sessions per day.
- 83% of the sessions occur during the week with Monday and Wednesday being the busiest days
- CommuterLink receives its most visitor sessions between 7:00 am and 6:00 pm. Peak usage is between at 4:00 pm and 5:00 pm for commuters to plan their trip home.

*Detailed usage statistics for the CommuterLink Website are maintained by the website host (UDOT), using the “Webtrends” tracking software package. All usage data reported in this section are based upon the information reported by that system.
Transportation Reform Demonstration Project:
Creating jobs and economic development in Michigan by removing barriers to coordinated federal, state and local public transportation investment and management
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PURPOSE

The purpose of this document is to provide an overview of the state of the practice for transportation demand management (TDM). This document will be incorporated into project reports identifying framework strategies for TDM for the communities of Grand Rapids, Washtenaw County, and the greater Detroit region.

These communities have chosen to investigate TDM strategies under the Michigan Sustainable Communities Smart Growth America Support Project. Strategies will build from existing conditions to pursue (or set) national best practices for transportation demand management for the region while serving as a statewide and national model for other communities.

This document will be used in the first stage of the planning process as an assessment tool for helping to determine a strategic focus for each community. Community representatives and the consultants will use this document as a framework for assessing where each community’s transportation system is strong and what elements hold the greatest potential for improvement.

TRANSPORTATION DEMAND MANAGEMENT OVERVIEW

Despite common perception, few places have a consistent traffic problem – they have a rush hour problem. The nearly universal hours of the traditional workday means that legions of workers, students, and visitors hit the streets at the same time – generally between 7:30am and 9:30am in the morning and 4:30pm and 6:30pm in the evening. This means that streets and highways are congested and challenged to operate efficiently during these select hours of the day, but generally have abundant capacity during all other days and times.

Transportation Demand Management (TDM) seeks to do two things – 1) promote more efficient modes of travel to move more people in the same amount of roadway space (Figure 1) and 2) spread the travel demand across more hours of the day to take advantage of space and capacity when it’s available (Figure 2).
TDM is a general term for strategies that increase overall system efficiency, most often by encouraging a shift from single-occupant vehicle (SOV) trips to non-SOV modes, or shifting trips out of peak periods. TDM seeks to reduce auto trips – and hopefully vehicle miles traveled – by increasing travel options, by providing incentives and information to encourage and help individuals modify their travel behavior, or by reducing the physical need to travel through transportation-efficient land uses. The cumulative impact of a comprehensive set of TDM strategies can have a significant benefit on system efficiency, accommodation of new growth, and success of a metropolitan area. TDM programs are usually implemented by public agencies, employers, or via public private partnerships.

**LEADING PRACTICES**

TDM is a common term today. Most places associate it with measures such as transit benefits, carpool matching, and telecommuting. All are very important measures, though still often only lightly used, but the leaders in transportation demand management go much farther in adopting comprehensive and ambitious strategies. Leading practices include:

- Integrated TDM programs across multiple employers and institutions closely coordinated with the municipality and transit authorities;
- Strong regional leadership and coordination of transportation demand management strategies, often including mode split targets with regular measurement and reporting of performance and progress;
- Pricing and incentives to influence mode choice and travel demand;
- Adoption of public policies that imbed transportation demand management (and predictability) into the land development process; and
- Broad and effective public outreach and promotion programs that not only improve the public’s awareness of alternative modes, but actively assist them in their day to day travel planning and choices.

**Integrated Transportation Demand Management**

Standard transportation demand management practice is often employer-based, and these programs can be highly effective. More effective, however, is the integration and coordination of TDM strategies across multiple employers in an area. Coordination avoids the “tragedy of the commons” where one employer bears the burden of reducing employee auto trips while a competitor’s employees get a “free ride” even while the net effect on the system diminished. The...
integration of TDM measures such as employee shuttles not only has cost efficiencies for all participants, but makes a more efficient system overall for employees, roadway networks, transit providers, and the general public as a whole.

Often this integration and coordination occurs through a voluntary member-based and controlled Transportation Management Association (TMA). TMAs work in close collaboration with local authorities, but are frequently privately funded and operated. Model TMAs allow the participation of large and small employers alike to enable even small employers to provide comparable travel services to their employees. Pooling resources dramatically improves the economic efficiency of all

**Mayo Management in Rochester, MN**

The Mayo Clinic in Rochester, Minnesota is the largest integrated medical center in the world and a flagship presence in the city. In 2010, the city of Rochester adopted a comprehensive mobility plan that included aggressive mode split goals for 2030. Recognizing the value they had in the city, and the value the city goals held for them, the Mayo Clinic has partnered with the city to establish a transportation management association to implement a host of programs including expanded TDM offerings at the clinic and an extensive commuter bus system from outlying areas. The city and institution continue to collaborate on a bicycle master plan and bike share feasibility study.

and the trip reduction effectiveness of TDM measures.

**Leadership and Performance Measurement**

Highly successful TDM programs often have at their root a strong champion and leader. Some regions have dynamic political leaders who eloquently make the case for collective action in managing travel demand. In other places, a major institution leads by example, encouraging other area employers or generators to join in the effort.

Equally important to leadership, is defining a measurable goal and regularly evaluating progress toward it. We achieve what we measure, goes the old adage. Today’s leading regions set mode split targets, define strategies and policies to achieve them, establish appropriate measures for performance, and standardize data collection and reporting schedules and responsibilities.

**Santa Monica’s “No Net New Trips”**

For decades, Santa Monica politics had been dominated by growth opponents who used traffic fear as their primary tool for stopping development. The city’s award-winning 2011 Land Use and Circulation Element update, however, commits to no net increase in vehicle trips, by locating new growth with transit, establishing new neighborhood retail centers, imposing a multimodal transportation impact fee, and enacting robust Transportation Demand Management requirements. To implement the plan, the city is writing new (and updating existing) ordinances, and investing in multimodal transportation options. Santa Monica’s General Plan is the first plan in the State of California to significantly exceed statewide Greenhouse Gas reduction targets.
Pricing and Incentives

According to the Encyclopedia Britannica, “So long as they are not artificially controlled, prices provide an economic mechanism by which goods and services are distributed among the large number of people desiring them.” Similarly, incentives or benefits are a means by which to compensate travelers for the inconvenience inherent in certain modes of travel. In transportation demand management, these two mechanisms most often materialize in parking rates, road tolls, and transit programs.

![Figure 3, Effects of Parking Cash-Out on Parking Demand](image)


Parking Pricing and Management

Parking management has a direct and profound impact on automobile travel demand. If parking is free, convenient, and abundant there is little incentive to travel via any other mode. But parking is never free. Parking has a substantial cost to employers and property owners in its construction, maintenance, operation, and opportunity cost (land that could be put to other revenue or value-producing use but which instead is held as surface parking). These costs are often hidden to employees and travelers or dramatically subsidized as a “loss leader” or “the cost of doing business”, but are still paid by all in higher rents and passed on to all customers. Making parking costs transparent to travelers helps better inform their commute decisions and balance the costs and benefits of alternative modes.

Leading practices include market-rate or cost-recovery parking pricing, unbundling parking from tenant leases or purchases, separate value accounting for employee benefits, and other practices.
Alternate Mode Incentives

Driving is fast, comfortable, convenient, and typically relatively cheap even when true parking costs are included. Alternative modes do often have penalties to the traveler in terms of time, comfort, and cost. However, encouraging the use of non-auto modes has broad benefits to regional economies and stakeholder employers and institutions in the form of greater transportation system reliability, resiliency, and capacity for additional growth.

Typically most effective are direct incentives or benefits such as employee transit or bicycle benefits or parking cash out programs.

FlexPasses in Seattle

King County Metro offers an annual universal transit pass program called FlexPass, available only for purchase by employers. Participating employers must purchase a FlexPass for all regular, full-time employees. The pass provides unlimited transit rides on King County Metro buses, Sound Transit regional express buses, and Sounder commuter rail, as well as a portion of vanpool costs and the guaranteed ride home program.

Development Practices and Processes

Every place changes and develops over time. While it is important for today’s employers and institutions to adopt demand management strategies, some of the most dramatic and effective programs have been those that anticipated the potential cumulative impact of growth thirty years out and established expectations and requirements for development in the present, even prior to a clear evidence of need. Establishing clear, consistent, and predictable policies provides a good framework to ensure equitable review and approval of diverse developments, whether they occur next year or next decade, and reduce the ultimate cost and consequences of traffic for a more sustainable future.

The best examples have adopted comprehensive public policies and established development review processes that require transportation demand management for all major developments that include bold strategies like maximum parking allowances and proffered bicycle infrastructure elsewhere in the network.

Four decades of TDM in Arlington County, VA

In 1972, Wilson Boulevard in Arlington County, VA was not much to look at. Cars were king. Parking ramp billboards marketed the area as “Parkington”. But with premium transit coming to the corridor, county leaders envisioned a different future where vibrant high density growth concentrated at the transit stations while the traditional neighborhoods were protected and thrived off it just beyond. Development codes were adopted requiring projects to mitigate their traffic impacts, promote alternative modes, and invest in establishing a multimodal system for the area. Today, more than thirty years later, the corridor produces 33% of the county’s tax base on just 8% of its land while Wilson Boulevard – that critical car corridor – has seen just 5% more in traffic volumes.
Information for Trip Planning and Decision-Making

One of the largest obstacles to efficient travel management is the lack of information. Many commuters simply do not know the range of travel options available to them, their cost, how to use them, or when they are available. Uncertainty is a tremendous deterrent.

Getting information out broadly is a major challenge and can require substantial cost, but it can also bring about the largest return on investment. Advertisements and promotional campaigns, such as carpool days, commute challenge weeks, or rideshare months can encourage commuters to try different modes once or twice, which is sometimes all it takes to change behavior.

Technology has been an enormous boon in encouraging and enabling management of travel demand. Travelers now have available to them an array of trip time and cost calculators – many of which include environmental or social cost calculations in them as well. These convenient tools allow travelers to determine the right mode of travel for them on that particular day according to their particular needs. Leading practices integrate information across a variety of modes and systems including taxi, transit, bicycle, and driving. Emerging tools include dynamic ridesharing and other social media connections. This is a resource sure to continue to expand in breadth and effectiveness.

Figure 4  Chicago’s Trip Planning App

Travel options in your hand

Smart phones and open source data has revolutionized travel. There is an app for nearly everything. One challenge, however, is that every system seems to have its own site forcing a traveler to consult multiple sources in order to plan their trip most efficiently.

In November 2012, the Regional Transportation Authority of Chicago released “goroo” a full website and app that combines the information of multiple transit providers in addition to weather and traffic information for walkers, bicyclists and auto commuters to make better decisions about the comfort and efficiency of their trip and options for connecting to, or substituting, transit services, a leisurely stroll or, soon, a transfer on one of the city’s shared bikes.

Beyond real time schedule information, the mobile site includes walking and bicycling information, updates on delays or detours, and information on major area attractions.

Source: RTA – www.goroo.com
TOOLS AND TECHNIQUES

In addition to these broad approaches, there are also a wide range of specific and effective tools utilized in successful TDM programs. Tools fall into three major categories:

- Expanded transportation options, which can include improvements to cycling and walking options as well as transit and ridesharing strategies;
- Incentives to use alternative modes, which includes commuter benefits for transit use and flexible scheduling; and
- Parking management, which includes a host of parking incentives and disincentives.

Expanded Transportation Options

Enhanced Bicycle and Pedestrian Facilities

Although responsibility and authority for developing broad bicycle and pedestrian networks generally falls to the municipality, individual employers or institutions can make a significant difference by providing bicycle and pedestrian connections and accommodations on their own campus or site. Simply making it safe and possible (and preferably attractive) to get from the general transportation network to and into the facility can dramatically improve use of non-motorized commute modes. Accommodations include pedestrian-oriented entrances, good sidewalks and lighting, attractive landscaping or art, seating, bicycle accommodation in parking ramps, secure bicycle storage, and employee shower and changing facilities. Many large employers, campuses, business districts, and municipalities are establishing bike-share programs to further enhance and enable this mode of travel.

Pass Programs

Some employers directly cover employee transportation costs (up to a certain level) providing compensation in addition to wages. Employer subsidies for transit, bicycling, and vanpools up to the federally allowed monthly limit are considered qualified transportation benefits under federal tax law and may be excluded from an employee’s wages.1 Consequently, neither the employer nor the employee is taxed on the benefit. Direct employer subsidies are generally greatly valued by employees and significantly impact their travel decisions.

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1 For further details about qualified transportation benefits, see the current IRS Publication 15-B.
Vanpools

Vanpools serve longer-distance commutes along corridors with very limited or no existing transit service. They consist of a group of five to 15 commuters who rideshare to and from work in vans leased from an outside operator who owns and maintains the vehicles and provides insurance and other support. In some cases, vans can be provided by an employer or can be owned by an individual. One of the vanpool participants serves as the primary driver and another as a backup driver. (Volunteer drivers usually ride free in exchange for their additional driving and coordination responsibilities.) The cost for participants depends on the size of the van, the length of the commute trip, the number of participants, and the availability of employer or government subsidies. Average costs are approximately $100 per month per person.

Carpool

Although carpools are typically formed voluntarily, institutions, employers, developers and property owners can encourage and accommodate them through the establishment and reservation of preferred parking spaces and free or reduced parking costs for designated and registered carpools.
Rideshare and Ride Matching

One of the greatest impediments to carpool and vanpool formation can be finding suitable partners with similar work schedules, origins, and destinations. Facilitated rideshare matching can overcome this obstacle by enabling commuters who are interested in ridesharing to enter their travel preferences into a database and receive a list of potential rideshare partners. The success of these programs is largely determined by the number of participants and, in turn, the number of potential matches that can be made. Rideshare programs may be administered through individual employers, but are often most effective when coordinated through a transportation management association or other larger scale program.

Car-Sharing

Shared vehicle programs are gaining wider and wider application across the country. Shared vehicles can be provided through a separate (typically private) car-sharing company or by the employer or property owner who owns, maintains, and manages the vehicle. Car-sharing enables employees to commute via a non-auto mode but still access an automobile for necessary daytime trips such as meetings or personal errands or appointments.

Shuttles

Some employers provide, or contract with transit providers to operate, direct shuttles to and from employment sites and transit or parking facilities. Employer shuttles pick up employees at a parking lot, regional bus stop, or commuter rail station, and drive them to their workplace. Some employers also operate daytime shuttles, allowing employees to leave their jobsite for lunch or running errands, making it unnecessary for them to drive. Shuttles can be operated by a local transit system, an employer, a municipality, a nonprofit, or a partnership of a combination of these entities.

Incentives and Supportive Policies

Travel Subsidies or Benefits

Direct subsidies may include the provision of free or subsidized transit passes, vanpool vehicles or fares, and/or shuttle services to reduce the rider’s cost of these high-capacity modes and create cost-competitive alternatives that make SOV commutes seem more expensive by comparison.

Federal code allows pre-tax benefit for employees. Employers can further promote the allowance by establishing systems to allow employees to withdraw money from their paychecks before taxes are deducted for use toward the purchase of transit passes.

Guaranteed Ride Home

This employer- or association-provided benefit allows for a set amount of free taxi rides or use of car-share vehicles for unplanned trips home that cannot be accommodated by the employee’s normal commute mode (e.g., working late past last scheduled bus, carpool passenger with sick child at school). Statistics on such programs indicate that although they tend to have relatively low employee utilization rates, they have very high satisfaction rates from participants providing a high benefit for a low cost to employers.

Flexible Scheduling
This strategy allows employees to reduce their number of weekly commute trips and shift work trips to nonpeak hour times of day. Examples include:

- Telecommuting – Allowing employees to work from home or a non-office location one or more days a week;
- Compressed Workweek – Enabling employees to compress regularly scheduled hours into fewer work days per week; and
- Flexible Schedule – Allowing employees to offset work hours from the typical 9-5 standard and shift commute travel to offpeak hours.

**Employer Assisted Housing and/or Live Near Your Work Programs**

Walking is the most affordable, reliable, and efficient mode of transportation, however it is many ways the most limited as well. Most people cannot reasonably walk farther than a mile from home to workplace, but for those who can and do they generally report lower levels of stress, higher levels of work and life satisfaction, and greater productivity in both.

Employers across the county, and particularly those in highly competitive markets or industries, are beginning to implement employee housing assistance programs. Such programs typically take the form of down-payment or first time homeowner assistance, but increasingly there are examples of developments using live near your work as a component of a larger traffic mitigation program.

The leading talent in today’s increasingly mobile workforce is often times choosing where they want to live before they are choosing where they want to work and then looking at employment opportunities nearby or tele-working options worldwide. Savvy employers see the benefits of investing in attractive, livable communities adjacent to their worksites as a means of attracting, and retaining the top talent for the next generation of innovation.

Not all Live Near Work programs involve housing subsidies. Some are as simple as real estate marketing of the nearby community. Staff that can walk to work can save upwards of $10,000 on average in annual transportation costs – the equivalent of a sizable wage bonus to employees at no cost to employers.

**Parking Management**

Parking management is a general term for strategies that encourage more efficient use of existing parking facilities, reduce parking demand, and shift travel to non-SOV modes. The supply of free or inexpensive parking at the final destination is a key decision factor cited for choosing to drive a personal auto rather than taking a bus, bike, walk, or carpool. Parking demand that exceeds supply

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**John Hopkins neighbors in Baltimore**

Since 1997, John Hopkins University has helped more than 300 employees purchase homes in the neighborhoods surrounding their campus. Through a partnership with Baltimore City and the State of Maryland, and partially funded by the Rouse Company Foundation, the program provides up to $17,000 in down payment and settlement costs for first-time home buyers. The program has resulted in much improved safety and livability in the target neighborhoods, strong relationships with the city and civic leadership, and improved overall retention for the institution.
results in the common phenomenon of “circling”—cars going round and round the local area searching for limited parking, leading to more congestion and delay. Therefore, parking management is integral to any transportation demand management program.

- Variable Market Rate On-Street Pricing – Setting parking rates that fluctuate with demand helps optimize parking availability, free spaces for short-term users, and reduce search traffic. As a general rule, on-street spaces should be priced according to demand while off-street spaces should be priced to recover construction, operating, and maintenance costs.

- Unbundling Parking Costs – Requiring that parking spaces be leased or sold separately (“unbundled”) from the rent or sale price gives a financial incentive inducing individuals to drive less or own fewer cars, or encouraging companies to increase transit commute rates among their employees.

- Parking Tax – Parking taxes can be assessed and designed to target specific types of parking behavior, such as taxing peak-hour, commuter, or early-bird parking.

- Parking Cash-Out – An employer based strategy that allows the employer to charge employees for parking while giving employees a bonus or pay increase to offset the cost of parking. Employees may use this increase to pay for parking or may choose an alternative mode and “pocket” the difference.

- Shared Parking/ Park Once is a strategy that seeks to shift parking demand into shared, public facilities rather than a proliferation of dedicated, accessory lots — reducing the volume of parking and local vehicle trips as well as the number of curb cuts on local sidewalks.

- Electronic Parking Guidance Systems direct motorists from the main access roads of a defined geographic area to parking facilities with available spaces. The number of spaces currently available in a specific car park or as a total number for a defined area is shown on variable information signs, and may also be presented via phone, the Internet, or in-vehicle navigation systems.

- Parking maximums impose limits on the number of parking spaces that the municipality will allow to be provided at new developments through off-street parking requirements, and can help encourage transit use and other alternatives to single-occupant automobile use.

- Park-and-ride lots can intercept traffic outside of highly congested areas and transfer them to transit or carpools for the final leg of the journey.

- Parking enforcement and education can help manage the on-street supply and free spaces for short-term parkers.

- Parking permit reform: allowing employees to purchase individual days of parking on a pro-rated basis comparable to monthly rates.

- Priority program such as providing a few free days of parking each month for employees who usually commute using a non-SOV mode; and/or offering lower parking rates to carpools and vanpools.
ORGANIZATIONAL STRUCTURES

As a region makes decisions about types of strategies to implement to manage transportation demand, a structure for carrying out the strategies is equally important to discuss. In some regions, a public or private entity takes the lead and manages implementation; in many, a public-private partnership is set up to access the advantages of each.

Transportation Management Organizations\Associations

TDM measures can be implemented on an employer-by-employer scale, but regional impacts are most easily achieved when multiple entities work together. Transportation Management Organizations or Associations (TMO\TMA) have been proliferating around the country for the past decade and are especially adept at implementing TDM due to their broad-reaching memberships and flexible funding.

TMO/TMAs are typically nonprofit organizations and, as such, are eligible for government funds inaccessible to private organizations. By pooling resources, individual stakeholders can leverage resources further, do more marketing and advertising and reach a wider range of individuals.
Challenges can arise in coordination with government agencies and addressing unmet needs of area residents or individuals not represented on the TMO/TMA.

**Private Entity**

A private employer along a corridor or in an area can lead TDM efforts, often with some of the advantages of a TMO. Private entities have maximum flexibility in implementing different strategies and often demand a high return on their investments, sometimes leading to a more successful program. As strategies take shape over the long term, however, private entities may not maintain interest or obligation to continue participating, especially if the return on the investment is not high enough. Also, the needs of all affected individuals may not be served by one private entity as the leader for TDM. Finally, private entities are typically not eligible for local, state, or federal funding that can sometimes offset costs.

**Public Agency**

Public agencies can also take the lead in implementing TDM measures. In many regions, these include regional or metropolitan transit districts or authorities, local planning or transportation departments, or metropolitan planning organizations. Public agencies by nature have a broader mission to address regional unmet needs, typically have greater access to federal and state funding, and can best coordinate with other governmental programs or organizations, such as transit systems. Despite these advantages, public agencies may not be able to access as much private funding and often have more constraints than a private entity might in implementing different measures.

**FUNDING AND PARTNERSHIPS**

Funding transportation demand management initiatives can be enhanced through partnerships and especially by the creation of a TMO. While businesses themselves can offer employee transportation benefits and in some cases take advantage of federal tax incentives, TMOs have much greater flexibility with raising funding and accessing additional funding streams. These can include:

- District assessment/tax - Assessments levied through a TMO or other type of business improvement district can help fund TDM programs and are often the largest source of income for these entities.

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**Lloyd TMA – Portland, OR**

Participating Lloyd Transportation Management Association businesses pay no dues. Instead the association is funded through three sources:

- A Business Improvement District that is a "fee/assessment" on property owners. The BID then provides membership to all businesses located in buildings paying the assessment. The BID generates 40% of the TMA’s budget.
- Parking meter revenue which supplements the BID and is targeted toward programs that serve business and employee needs. This accounts for roughly one-third of the budget.
- Commissions on the sales of transit passes. The TMA receives 3% on all transit passes sold to businesses through the TMA and/or its Transportation Store. In 2005, the TMA sold over $1.2 million in transit passes, and therefore received about $36,000 in commissions (comprising the balance of the TMA budget).
Parking revenue - Parking revenue can be used on an individual employer level but also on a larger scale, especially if the organization is allowed to collect revenue from parking meters.

Direct employer contributions - Direct contributions to services is the most common type of funding, especially for smaller-scale or early-phase efforts. Contributions can be assessed based on a formula or collected as part of dues for a TMO.

Local government contributions - For special projects, local governments sometimes supply grants or potentially state or federal funding for certain types of initiatives, such as directly-operated transit. Typically, governmental contributions are not allocated on an ongoing basis.

EDUCATION AND OUTREACH

Social marketing and incentive programs are proving increasingly popular and effective at promoting non-SOV travel. Social marketing seeks to influence individuals’ behavior to achieve a broad social good (in the case of TDM, reducing drive alone trips). Awareness and educational programs, workshops, and community outreach efforts may take the form of promotional campaigns similar to product advertising.

Incentive programs build on this marketing effort to frame non-motorized, transit, and high-occupancy travel as a social norm, by offering prizes or cash rewards to residents who use non-SOV modes. In Seattle, Metro’s bi-annual Wheel Options campaign gives commuters a chance to register and win a sweeping variety of prizes for getting to work any way other than driving alone. The county’s In Motion programs extend this opportunity to residents in general.

Figure 6  Seattle Metro TDM Advertisement

Employers can easily provide information about commute options in employee lunch and break rooms as well as via intranet sites, periodic emails, and employee newsletters. Employers and TDM entities can also hold events to promote use of alternatives to driving alone (e.g., transportation fairs, bike to work day, contests, etc.).

Another strategy is to have an employee transportation coordinator. This is an individual whose responsibilities are to find transportation options and develop transportation programs for employees. Few employers offer an on-site coordinator, a practice which is common typically at
only the very largest of employers. This service is also commonly provided through a TMA or government entity or agency.

**PERFORMANCE MEASUREMENT**

No matter what type of strategy an area decides to implement, keeping tracking of its effect on the region is critical to maintaining participant momentum and supporting funding. For some measures, such as transit service, tracking the number of passengers supplies an acceptable metric to measure success. However, the primary goal of TDM measures is to reduce single-occupant vehicle travel in an area. Therefore, measuring the trip reduction impact is a more telling method for gauging success. The below table displays the estimated effects of each type of strategy and combination of strategies.

**Figure 7  Impact of Selected Employer-Based TDM Strategies**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Details</th>
<th>Employee Vehicle Trip Reduction Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Charges</td>
<td>Previously Free Parking</td>
<td>20%-30%</td>
</tr>
<tr>
<td>Information Alone</td>
<td>Information on Available SOV Alternatives</td>
<td>1.4%</td>
</tr>
<tr>
<td>Services Alone</td>
<td>Ridematching, Shuttles, Guaranteed Ride Home</td>
<td>8.5%</td>
</tr>
<tr>
<td>Monetary Incentives Alone</td>
<td>Subsidies for carpool, vanpool, transit</td>
<td>8-18%</td>
</tr>
<tr>
<td>Services + Monetary Incentives</td>
<td>Example: Transit vouchers and Guaranteed Ride Home</td>
<td>24.5%</td>
</tr>
<tr>
<td>Cash Out</td>
<td>Cash benefit offered in lieu of accepting free parking</td>
<td>17%</td>
</tr>
</tbody>
</table>

1 Based on research conducted by Washington State Department of Transportation.
2 Schreffler, Eric. “TDM Without the Tedium,” Presentation to the Northern California Chapter of the Association for Commuter Transportation, March 20, 1996.
3 Ibid
4 Washington State Department of Transportation
5 Schreffler (1996)

**LEARNING FROM THE LEADERS**

By far, the best transportation plan is a good land use plan where employment, amenities and education are easily accessible and attractively designed and located. While most communities still struggle with the seamless union of land use and transportation planning, design and development, transportation management strategies can help communities and stakeholders more efficiently use the systems and resources they have and ensure they have space and services for continued growth.

Which tools or approaches work in a particular locale depends on transportation resources, community cultures, and stakeholder commitment.
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TRANSPORTATION DEMAND MANAGEMENT for CANADIAN COMMUNITIES

A GUIDE TO UNDERSTANDING, PLANNING AND DELIVERING TDM PROGRAMS
Transportation Demand Management for Canadian Communities:
A Guide to Understanding, Planning and Delivering TDM Programs

Prepared for
Transport Canada
by
Noxon Associates Limited

March 2011
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About this guide

TRANSPORTATION DEMAND MANAGEMENT (TDM) is one of the approaches that Canadian municipalities and regional transportation authorities are using to create cleaner, more efficient and reliable transportation systems.

Over the last decade, a growing number of communities have been integrating TDM into their transportation plans and operations. This guide represents a summary of the lessons they have learned, and offers advice to help other municipalities plan and implement their own TDM programs. It references real-world examples, as well as other documents that offer additional guidance in more specialized areas of TDM. It draws on collective experience to provide an overview of the entire process behind TDM program planning and delivery.

This guide is meant to be accessible to readers who are less familiar with TDM, including those in mid-sized or small communities. It addresses the practical concerns of its intended readers including decision makers (e.g. elected officials and senior managers) who provide staff with strategic direction and authorize resources, managers in municipal staff groups with direct or indirect responsibility for TDM, and practitioners involved in planning and delivering TDM measures.

The figure below illustrates the guide’s structure, and will help readers navigate the main sections.

CHAPTER 1 – UNDERSTANDING TDM discusses the role of TDM, its relationship to other municipal activities, and challenges and keys to success.

CHAPTER 2 – PLANNING TDM PROGRAMS outlines a four-step process to planning new or expanded TDM programs.

CHAPTER 3 – DELIVERING TDM PROGRAMS discusses three keys to the effective delivery of TDM programs including internal capacity building, collaboration with partners, and communication with key audiences.

APPENDIX A – TDM MEASURES offers a descriptive inventory of common TDM approaches and tools that are broadly relevant to Chapters 1, 2 and 3.
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Glossary of key terms

**ACTIVE AND SAFE ROUTES TO SCHOOL (ASRTS) PROGRAM.** Comprehensive, community-based initiatives that encourage walking and cycling to school through education, training, promotion, safety improvements, and incentives. Also known as Safe Routes to School.

**ACTIVE TRANSPORTATION (ACTIVE COMMUTING).** Human-powered travel, primarily walking and cycling but also in-line skating, skateboarding, wheelchairing and other methods.

**BIKE SHARING.** Programs that offer free or low-cost bike rentals, intended for short periods of use and a large number of daily users per bicycle. Public bike sharing initiatives are open to all users, while private bike sharing initiatives are restricted to employees or clients of a particular business or institution.

**CARSHPARING.** Services that offer short-term pay-per-use car rentals, typically open to the public and sometimes also to businesses as a complement or replacement to corporate fleet ownership.

**COMMUTER SURVEY.** An electronic, paper-based or face-to-face tool for gathering information about employee commuting habits and attitudes in a workplace.

**CYCLING SKILLS COURSES.** Training for individuals about safe bicycle operation, addressing subjects such as riding in traffic, darkness and inclement weather, and roadside bike repair. The Canadian Cycling Association’s CAN-BIKE program includes courses for children, learner adults, women, rural cyclists and urban commuters.

**EMERGENCY RIDE HOME.** A service offered by an employer or third party that helps non-driving commuters get home quickly and conveniently in case of family emergency, unexpected overtime or other unforeseen event. Transportation is typically by free or reimbursable taxi or car rental. Also known as guaranteed ride home (GRH).

**EMPLOYER TRANSIT PASS PROGRAM.** The sale of transit passes to commuters at their workplace, with the employer either acting as a reseller, or forwarding payroll deductions to the transit operator. Payroll-deduction transit pass programs typically demand a minimum one-year subscription.
**End-of-Trip Facilities.** Bicycle parking, shower and change facilities in workplaces for use by cycling or walking commuters.

**Individualized Marketing.** Initiatives that use targeted, customized communication and incentives to motivate sustainable transportation choices by individuals who self-identify as being interested in adopting new behaviours. Individualized marketing is most commonly applied at a household level, but can also be used in workplaces.

**Market Segmentation.** Division of a larger market into groups that possess common characteristics, as the basis for marketing activities that differ among groups.

**Open Street Events.** Special events that involve temporary closure one or more streets to motor vehicles, enabling use of the street space for walking, cycling, entertainment and other activities.

**Public Transit Pass Program.** Sale of discounted transit passes to the general public by subscription, typically for a minimum term of one year.

**Ridematching.** A service to help commuters find partners for carpooling, typically through automated Internet-based services.

**Telework (Telecommuting, Mobile Working).** An arrangement allowing workers to reduce their commuting by performing some or all of their work away from their normal workplace.

**Transit-Oriented Development.** Form of development offering a land use density, mix and design that makes transit use attractive and efficient; typically involves mixed-use, pedestrian-friendly developments around rapid transit stations and corridors.

**Transportation Demand Management (TDM).** The use of policies, programs, services and products to influence whether, why, when, where and how people travel. TDM measures help shape the economic and social factors behind personal travel decisions.

**Transportation Demand Management (TDM) Program.** A collection of TDM initiatives delivered through or in partnership with municipal government operations, typically with dedicated staff and financial resources. TDM programs are usually considered to be ongoing, long-term endeavours rather than short projects.

**Transportation Fair.** A special event at workplaces or educational institutions to build awareness of sustainable travel options by offering a range of information and services.

**Transportation Management Association (TMA).** An organization that promotes and supports workplace travel plans among employers; may offer services such as commuter surveys, analysis, consultation, special events and carpool ridematching.

**Trip Planning.** Internet-based, phone-based or face-to-face help for individuals to plan optimal routes for trips, usually by transit but sometimes by cycling or walking.

**Universal Transit Pass (U-pass) Program.** Common initiative at post-secondary institutions, whereby all students or members of a sub-group (e.g. full-time undergraduates) pay a fee that gives them unlimited access to transit for the entire semester, school year or calendar year. U-Pass fees are typically much lower than the cost of buying regular passes or tickets, because the cost of transit fares is redistributed from a smaller group to a larger one.

**Walking School Bus.** An arrangement whereby a group of children walks to school with one or more adults, typically involving set meeting points, schedules and rotating volunteer schedules.

**Workplace Travel Plan.** A package of coordinated initiatives to encourage efficient and sustainable commuting among employees.

**Vanpooling.** Shared use by multiple commuters of a van that is typically owned by a third party such as a non-profit organization, for-profit business or employer.
Chapter 1: Understanding TDM

This chapter introduces TDM and its benefits for Canadian communities, and helps readers to:

- understand how TDM supports sustainable transportation
- see how TDM is integrated with other municipal services
- explain and build support for TDM
- be aware of common challenges and keys to TDM success

After reading Chapter 1 readers will be better equipped to tackle Chapter 2, and start the process of planning a new or expanded TDM program.

1.1 The basics of TDM

1.1.1 Communities and sustainable transportation systems

The challenges posed by transportation systems to Canadian communities are growing. Increasingly, congestion is a fact of life but road expansion is no longer considered a solution. The environmental impacts of motorized travel are unacceptable. The costs of conventional mobility are unsupportable given today’s fiscal constraints. Residents are demanding travel options that are convenient, reliable, healthy and safe. In response, virtually all new transportation plans emphasize the need for more sustainable transportation options—in other words, greater use of walking, cycling, transit, carpooling and telework.

By reshaping their transportation systems, Canadian communities are pursuing three key dimensions of sustainability:

- **QUALITY OF LIFE.** Sustainable transportation systems reduce travel delays that affect families and increase costs to business. They increase physical activity levels and reduce the health impacts of air pollution. They improve safety by shifting travel from cars to transit, reducing travellers’ risk of being involved in a collision. They increase opportunities for all people to participate in educational, recreational and social activities without the need to use a car.

- **ENVIRONMENTAL HEALTH.** Sustainable transportation systems have lower emissions of greenhouse gases and smog-causing air pollutants, and help reduce intrusion into natural areas by urban development.

- **ECONOMIC GROWTH.** Sustainable transportation systems have lower long-term costs, including the costs of transportation infrastructure (e.g. new and wider roads), transportation operations (e.g. vehicle fuel, repair, insurance) and their health impacts (e.g. hospital care for collision victims and asthma patients). Car travel is expensive both for citizens and governments. Shifting travel demand from cars to more sustainable modes frees up public and private resources to invest in other priorities.
1.1.2 Definition of TDM

In any community, the transportation and land use system includes three major elements that represent the physical, economic and social factors behind travel behaviour (see figure, below):

- **transportation demand**—the needs and desires of individual people
- **transportation supply**—the infrastructure and services that move people
- **land use**—the places people travel to and from

![Major elements of a community's transportation and land use system](image)

Sustainable transportation measures work by addressing one or more of these three key elements. Policies, programs, services or products that address transportation demand are grouped under the term **TRANSPORTATION DEMAND MANAGEMENT** or **TDM**. By influencing whether, why, when, where and how people travel, TDM measures can cause the following changes in travel behaviour:

- **modal shift**—more people choosing to walk, cycle, take transit, carpool, vanpool or telework
- **trip reductions**—more people choosing to telework, shop online or conduct personal business by telephone
- **driving reductions**—more drivers making fewer trips by car and to closer destinations
- **time and route shifting**—more drivers changing the time or route of their driving trip to avoid traffic congestion

1.1.3 Rationale for TDM

TDM offers communities the same benefits as other sustainable transportation measures that change transportation supply or land use. It can reduce air emissions, congestion, delay, automobile user costs, and public costs incurred for health care, emergency response, and road and parking infrastructure. It can also improve access to opportunity, public health, road safety, employee morale and productivity, and environmental health.

Three key attributes of TDM make it a valuable addition to a community’s sustainable transportation “toolbox”:

- **FLEXIBILITY.** TDM measures are readily customized for specific user groups (e.g. seniors, youth, cyclists, transit riders), travel purposes (e.g. shopping, commuting), travel destinations (e.g. a single hospital, business park or neighbourhood), or timeframes (e.g. weekdays, sporting events, an entire smog season). By comparison, transportation supply and land use measures are much less customizable by user group, purpose, place or time.

- **SPEED.** TDM measures can be planned and delivered in days, weeks or months. Transportation supply and land use measures can take years, or even decades.

- **AFFORDABILITY.** TDM measures can be scoped and scaled to match available resources. While the most effective approaches to TDM are not inexpensive, municipalities can tailor a TDM program to make effective and creative use of existing staff and budgets. Even relatively costly TDM measures tend to be far less expensive than most transportation infrastructure projects.
TDM measures do not replace transportation supply measures (such as new transit lines and bicycle lanes) or land use measures (such as urban design standards and mixed-use developments). However, they complement these other measures in a very powerful and cost-effective manner. In fact, TDM is an excellent way to maximize the efficient operation of existing land use and transportation systems.

Assessing the benefits of TDM measures

By focusing on social and economic factors and avoiding expensive physical changes, TDM measures can have very high benefit-cost ratios. One study for the UK Department for Transport estimated that the congestion-reduction effects of TDM measures could have a ten-to-one ratio of benefits to costs—and this excluded powerful but controversial measures like road pricing. [S. Cairns et al., Smarter Choices: Changing the Way We Travel, 2004]

A compilation of this and other evidence on the effectiveness of TDM measures is available in The Case for TDM in Canada: Transportation Demand Management Initiatives and Their Benefits, available at www.actcanada.com. That guide is a recommended tool to help practitioners understand their key audiences and build support for TDM initiatives.

1.1.4 Types of TDM measures

TDM measures can take different forms (see the figure below, as well as the more detailed list in Appendix A), and are generally divided into two categories. Education, promotion and outreach measures raise awareness, improve understanding, and build positive attitudes about sustainable transportation choices—for example, special events or cycling skills training. Incentive and disincentive measures make specific travel choices more or less attractive through convenience improvements, cost changes or rewards—for example, ridematching services or transit pass discounts.

TDM measures can also be delivered in different locations. Workplace initiatives can involve carpool ridematching services, subsidized transit passes, telework promotion or flexible work hour programs. School initiatives can involve walking school buses or ridematching services. Post-secondary initiatives can involve universal transit passes, active transportation promotion, ridematching services and parking management. Residential initiatives are aimed at households, usually within a specific neighbourhood, and can involve individualized marketing or carsharing. Community-wide initiatives are not targeted at a particular market, and include public carpool ridematching, high-level messaging campaigns and special events.
1.2 TDM in the municipal context

1.2.1 Integrating TDM with other municipal activities

TDM can provide support to many activities that municipalities may be involved in.

**Public Transit.** Marketing activities by transit systems are a form of TDM. Transit systems also conduct special events to encourage individuals to try transit, and offer fare incentives such as discounts to encourage individuals to buy transit passes or travel outside rush hours.

**Active Transportation.** Cycling and walking maps, special events like Bike to Work Week, cycling skills courses, better bike parking, promotion of public bike sharing systems, and celebrations of new trails or bike lanes are all TDM initiatives.

**Carpool Lanes and Carpool Lots.** These supply-side measures depend on effective promotion and the facilitation of carpool formation through ridematching services, a staple of TDM programs.

**Land Use Intensification.** Urban boundaries that contain growth and zoning by-laws that encourage infill development both concentrate transportation activity in existing developed areas. TDM programs can ease the transition to intensification by encouraging residents and employees of infill projects to travel sustainably. In areas with limited parking capacity, TDM programs can also make vacant land more attractive to developers.

**Transit-oriented Development (TOD).** Many municipalities are working to intensify mixed-use, pedestrian-friendly developments around transit stations and corridors. The power of good design to maximize transit use can be amplified by effective education, promotion and incentives—particularly when new residents and employees are relocating from more car-dependent locations.

**Air Quality Improvement and greenhouse gas emission reductions.** Motorized travel generates a substantial portion of total greenhouse gas emissions and other air pollutants in most communities. Virtually all municipal air quality and greenhouse gas emissions reduction strategies aim to reduce driving, and TDM measures can help accelerate shifts to more sustainable travel.

**Economic competitiveness.** Municipalities compete to attract investment that creates and retain jobs, and to attract new residents. Telework and other TDM programs that improve commuting options can make workplaces more attractive and increase their reach into the labour market. They can also make the image of a community’s lifestyle more attractive to young families and the “creative class” of knowledge workers.

**Active Living Promotion.** Municipal health departments and district health units promote the health benefits of improved fitness through active living. TDM programs that encourage active transportation, such as for daily trips to work or school, are good complements to active living programs.

**Child and Youth Development.** The healthy development of young people is a primary concern of our education, public health and social service systems. TDM measures such as cycling skills education courses or Active and Safe Routes to School programs can increase physical activity among children and youth while also building their confidence and independence.
1.2.2 Challenges facing TDM

Most major Canadian municipalities have created TDM policies and programs, but few have successfully implemented broad and effective TDM measures. Several recurring challenges have contributed to this situation.

**TDM needs stronger backing by elected officials.** TDM is a broad subject that tends not to offer simple solutions. Its wide scope and subtle variations make it challenging for decision makers to champion. It can also be difficult to “see” TDM initiatives and measure their short-term impacts, which adds to the challenge of building political and public support.

**TDM does not fit the usual structure of municipalities.** TDM planning and delivery functions lack a natural home in municipal administrations—rather, they tend to bridge diverse areas including transportation engineering, development planning and approvals, transit service, health promotion, social services, economic development, and communications. TDM requires the commitment and assistance of engineers, planners, economists, behavioural psychologists, social workers, communicators and elected officials.

**TDM staff may be asked to bear additional responsibilities.** TDM programs can become “catch-alls” for activities that do not fit neatly within traditional traffic and transit programs. For example, TDM staff are commonly asked to take responsibility for cycling network planning, sidewalk replacement projects and other sustainable transportation initiatives. This is not necessarily a bad thing, but the day-to-day demands of these projects can easily divert time and attention from TDM.

**Infrastructure and land use issues are seen as more important.** In municipal organizations with limited resources, land use and transportation infrastructure concerns can control the agenda and marginalize TDM initiatives. However, it is important that municipalities work on land use, transportation supply and transportation demand at the same time—TDM is an inexpensive way to boost the effectiveness and speed of development and transport infrastructure strategies.

1.2.3 Keys to success

The TDM experiences of Canadian municipalities have revealed several basic approaches that can maximize the effectiveness and return on investment of TDM initiatives.

**Develop and follow a plan.** A TDM program is a long-term commitment that can involve many stakeholders and a wide range of measures. A TDM plan can help a municipality attract support, provide direction and coordinate action over time. This issue is the subject of Chapter 2.

**Remain alert to other opportunities.** While a TDM plan is very helpful, it is important to watch for opportunities (both internal and external) that the plan does not foresee. A sense of adaptability and a willingness to consider new ideas will ensure that open doors are not passed without consideration.

**Build partnerships.** TDM thrives on strong partnerships and cannot be undertaken successfully by a single group. Municipal governments have limited ability to make TDM initiatives work without help from institutional, private sector and other community partners that offer resources, extend the reach of TDM measures, and enhance the credibility of messages originating within government. For municipal staff groups, learning the art and value of successful partnerships can be vital. This issue is discussed further in Chapter 3.

**Provide adequate resources.** TDM is not about plans and policies—rather, it is about working with individuals and community organizations. These activities require time, energy and money. A municipality without a dedicated TDM practitioner on staff is likely to accomplish little, and many more staff may be warranted. Likewise, budget is required to develop and deliver the tools, resources and
incentives that can influence behaviour. This issue is discussed further in Chapter 3.

**Communicate clearly.** Communication may serve diverse purposes and take many forms, but it is an essential part of most TDM measures, and is also fundamental to the success of an overall TDM program. It cannot be an afterthought. This issue is discussed further in Chapter 3.

**Lead by example.** TDM measures invite institutions, businesses and individuals to behave differently—so to build goodwill, municipalities must put their own house in order first. This is especially true when working with other levels of government and private-sector employers. Developing a travel plan for its own workplaces allows a municipality to learn about TDM, and to develop and test new tools and resources before offering them to other workplaces.

**Embrace innovation.** “Doing things differently” requires both an appetite for innovation, and a willingness to treat failure as a learning experience. Strong leadership can help foster innovation. Small-scale demonstrations or pilot projects can encourage municipal decision makers and the general public to be more accepting of setbacks when they occur.

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**Helpful resources**

The Federation of Canadian Municipalities offers a brochure, entitled *Improve Travel Options with Transportation Demand Management (TDM)*, and a customizable PowerPoint presentation to build understanding of TDM among key audiences in a range of communities. These resources were designed to address the questions and concerns of elected officials and other municipal decision makers. Both are available for free as downloads from www.gmf.fcm.ca.
Chapter 2: Planning TDM programs

TDM programs can target numerous audiences with multiple activities over several years, and are more likely to succeed when they are based on a thoughtful and realistic plan. This chapter outlines a four-step process to help a municipality plan a new or expanded TDM program with measures (see Appendix A) that support the community’s transportation goals:

- **Step one: Gather information**—Develop knowledge to enable good decisions by conducting a scan of current activities, talking with stakeholders, and researching key markets.
- **Step two: Set direction**—Articulate the community’s TDM vision, goals and objectives, and identify its most important opportunities and challenges.
- **Step three: Assess options**—Consider how different TDM measures could help the community achieve its goals by using a range of criteria to evaluate them.
- **Step four: Identify actions**—Build a plan of action that explains what TDM measures will be implemented and how the TDM program will strengthen over time.

These steps are summarized in the flowchart below, and the key questions to be asked at each step are summarized in Section 2.5.

By following the ideas in Chapter 2, a municipality can develop a plan for a TDM program that is appropriate for the community’s context, objectives and challenges. Delivering that TDM program successfully is the subject of Chapter 3.
2.1 Step one: Gather information

TDM plans are like business plans—they should be based on a solid understanding of key markets and competing interests.

The first step in building a TDM plan is to gather information that will enable a solid understanding of the existing situation, and lay the groundwork for identifying the TDM plan’s major directions and recommended actions (as discussed in later sections of this chapter).

It is important to know what TDM-related initiatives each branch of the municipal government has tried before, is doing now, or is planning for the future. Integrating this knowledge into the TDM plan will help identify opportunities, dodge pitfalls and generally avoid “reinventing the wheel.”

2.1.1 Scan of municipal activities

Compile a list of municipal challenges, plans, policies, programs, projects and partnerships that are relevant to possible TDM actions. Areas to investigate include public transit, active transportation, parking, development planning and approvals, public health, environmental management (water and energy conservation, air quality, climate change), parks and recreation, communications, economic development and tourism. Note that some of these areas may be the responsibility of external organizations like regional governments, district health units or arm’s-length commissions, and are addressed in the next section.

2.1.2 Scan of stakeholder interests

It is also helpful to scan the challenges, interests and activities of external TDM stakeholders and potential partners to identify their related objectives and past, present or future actions. This scan may involve the review of strategic plans, status reports, media releases and other documents. It may also involve discussions with representatives of relevant organizations.

Stakeholders to include. The broad range of possible stakeholders includes chambers of commerce and economic development organizations, school boards, university and college administrations and student associations, large employers (e.g. hospitals), major developers and property managers, adjacent municipalities and senior levels of government, social service agencies (e.g. for seniors, youth, immigrants, persons with low incomes or disabilities), festival organizers and local non-profit organizations active in environment or transportation.

This list of stakeholders may be lengthened if any of the activities identified in the previous section are the responsibility of external organizations, rather than the municipality. It may also be shortened to suit the time and resources available for the scan.

Issues to address. Key questions to ask when gathering information include:

- What challenges faced by stakeholders’ organizations, employees or customers could be overcome by improving travel options or shifting travel demand? These may be known,
high-profile challenges that contributed to the need for a TDM plan in the first place, or they could be more subtle issues that are only revealed through conversation.

- What TDM-related initiatives (i.e. facilities or services) have stakeholders undertaken in the past? Are they planning any in the future?
- What possible TDM services or activities might interest stakeholders as partners, clients or participants?

**How to gather information.** Stakeholders can be consulted by email or a written questionnaire, but talking to them by telephone or in person may spur them to be more forthcoming. In some cases, a workshop with multiple stakeholders can spark a creative, collegial atmosphere that leads to new possibilities being identified. Another step that could identify potential partners and other stakeholders in the municipal TDM planning process is to issue a public call for submissions through website notices, articles or advertisements in community newspapers, and announcements at committee or council meetings. To keep them on topic and maximize the value of their input, consider asking respondents to address a small number of focus questions, like those suggested above, and to limit the length of their submissions.

**2.1.3 Market research**

The strategies commercial marketers use to sell us soap and soft drinks are based on a thorough understanding of the overall market and key segments within it. Marketers want to know what products consumers prefer and why, and what advantages of a different product might entice them to change their behaviour.

A similar approach is taken by social marketers, including TDM practitioners, who try to influence individual behaviours for social benefit rather than corporate profit. Their thought process, known as market segmentation, identifies and analyzes groups of people with common characteristics. It is summarized in the following figure.

**Benefits.** TDM planners and practitioners can use market research to build their understanding of how people travel, why they do so, and what measures might get them to travel differently. Market research can identify groups that are most likely to adopt new behaviours, as well as those that are most likely to resist.

Another benefit of market research is that it can create a baseline for evaluation. The success of a TDM initiative can be determined by comparing, for example, the future number of bicycle commuters to a baseline measurement conducted before the initiative was conducted.

**Information sources.** While the principle of using market segmentation to support TDM planning is strong, many municipalities collect very little helpful information. Knowledge about individual travel circumstances, preferences and decisions is rare. One possible source of market research relevant to TDM is a customer survey undertaken by the local transit system to identify ridership growth opportunities and challenges. Another source could be a public opinion survey conducted as part of an active transportation planning process. Several other good Canadian examples of TDM market research are summarized in the following box.

While market research does cost money to undertake, it can add great value to future investments in TDM programs and services. They key to effective market research is to not waste resources on questions that provide little direction. The activity scan and stakeholder consultation activities described above can help
identify important questions about key travel market segments. One way to maximize the return on market research is to focus on known problem areas: if congestion in a single corridor is driving interest in TDM, surveys could help identify who is driving through that area, why, and what might motivate them to take a different route or change travel modes.

Helpful resources

Transport Canada offers two publications that can help with the information-gathering step of a TDM plan. Both are available at www.tc.gc.ca/urban.

- Changing Transportation Behaviours: A Social Marketing Planning Guide provides detailed advice on gathering information to support TDM initiatives.
- Compendium of Canadian Survey Research on Consumer Attitudes and Behavioural Influences Affecting Sustainable Transportation Options lists findings about key travel-related attitudes, perceptions and misperceptions of various parts of the Canadian population.

Examples of TDM market research in Canada

The City of Ottawa’s Commuter Travel Behaviour and Attitude Survey in 2002 used a telephone survey of 1,000 adults to gather information on current commuter travel behaviours and the underlying reasons, the potential for shifting travel demand from cars to walking, cycling and transit; and residents’ awareness of and participation in certain programs.

The Smart Commute program of Metrolinx has conducted three commuter attitude surveys, the latest in 2008, to better understand the travel choices of commuters in the Greater Toronto and Hamilton Area, the reasons for those choices, and commuters’ awareness of Smart Commute. It has also conducted a comprehensive School Travel Household Survey to help develop effective school-based TDM programs.

The Central Okanagan Region’s market research for its TDM-focused Social Marketing Strategy in 2004 included six focus groups and a random telephone survey of 823 Kelowna area residents.

The Vélo Québec Association conducted an opinion survey in 2005 (L’état du vélo au Québec) to measure cycling activity among adults, their interest in cycling more, motivators to do so, barriers that kept them from doing so, and support for various government policies and actions to improve cycling.

Major metropolitan areas (e.g. Montreal, Ottawa, Toronto, Calgary, Edmonton, Vancouver) conduct periodic origin-destination studies of their entire populations. These random-sample surveys attempt to capture all local travel by residents (but excluding children, in most cases), and provide valuable material for social marketers who can link current choices to individual age and sex, family size and structure, work and home location, and so on. However, origin-destination studies do not capture other valuable information concerning values, attitudes and preferences that have a major impact travel behaviours.
2.2 Step two: Set direction

The second step in building an effective TDM plan is to use the information gathered in the first step to create a strategic framework that sets the plan’s major directions. This framework, which includes a TDM vision, goals and objectives (see Section 2.2.1), articulates what the municipality hopes to achieve through the use of TDM. It provides a basis for identifying strategic opportunities and challenges (see Section 2.2.2) and is also useful in evaluating possible TDM initiatives, as discussed in Section 2.3.

**VISION STATEMENT.** A vision describes an optimal future. The benefit of a compelling TDM vision lies in its ability to clearly communicate to stakeholders why TDM is important by clearly describing what it can accomplish in a tangible way.

One approach to building a TDM vision is to describe how the community will look when TDM initiatives have had their fullest effect—in other words, what travel outcomes (i.e. changes to attitudes and behaviours) might be realized, and what effects those changes might have on the lives of residents. One example of this kind of TDM vision is shown in the accompanying box.

Another approach to building a TDM vision is to structure it around important community values such as quality of life, environmental health and economic growth—core values that a municipality may already have identified in a general community vision, official plan or transportation master plan. Linking TDM directly to the community’s loftiest desires and intentions is a powerful way to express why TDM is important. One example of a TDM vision that is structured in this way is given in the upper box on the following page.

**GOALS.** While a TDM vision can explain the importance of TDM at a high level, more specific goals and objectives are required as the basis for evaluating and planning actual TDM initiatives. Goals highlight the priorities of a TDM program by identifying the outcomes that warrant the greatest attention, and the activities that warrant the greatest resources. Goals can be expressed in many ways—they may focus on community outcomes, specific major program delivery components, the application of specific TDM activities or tools, or the delivery of activities through or to key stakeholders. The lower box on the following page shows examples of each of these.

2.2.1 Vision, goals and objectives

The work discussed in Section 2.1 results in a good understanding of the context for a TDM program in the community, including municipal activities, stakeholder interests and market conditions. The next task is to articulate what a TDM program can do for the community, why it is important, and who will benefit from it.
**A TDM vision based on travel outcomes**

In the future, Calgary residents will rely less on driving cars and more on walking, cycling, transit, carpooling, and telework. Those who drive will choose destinations, routes, and times that reduce their travel impacts. Trips to reach employment, education, and personal services will be shorter and more convenient. Traffic congestion and air pollution will be reduced, individuals will be safer and more physically active, and businesses will be more accessible to employees and customers. Transportation infrastructure requirements will be reduced on a per capita basis.

The City of Calgary’s TDM initiatives will contribute to this future state by improving awareness and understanding of the travel options available to the public, providing incentives to make sustainable options more attractive, and using partnerships to build stakeholder interest and commitment.

Through leadership The City will demonstrate its commitment and build strong connections among its related services, and through outreach it will actively engage individuals and other organizations in efforts to help residents make more sustainable travel choices.

— City of Calgary’s TDM Master Plan (2008)

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**Possible approaches to identifying and structuring TDM program goals**

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<thead>
<tr>
<th>Focus on community outcomes such as:</th>
<th>Focus on the application of specific TDM activities or tools such as:</th>
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<tr>
<td>better public health</td>
<td>guidelines for new developments</td>
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<tr>
<td>reduced congestion and delay</td>
<td>promoting transit</td>
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<tr>
<td>improved equity</td>
<td>promoting active transportation</td>
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<tr>
<td>reduced emissions</td>
<td>promoting carpooling</td>
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<tr>
<td>enhanced safety</td>
<td>managing parking</td>
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**Focus on major program delivery components such as:**

- outreach
- marketing
- performance measurement
- innovation (research and development)
- cost-effectiveness

**Focus on activities delivered to or through key stakeholders such as:**

- employers and property managers
- developers
- schools and post-secondary institutions
- families
- youth
- seniors
- special events and festivals
**Objectives.** Individual goals are usually broken into objectives that are either qualitative (i.e. descriptive) or quantitative (i.e. measurable). Quantitative objectives include targets as the basis for future performance measurement, evaluation and reporting. Setting effective targets requires a “baseline measurement” (as discussed in Section 2.1.3) that describes existing conditions. Directional targets represent either a simple increase or decrease from the baseline (e.g. more people buying transit passes, fewer single-occupant vehicles parking in municipal lots). Specific targets represent a more precise change from the baseline (e.g. number of employers to engage, number of residents to be involved in special events).

**An example TDM goal and component objectives**

**Goal:** To use marketing strategies that build public support for sustainable travel options, improve public awareness of their benefits, and encourage their use

**Objectives:**
- Create a TDM program identity and use it to link and strengthen TDM messages
- Develop a social media campaign that engages individuals and enables personal communication (target: attract 300 “friends” to the program’s Facebook page in one year)
- Support events that build public awareness and encourage people to try sustainable travel options (target: double the number of special event participants over three years)

**2.2.2 Opportunities and challenges**

After setting major directions for the TDM program, it is advisable to assess the factors that both support and oppose success. Having a good sense of the opportunities and challenges facing TDM initiatives is key to developing a plan that is strategic in nature.

Opportunities and challenges should be considered and identified for several dimensions of the TDM program. For each dimension, ask the following questions:

- **What are the ideal conditions?** Identify factors or conditions that would maximize success.
- **What opportunities exist?** Identify real factors or conditions that meet or approach any of the ideal conditions.
- **What challenges exist?** Identify real factors or conditions that obstruct or oppose any of the ideal conditions.
- **What future directions are needed?** Identify the most attractive opportunities and threatening challenges that will shape future actions.

**Assessing program viability.** The first dimension to ask these four questions about is the basic viability of the TDM program as a municipal endeavour. One aspect of viability is authority and accountability, for which the ideal conditions include:

- a clear mandate for staff to implement TDM initiatives within the organization and out in the community
- a supportive TDM policy framework
- endorsement and encouragement of TDM initiatives by senior management and elected officials
- a clear TDM “figurehead” (either an individual or staff group) who is associated with the program’s objectives, communications and activities
- performance targets, and measurement and reporting protocols
The other aspect of TDM program viability is \textit{internal and external resources}, for which the ideal conditions include:

- sufficient staff and budget to enable strategic actions
- a prioritized, affordable and feasible action plan
- committed internal partners who act as champions, share an interest in key outcomes, and actively participate in coordination and implementation
- external partners who could act as champions, share an interest in key outcomes, and actively participate in (or deliver) TDM initiatives
- an intention to recognize and reward the successes of internal and external partners

\textbf{Assessing goals and objectives.} After using the four previous questions to assess overall program viability, they can also be used to assess individual TDM goals and objectives. Consider and document the ideal conditions, opportunities, challenges and future directions for each goal and its component objectives. Especially when conducted by a group like a TDM steering committee (see Section 3.2.1) this exercise can greatly enhance a municipality’s collective understanding of how individual measures could contribute to a longer-term vision for TDM.

\section*{2.3 Step three: Assess options}

After the direction-setting work discussed in Section 2.2, the next step is to identify the most appropriate TDM measures to include in the municipal program. This section discusses criteria that can help evaluate different TDM measures (including those in Appendix A).

\textbf{Impact.} Understanding the potential impact of a measure in key areas is always important. A commonly assessed impact is the expected degree of change in individual travel behaviours—for example, how many people might be motivated by a particular project to switch from driving alone to walking, cycling, transit or carpooling. This is a very challenging question to answer, as human responses to change are always somewhat unpredictable.

Some modelling tools do exist that could help predict the impacts of TDM measures on travel behaviour (see the box on the following page). However, local knowledge and experience are probably the most reliable tools for estimating behavioural change. Questionnaires that ask people about the likelihood of changing behaviour in response to a given measure can give a rough picture, but are notoriously unreliable. How people say they would react hypothetically is often very different from how they do react when faced with reality.
Models that can help predict travel behaviour impacts of TDM measures

Transportation models (e.g. EMME) are maintained by larger municipalities and can reflect the impacts of changes in travel time, out-of-pocket costs, transit service quality and car ownership. However, they do not address active transportation well and cannot consider less tangible factors such as the relative comfort and security of travel options.

Economic models use elasticities to assess the different choices that may result from price changes.

Choice models that simulate consumers’ rational trade-offs are very flexible but must be customized using market-specific data (e.g. stated preference surveys).

Integrated land use and transportation models can consider the effects of land use mix and density, but are complex and costly.

Program models to evaluate specific TDM measures, such as TRIMMS (Trip Reduction Impacts for Mobility Management Strategies), a sketch-planning tool calibrated using American data.

Other tools to estimate TDM outcomes

Transport Canada’s Urban Transportation Emissions Calculator (UTEC) is an online tool to estimate emissions from personal, commercial and public transit vehicles (see www.tc.gc.ca/utec). Key information from UTEC for different Canadian regions has been summarized in Section 3.2.5 of Workplace Travel Plans: Guidance for Canadian Employers, (see www.tc.gc.ca/urban).

The Canadian Automobile Association’s Driving Costs brochure (www.caa.ca/drivingcosts) can help estimate the costs of car ownership and operation. Other travel costs related to parking, tolls and transit fares depend on local conditions. The costs of delay due to congestion are difficult to estimate, as are the social costs of transportation activities (e.g. construction, maintenance, pollution, noise) arising from an average trip.

Helpful resource

For those seeking a compilation of measured TDM impacts in a variety of areas, ACT Canada’s report The Case for TDM in Canada: Transportation Demand Management Initiatives and Their Benefits is a reliable source (available at www.actcanada.com).

Cost. Nominally similar TDM measures can have widely varying costs. For example, promotions using social media like Facebook and Twitter will cost less than those using television and radio ads; similarly, incentives can range from inexpensive giveaways to substantial discounts or rewards. This flexibility to plan measures to fit an available budget is one of the advantages of TDM over conventional infrastructure. However, when evaluating the costs of individual initiatives or the achievement of certain objectives, it is necessary to consider what will be done by whom, and how. Cost estimates can be more illuminating when direct costs (those borne by the municipality) are accompanied by leveraged costs (those borne by partners). Two projects with similar direct costs but different leveraging potential are likely to be viewed differently; greater leverage likely means greater impact.
**Feasibility.** There are many dimensions to the feasibility of a possible TDM measure. Whether it is likely to be easier or more challenging depends on the requirement for staff time and budget, and the difficulty of acquiring or developing needed tools and resources. It is quite possible for some measures to have short-term windows of heightened feasibility, due to financial or political opportunities, that will pass if not acted on. For TDM measures that involve partnerships, it is important to assess the engagement of key partners and stakeholders, and the difficulty of coordinating heightened levels of involvement. Finally, legal or regulatory barriers may impact on the feasibility of certain measures.

**Immediacy.** This criterion reflects the time it will take to implement a measure and reap the benefits. Some measures can be undertaken quickly but take years to show results; others may take years to implement but show rapid results. It is important to be realistic and avoid underestimating the time needed to implement measures and see results. TDM programs can involve many concurrent measures that compete for staff time, and the competition for attention and effort of partners can also be fierce (especially when the project is outside partners’ core interests, as with school or workplace travel plans). There are many stories of TDM projects being delayed for months or even years because of turnover in a single staff position. Results also tend to be slow because masses of people rarely change behaviours suddenly; rather, individuals tend to change travel behaviour when other life changes occur (e.g. a new job or family member, improvement or decline in health or financial circumstances, and so on).

**Value.** Value is the balance of costs against benefits. A TDM initiative that achieves moderate gains at a moderate cost will offer less value than another offering greater gains at a lower cost. Applying a value scale to compare different TDM measures is one way to highlight key differences among them, and can also help to make the business case for measures that end up being recommended.

**Risk.** Risk considers confidence in a measure’s impact and cost estimates, as well as its feasibility and immediacy of results. Comparing options on the basis of risk can highlight those that are quick wins (immediate, feasible, high confidence) as opposed to long shots (slower, less feasible, lower confidence). Particularly when starting a new TDM program, lower-risk measures are a more attractive starting point. Early success is a good way to build momentum and validate TDM approaches; it also might not be advisable to begin a new program with measures that face technical obstacles, require years to work, and are subject to substantial cost overruns.

**Role.** Within a TDM program, some measures act as important precursors or foundation elements that enable and strengthen others. For example, it may be hard to persuade employers to develop workplace travel plans before the municipality has a “value proposition”—i.e. a group of services and programs (e.g. a carpool ridematching service or discounted transit pass program) that it can offer as an incentive for employers to become engaged.

**Strategic Importance.** A final criterion to assess possible TDM measures is the extent to which each measure will contribute to the TDM plan’s goals and objectives. Even a simple approach to gauging a measure’s impact on each objective (e.g. a low, moderate or high rating) can help identify the relative importance of each option within the strategic framework. Knowing that a particular measure is strategically important may compensate for low ratings in other areas. For example, a highly strategic measure may be considered a priority despite weak value or risk ratings; likewise, a low-risk, high-value measure may be delayed if its impacts are in an area of low importance.
2.4 Step four: Identify actions

The final step in developing a TDM plan is the identification of actions to be undertaken. Ideally, this is more than a list of tasks or measures drawn from those in Appendix A—it should be the story of how those tasks will accomplish the TDM program’s goals and objectives.

**Audiences.** The action plan component of a TDM plan has several audiences. These include decision makers, who want to know the rationale for each action as well as its expected outcomes and costs. Managers also want to know what resources are needed to deliver the program, who needs to be involved, what risks to watch for, and how to evaluate performance. TDM staff want to know what they are expected to deliver, how and by when. Finally, stakeholders and partners—both inside and outside the municipal organization—need to know their roles and responsibilities, and the importance of the part they will play.

**Contents.** A well-rounded action plan will include the following information:

- action descriptions, including major TDM program elements, their component tasks and key deliverables
- high priority tasks such as key foundation elements or quick wins
- roles and responsibilities for each task, and a roll-up for each key stakeholder including TDM staff, internal partners and external partners
- expected timelines for individual tasks, and a roll-up for each calendar year (or other time periods as needed, e.g. by quarter or fiscal year)
- costs and funding sources for the entire program, key elements and individual tasks, and a roll-up by quarter or year
- desired outcomes for key program elements and individual tasks, and a roll-up by market segment or other theme as appropriate
- performance measurement indicators and targets, and monitoring and evaluation activities for the overall program and for key elements and tasks
- a communications strategy that addresses key messages and channels, public engagement approaches including outreach and social media, and program reporting
- a continuous improvement process, including timelines for revisiting and updating the TDM plan as needed

Despite this long list of desirable elements, it is not always possible or necessary to develop a detailed multi-year action plan right away; it may simply be beyond the short-term capacity of involved staff. Instead, a municipality’s first action plan may well be more strategic. For example, it could identify goals and objectives, key market segments, and an approach to identifying a detailed stand-alone action plan for each priority area. This approach could lead to
the subsequent development of one action plan for workplace partnerships, another for school outreach, and a third for internal municipal programs. One advantage of this approach (other than its respect for capacity constraints) is that key stakeholders (e.g., elected officials) will be able to endorse a “big picture” document without having to absorb a large amount of detail or needing to approve actions they are not yet fully comfortable with. A preliminary action plan can also specify general frameworks for resource needs and expected outcomes, leaving future action plans to flesh out the details.

**Helpful resource**

Performance measurement for TDM is key to demonstrating success and building buy-in, but it can be very challenging. Transport Canada’s *Canadian Guidelines for the Measurement of Transportation Demand Management Initiatives—User’s Guide* can help (see www.tc.gc.ca/urban). The guidelines are applicable to a range of TDM initiatives and offer a step-by-step framework for practitioners to choose impact measurement techniques that suit their application and local context.
### 2.5 Summary

#### Planning TDM programs

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<tr>
<td><strong>Scan of Stakeholder Interests</strong> <em>(Section 2.1.2)</em></td>
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<tr>
<td><strong>Market Research</strong> <em>(Section 2.1.3)</em></td>
<td>Identify and examine information sources that can explain local travel patterns and attitudes</td>
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<td>Identify new market research that could help</td>
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<td>Create a meaningful TDM vision statement, goals and objectives to guide the selection and implementation of actions</td>
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<tr>
<td><strong>Opportunities and Challenges</strong> <em>(Section 2.2.2)</em></td>
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<td>Identify possible TDM measures and apply key criteria to evaluate their potential contribution to the achievement of goals and objectives</td>
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<tr>
<th><strong>Step Four: Identify Actions</strong> <em>(Section 2.4)</em></th>
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<td>Develop an action plan that addresses key audience interests and describes how actions will unfold over time</td>
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Chapter 3: Delivering TDM programs

After working through Chapter 2 and completing a plan for the municipality’s TDM program, the process of implementation begins. The wide range of possible TDM measures (see Appendix A) means that this guide cannot address the delivery of specific initiatives—a subject better addressed by more specialized guides. However, Chapter 3 does discuss three keys to enabling the successful delivery of TDM programs that might involve any number of measures:

- **Building capacity**—Provide strong leadership, develop supportive policies, and ensure adequate levels of staffing and funding.
- **Working collaboratively**—Coordinate the actions of internal stakeholders, build external partnerships, and take advantage of opportunities for alternative service delivery.
- **Engaging audiences**—Use messaging, branding, Internet communications, special events, recognition, reporting and media relations to build dialogue with TDM stakeholders and customers.

This chapter will help build a stronger foundation for the municipality’s TDM program, and enable effective delivery of the TDM plan developed in Chapter 2.

### 3.1 Building capacity

The capacity of a TDM program to achieve success can be elevated through strong leadership (Section 3.1.1), supporting policy (Section 3.1.2), and adequate staffing (Section 3.1.3) and funding (Section 3.1.4).

#### 3.1.1 Executive leadership

**Benefits.** Leadership among elected officials and senior managers is critical to the success of a municipal TDM program. Ideally, a *TDM champion* will emerge who can be a role model for staff and the public, an ally in public debate, a spokesperson to the public and media, a sponsor for new initiatives, and a mentor for additional champions over time.

**Fostering leadership.** As discussed in Section 1.2.2, TDM suffers from limited attractiveness as a political issue—and for this reason, a high-level TDM champion may not emerge naturally. It may be more practical to seek champions on an issue-by-issue basis, by positioning TDM’s varied benefits in a way that reflects the specific interests of potential leaders: for example, a municipal councillor who cares about improving child safety around schools or making neighbourhood businesses more prosperous; a medical officer of health who sees walking and cycling as a public health measure; or the director of a social planning council who wants new immigrants to be more comfortable using public transit to reach employment and education.
On an issue-by-issue basis, these supporters can be critical to building support for individual TDM initiatives. Over time, the TDM program will build its own political capital and attract champions who see TDM as a flexible approach to meeting a wide range of community goals.

3.1.2 Policy support

Policies remind decision makers about what to do (or not do) in certain circumstances. A strong framework of supporting policies can help ensure that future decisions are consistent with a TDM plan, and support its delivery.

An effective TDM policy framework can involve plans in many other areas (land use, transportation, municipal facilities, environmental management, public health) that touch on issues related to TDM. These connections remind decision makers that TDM is not a straightforward transportation service like snow clearance or vehicle licensing—rather, it is an interdepartmental approach to meeting community goals by influencing the daily travel decisions of residents.

TDM-supportive policies are crucial to the effective delivery of many TDM measures. For example, it can be difficult to promote bicycle commuting if workplaces do not offer bicycle parking, showers and change rooms. However, those features add to the costs of commercial development and, unless zoning by-laws require them, they are likely to be resisted by many developers.

Many municipal policy documents should be reviewed to maximize policy support for TDM, including: land use plans (from official plans to neighbourhood plans), zoning by-laws, transportation plans (including transit, active transportation and parking plans), and public health, recreation and environmental management plans.

It is helpful that municipal policies can “trickle down” from one plan or statement to another. For example, official plan policies will guide the creation of a transportation master plan, and transportation plan policies will guide the creation of a TDM plan. Policies can also “trickle up” from one plan or statement to another—and this is a real opportunity for TDM practitioners to broaden the effect of their work. For example, TDM plans could identify deficiencies in transportation plans or land use plans that need to be fixed when those plans are updated in the future.

3.1.3 Staffing

**Need for TDM staff.** At their most effective, TDM programs create a cultural shift within governments and across communities. This kind of change requires many eyes to spot opportunities, many minds to build partnerships, and many hands to deliver initiatives. Developing TDM tools, processes and relationships is labour-intensive work, and tackling serious transportation challenges through TDM demands serious resources.

Having sufficient TDM staff within a municipal government and its partner organizations is essential to success. However, TDM is a discipline that lacks resource-based benchmarks or standards for municipalities, and it tends to struggle to compete with the staffing needs of more established municipal services.

**Role of a TDM coordinator.** It is increasingly common for municipalities to hire a single “TDM coordinator” to plan and deliver TDM initiatives. This person may be located in one of many municipal departments—usually in planning or engineering, but possibly in transit, health, social services, or elsewhere. He or she typically works closely with colleagues in all of these areas, playing a central coordinating and facilitating role with planning, monitoring and reporting responsibilities.

Over time, individual TDM coordinators can build momentum and achieve some success, but they cannot single-handedly influence the travel decisions of tens or hundreds of thousands of other people. It is simply not realistic to expect one or two practitioners to make significant
progress in overcoming the transportation challenges facing a typical medium or large municipality. A shortage of staff cannot be counterbalanced with budgets for contractors and consultants, because of the time and energy required to responsibly manage those expenditures.

**Number of Staff.** So, while it is relatively easy to say that one or two TDM practitioners are needed to enable any kind of effective delivery, it is more difficult to identify an optimal number. In fact, no Canadian community has reached an optimal level of TDM service delivery—and most communities with approved TDM policies and plans are far short of the staffing levels they would need to deliver them (even the Greater Toronto and Hamilton Area, where governments and their partners employ at least 30 full-time TDM practitioners in 2010, could make effective use of many more).

Any community of at least 20,000 people that wishes to develop a TDM program could benefit from having at least one full-time TDM staff person. Based on Canadian experience, it is suggested that a minimum of one full-time TDM practitioner for every 100,000 to 200,000 residents would enable a meaningful impact on larger communities. These practitioners may be distributed among government agencies, or employed by NGOs that deliver services on behalf of a municipality.

As noted above, the optimal staffing level for TDM programs will depend on the nature and desired outcomes of the services being delivered. An analogous issue is illness prevention—i.e. how many people should be working to prevent illness in a community? Clearly, there is no straightforward answer—it will depend on the illnesses being targeted, the nature of the audiences, and the measures being delivered. For TDM programs, a prudent approach is to start small but continually build human resources over time, as they are needed to deliver promising initiatives.

**Skills to Look for When Hiring.** TDM is a demanding discipline. Practitioners do not require transportation experience, but they do need an interest in transportation issues and a willingness to learn more about them. The following attributes would be very helpful to any person playing a TDM coordination role:

- *municipal experience*—how decisions are made, how to navigate a bureaucracy
- *business experience*—what interests the private sector, how decisions are made
- *marketing and customer service experience*—understanding consumer behaviour, focusing on client needs
- *volunteer experience*—what motivates volunteers, how to build and leverage capacity
- *communication skills*—speaking with energy, writing clearly and accessibly
- *quantitative skills*—understanding and expressing travel data, creating spreadsheets and charts
- *people skills*—listening, enthusiasm for building relationships, desire to help others
- *pragmatism*—ability to recognize and pursue what works, good judgment in weighing practice versus theory
- *drive and determination*—love of challenge, willingness to take risks, ability to learn from failure
- *passion*—for cities, for people, for change

It is worth noting that these skills are not linked with any one academic curriculum or professional certification. Job applicants are best judged on individual merit and experience.

**Improving Skills.** Because TDM practitioners are unlikely to have all the skills listed above, ongoing professional development opportunities are vital. Training in areas including leadership skills, project management, media relations and public speaking is particularly valuable.
Practitioners also need to keep track of how TDM is working and evolving in other Canadian communities and internationally. Conferences, webinars and workshops allow them to meet and learn directly from their peers, and to build relationships that enable ongoing communication and advice.

Helpful networking resources

ACT Canada is the country’s only national organization devoted to sustainable mobility (see illustration below), and has focused on TDM for almost a decade. It holds annual conferences featuring international speakers and the results of Canadian experiences. See www.actcanada.com for more information.

The TRANSP-TDM listserv is operated by the Center for Urban Transportation Research at the University of South Florida. It is an active forum for information exchange and maintains an extensive archive with years of postings. See www.cutr.usf.edu/tdm for more information.

3.1.4 Funding

FUNDING AMOUNTS. Having adequate TDM staff and supportive internal partners will help a municipality to achieve some success, even with limited financial resources. Creative practitioners and their partners have been known to fund TDM measures by drawing on municipal budgets for public transit, active transportation, traffic management, health, recreation and environmental management. However, it is likely that transparency and accountability will eventually require the availability of TDM operating funds.

As with staffing, TDM funding can grow over time as plans are implemented and services expand. However, Canadian experience indicates that a rough annual budget of $0.50 or more per capita (excluding staff salaries) would allow delivery of basic TDM functions. Again, this amount will not enable substantial success against real challenges—but it does represent a starting point.

FUNDING SOURCES. While a few regional transportation authorities are funded by fuel taxes or vehicle registration fees, most of Canada’s municipalities rely on property taxes to fund public services such as TDM programs. Several other sources of TDM funding may be available, depending on local circumstances:

- **Fee-for-service arrangements** for some TDM programs, such as assistance to employers, can generate revenues that offset some costs. Experience has shown that only larger metropolitan areas are likely to offer market conditions that support such arrangements.
- **Partners** including school boards, business associations, festival groups and event sponsors may contribute financially to TDM initiatives that benefit them.
- **Development charges**, which are levied to pay for growth-related capital projects (e.g. new roads, libraries and community centres). Depending on legislative and regulatory frameworks, development charges can raise revenues for TDM programs that are expected to reduce the capital cost impacts of new development. As an example, the Town of Markham, Ontario funds its entire TDM program through the community-wide development charges assessed on new homes and commercial developments.
- **Parking fees** from off-street municipal lots and on-street spaces are often returned to general municipal revenues, but a portion of them
could be redirected to TDM programs. As an example, in Ontario the City of Mississauga’s parking program funds both a municipal TDM staff position and the Smart Commute Mississauga organization. This idea of using parking fees paid by drivers to improve transportation options for everyone can be politically palatable (it helped win public support for the congestion charging scheme in London, England) and also provides a degree of funding security.

- **Transit fare revenues** support transit operations, including conventional marketing activities. A portion of fare revenues could be used to support TDM programs that contribute to the achievement of transit ridership objectives.

- **Philanthropic foundations** may be willing to support TDM projects that are focused on improving a community’s social, public health or environmental outcomes.

- **Provincial and/or federal government programs** may offer support for projects related to sustainable transportation, health or the environment, but the specifics of such programs vary by jurisdiction.

- **The Green Municipal Fund** of the Federation of Canadian Municipalities offers support for a variety of projects, including grants for up to 50% of the cost of sustainable transportation feasibility studies and field tests (maximum $350,000). See www.gmf.fcm.ca for more information.

### 3.2 Working collaboratively

As mentioned in Section 1.2.3, working with others is a key to TDM success—it can maximize resources, increase reach to key audiences, and propagate social and organizational change. For this reason, most municipal TDM staff act as the “hub” in a wheel with many spokes—they wield influence, rather than control. It is worth noting that this culture of collaboration may be more natural to outreach-focused community planning, social service and public health departments than it is to more technical engineering groups.

#### 3.2.1 Internal coordination

**Steering Committee.** Coordination of TDM initiatives within a municipality is essential because of the many linkages among services. Formation of a steering or advisory committee can help stakeholders to stay informed of plans and actions, and to maximize synergies while minimizing conflicts.

Such a committee may include representatives of engineering, planning, health, recreation, environment, communications, social and economic development services. Local transit and parking operations are particularly critical members. Regular meetings can help cement personal relationships and encourage informal discussion in a way that email and phone conversations cannot. By emphasizing the cooperative nature of TDM programs, the committee can also become a forum for sharing staff and financial resources.

**Stakeholder Education.** More broadly speaking, internal education is advisable to build awareness of the TDM program, its methods and objectives among municipal staff, managers and elected officials. It can prevent the inadvertent introduction of new obstacles to TDM measures. Municipal staff in diverse departments, and particularly those responsible for planning and engineering, should understand sustainable transportation and TDM sufficiently to know how they can contribute to the solution, rather than be part of the problem. One path to improving their knowledge is through participation in webinars or other educational opportunities provided by outside organizations.
Municipal staff who have a close relationship to TDM services can benefit from extra learning or training opportunities. For example, development approvals staff require a clear understanding of the features that make new development TDM-supportive, and of the importance of working with developers to integrate those features. Tools that can help development approvals officers fulfill their role include checklists, guidelines and constructive critiques of previously approved developments that highlight both positive and negative features.

### 3.2.2 External partnerships

As discussed in Section 1.2.3, municipalities need institutions, businesses and community organizations to be actively involved in their TDM programs. In each case, these relationships are based on common interests and shared objectives. Many of the TDM measures identified in Appendix A exhibit the need for partnerships (ranging from informal collaboration to formal agreements) with workplaces, schools, post-secondary institutions and community groups.

**Benefits.** The benefits of partnerships include:

- **gaining support**—by demonstrating the broad interest and involvement that can convince decision makers of a TDM program’s value
- **leveraging resources**—by motivating external partners to invest in areas that interest them (e.g. investment by an employer in its own workplace, by a school board in its schools, or by an environmental group in TDM programs that raise awareness of climate change)
- **extending reach**—by opening up service delivery channels to access new markets, such as through a partner’s website, newsletters, meetings or events
- **enhancing credibility**—by ensuring that TDM messages come from independent sources, as well as from government
- **reducing risk**—by reducing the overall risks to the program of any one partner withdrawing its resources or participation

### 3.2.3 Alternative service delivery

Contracting with private or non-profit organizations to deliver specific TDM services can be a realistic option for municipalities. Transit authorities, where they are separate from the municipality, are another alternative.

**Service types.** External providers can deliver a number of services such as special event promotion and management (e.g. Bike to Work Weeks), school outreach (e.g. Active and Safe Routes to School programs, youth engagement and skills training), employer outreach (e.g. commuter surveys and other travel planning assistance, employee engagement, transportation fairs and other workplace events), and cycling skills courses available to the general public, workplaces or other targeted audiences.

**Benefits.** External service providers can offer several potential benefits:

- They can offer pre-existing relationships with key stakeholders (for example, a chamber of commerce might effectively deliver TDM services to employers). When dealing with those stakeholders, they do not bring with them the weight of municipal government (which could be either positive or negative depending on the stakeholder, service provider and government in question).
- They can have lower operating costs for accommodations, salaries and benefits. They can also leverage revenues from third parties that may be unavailable to municipal...
governments (e.g. from private-sector sponsors or senior government programs).

- They have less challenging approval processes for communications and purchasing. They also have less burdensome staff hiring processes, and greater flexibility in hiring term or part-time workers.
- They can operate without the disruption of labour stoppages, councillor inquiries, and (with longer-term contracts) election years and annual budget uncertainties.

**Key Issues.** Following good contracting procedure, TDM service agreements must be based on a clearly defined scope, deliverables, timelines, quality expectations and performance measurement criteria. It is also important to define communication protocols early in the process: Should messages to clients and the general public be seen as coming from the service provider and/or the municipality? Should branded programs carry the identity of the service provider and/or the local government? Who should handle media inquiries?

It is important to emphasize that TDM programs cannot be completely outsourced—municipalities must preserve critical policy, leadership and program development functions. Outsourcing arrangements also need to avoid creating a dependency on any single service provider, which can lead to future terms and conditions that are less than competitive.

**Transportation Management Associations (TMAs).** TMAs are one way to offer TDM services to employers. They can take different forms:

- The Greater Toronto and Hamilton Area has a network of eleven local Smart Commute organizations in 2010—some are independent non-profit organizations, some are programs delivered by local chambers of commerce or boards of trade (which can leverage established employer relationships), and others are municipal government services. All rely primarily on government funding to stay in operation (see www.smartcommute.ca for more information).
- In Quebec, several *Centres de gestion des déplacements* (CGDs, the French equivalent of TMAs) exist in the province’s largest cities. All are non-profit organizations, and rely significantly on government subsidies received by their clients (for more information see www.acgdq.com).
- In Vancouver, groups of employers in shared geographic areas work together under the banner of a TMA, with help from TransLink but without any formal organizational basis.

TMAs have the potential to be dynamic, efficient organizations. Like Quebec’s CGDs, they can generate revenue by providing valued services to workplaces—however, they are very unlikely to be financially independent. In Quebec, CGD revenues from employer fees are largely subsidized by the provincial government; in Toronto, the rates of cost-recovery by TMAs are less than 20%. TMAs can also be susceptible to poor performance if they lack the motivation of close government ties or funding conditions tied to outcomes. In short, the viability of independent TMAs in Canada is far from proven.

A more practical and controllable approach to alternative service delivery for employer-facing programs might be a straightforward service contract with a local non-profit organization. Another option would be to retain a for-profit business to deliver services in the manner of a TMA using a pay-for-performance contract. This model is being applied by Smart Commute Brampton-Caledon in Ontario, which has hired consultants to deliver services, but is otherwise untested in Canada. It is more common in the United States.
3.3 Engaging audiences

3.3.1 Messaging

**BENEFITS.** TDM programs are a chance for municipalities to talk with residents about options for getting around, and how to take advantage of them. The messages they deliver can support behaviour change by shifting the competitive position of different travel choices, and by “detaching” the desire for personal mobility from the assumption of car use. The culture of many communities holds that driving is the natural travel choice for most people, and that transit, carpooling, cycling and walking are most appropriate for low-income or athletic individuals. To change this culture, those communities must work to make the public image of sustainable travel choices more mainstream and attractive, with greater perceived benefits for users (e.g. fitness, cost savings, time savings) and the general public (e.g. congestion reduction, pollution reduction, lower public expenditures).

**KEY ISSUES.** It is important to not oversell sustainable travel choices by claiming benefits that are unlikely to be realized. Equally, it is important to not promote choices that people feel are remote or unavailable—for instance, promoting cycling in a neighbourhood where on-road safety is an acknowledged issue, or where promised cycling facility improvements are yet to be built.

It is also advisable to avoid positioning car use as “undesirable.” Many people reasonably feel that driving is their only choice to meet day-to-day obligations. TDM messages that criticize their travel decisions may only create hostility. Instead, messages about how people can drive efficiently, when they must drive, are both inclusive and constructive.

3.3.2 Identity and branding

**BENEFITS.** A memorable identity can help a TDM program build a long-term relationship with residents. At their best, program identities become brands—and successful brands enjoy customer confidence and loyalty, as shown by commercial examples like Apple Computer or Walmart. However, strong brands are based on consistent, positive customer experiences—that is, they require long-term commitment and they are earned rather than manufactured.

TDM program identities can help consumers and program partners to “connect the dots” by linking different products and services together (e.g. carpool programs, cycling skills courses, telework training, discounted transit pass programs). They position sustainable travel options as a mutually supportive suite of choices that offer more flexibility and convenience as a group than they do individually.

**KEY ISSUES.** One issue to tackle when developing a TDM program identity is to determine how it relates to other sustainable transportation services and programs that may have their own identities, such as public transit and carpool ridematching services. Overlapping or conflicting identities can confuse individuals who are looking for information or assistance. Another issue to consider is how a TDM identity relates to the identity of its parent organization. Government agencies typically have protocols that limit the scope and use of program identities; only in occasional cases (such as Metrolinx’s Smart Commute and the Central Okanagan’s i-Go!) will a TDM program identity likely gain its own meaning independent of its parent organization(s).
Local or regional TDM program identities in Canada

In Vancouver, TransLink’s TravelSmart program began as an individualized marketing pilot project and has now become the organization’s umbrella identity for promoting multimodal travel options (see www.travelsmart.ca for more information).

The City of Ottawa’s TravelWise program identity has been in use for a decade, and the name and logo have been shared with the Region of Waterloo (see www.ottawa.ca/travelwise and www.region.waterloo.on.ca/travelwise for more information).

The i-Go! program is supported by the City of Kelowna, West Kelowna and Westbank First Nation (see www.i-go.ca for more information).

In the Greater Toronto and Hamilton Area, the Smart Commute program identity developed by Metrolinx encompasses eleven local Smart Commute organizations that deliver TDM services (see www.smartcommute.ca for more information).

In the Montréal metropolitan area, the Agence métropolitaine de transport (AMT) has created the allégo program identity as an umbrella for its TDM services (see www.allego.amt.qc.ca for more information).

3.3.3 Internet use

**BENEFITS.** It is essential for TDM programs to have a strong Internet presence. The Web, email and social media greatly reduce the cost of program communications, increase convenience for users, and create new marketing channels for reach key audiences.

**KEY ISSUES: WEBSITES.** TDM programs commonly offer a central Web site as a clearinghouse for information on individual travel choices and TDM program initiatives. This site is usually located within a local or regional government’s Web site, unless an independent program identity has been established. An accessible and effective Web site can substantially reduce the amount of time that TDM staff members must spend answering questions or mailing out flyers and application forms. Web-based information technology also allows a Web site to act as an automated hub for sending out newsletters and other communications to interested individuals.

TDM program Web sites can evolve into portals that offer features such as multimodal travel planners, live traffic cameras, weather and collision reports, road construction notices, efficient driving tips, and links to air, rail and intercity bus carriers. Even though broadening a Web site’s scope in this way can dilute the core TDM message, there is definite public benefit in centralizing travel information. There is also a valuable opportunity to greatly increase the number of people who are exposed to the TDM program’s messages and services when they visit the site for other reasons such as traffic reports.

**KEY ISSUES: SOCIAL MEDIA.** One of the keys to effective marketing is to place products where people happen to be looking. Today, that means social media—the most important of which are Facebook, Twitter and YouTube (although the pace of change is dramatic).
**3.3.4 Special events**

**BENEFITS.** Special events serve many purposes within a TDM program. First, they validate and build awareness of sustainable travel choices by promoting them through media coverage, political endorsements and celebrity involvement. By encouraging visible displays of sustainable travel (e.g., a temporary increase in cyclist volumes) they shift social norms and build public acceptance of those options. They encourage people to try a new way of getting around, even for just one day, and provide positive reinforcement for people who already make regular use of sustainable travel options. Finally, they attract sponsors and partners who may then become more involved in other aspects of a TDM program.

**KEY ISSUES.** TDM practitioners can easily underestimate the resources required to successfully organize, promote and deliver a special event. Engaging individuals, business, community organizations and media is a time- and energy-consuming activity. When in doubt, a good strategy is to launch a new event by setting manageable objectives for participation, possibly by limiting the initial scope. Delivering a small but successful event is a good way to build momentum for subsequent years.

**TDM-related special events across Canada**

Many municipalities and non-governmental organizations conduct or sponsor special events that are consistent with TDM objectives, including:

- Bike (and Bike to Work) Day, Week or Month
- Commuter Challenge events
- International Car Free Day and In Town Without My Car Day
- International Walk to School Day or Month
- RideShare Week

Variations on these events are too numerous to list, and change frequently. Readers are encouraged to search the Internet for more information.
3.3.5 Advertising

**Benefits.** The publicity gained through advertising can play several important roles in a TDM program. First, it can build understanding of key issues and help influence attitudes, such as through an active transportation messaging campaign using bus boards, shelter ads or community newspapers. It can raise awareness of opportunities to participate in TDM initiatives, such as using local business publications to reach employers. It can also raise awareness about special events, such as promotion of Bike to Work Week through radio spots, or of employer recognition awards through print ads in business tabloids. Finally, it can provide clear and timely public information, such as notices of new services, application deadlines, or public review periods for reports.

**Key Issues.** For community-oriented information, weekly or monthly community papers can offer greater effectiveness and value than daily newspapers, particularly in larger markets. Electronic media can also be useful in reaching large numbers of people with a focused message. Although television ads are expensive, radio spots can be more economical or even virtually cost-free if they are positioned as public service announcements.

3.3.6 Recognition

**Benefits.** Positive reinforcement is helpful in encouraging and reinforcing any form of behaviour change. Public recognition of stakeholder efforts and successes is a valuable component of any TDM program.

**Key Issues: Awards.** The TDM-related awards used in Canadian communities include employer awards that recognize workplaces (and the people within them) that have made substantial travel planning efforts, and cycling-friendly business awards that recognize workplaces or merchants that have improved and promoted bicycle commuting and/or made cycling more attractive for customers. They also include individual awards for citizens who have played significant leadership roles in TDM programs or the pursuit of sustainable transportation, and special event awards that recognize organizations achieving high rates of participation among employee or student populations.

**Key Issues: Other Forms of Recognition.** Of course, recognition need not take the form of awards. It can also include public identification (e.g., through newspaper ads or a municipal Web site) of workplace or school partners, advisory committee members, special event participants or others who have supported TDM initiatives. Holding an event dedicated to recognition gives elected officials and other champions an opportunity to enhance their visibility on the issue, and for TDM stakeholders to meet each other and celebrate their successes together.

**Examples of TDM program awards**

The Smart Commute program of Metrolinx gives out several Employer of the Year awards, and a Champion Award for outstanding contributions by other individuals or organizations.

The City of Ottawa’s Bruce Timmermans Cycling Awards recognize annual contributions by individuals and organizations. They also offer cycling-friendly designations to business, organizations and other destinations that offer facilities and services to make cycling more attractive.
3.3.7 Reporting on program results

**Benefits.** Regular publication of reports on the status of the TDM program and individual initiatives, including measured results and individual stories or testimonials, serves a number of purposes. Reporting is part of program accountability and building the case for continued investment; it offers a chance to recognize contributors; it is an opportunity to validate TDM concepts and build understanding of their potential among the general public; and it can leverage media coverage to provide broad program exposure.

**Key issues.** As discussed in Section 2.4, a TDM program’s performance measurement activities will provide much of the key material for program reports. This information is vital, as it can help justify the continuation or expansion of program resources. However, many Canadian TDM programs have struggled with program reporting due to difficulties with performance measurement, often springing from a lack of technical knowledge and inadequate staff and funds to undertake needed surveys and observations. Remaining aware of this pitfall and seeking ways around it will increase the odds that a TDM program report will contain tangible evidence of success.

3.3.8 Media relations

**Benefits.** Media attention for TDM programs and initiatives can be much more than free publicity. It can validate the existence of a TDM program, and strengthen social norms around sustainable transportation choices. Positive “buzz” is also noted by elected officials and community partners, who may see an opportunity to lend their support and share the limelight.

**Key issues: challenges.** Fostering positive media relations around TDM programs can be a challenge. While media are generally supportive of the notions of outcomes like congestion or pollution reduction, reporters and editors can find more news value in critiques of government initiatives as inadequate or wasteful. The longer-term nature of TDM initiatives distinguishes them from more conventional transportation projects and their “ribbon cutting” opportunities. Their real news value lies not in a top-down narrative, but in the stories of individuals, businesses and institutions that benefit from them.

**Key issues: suggested approaches.** Promotional measures around special events or new services can identify “good news” stories for media use. Actions by residents, businesses and schools (not governments) offer human interest and encourage stories about outcomes rather than process. An added benefit of such stories is that they support the goal of shifting social norms by publicizing people who have changed their travel behaviour and benefited by it.

Because many TDM activities focus on the participation of local individuals, schools and businesses, community newspapers can make strong allies. It can help to have program partners make their own media contacts; this reduces municipal influence over the resulting story, but can make the story itself more attractive.

Generally, a successful media relations program must be based on more than a defensive approach of identifying sensitive issues and preparing question responses. It must proactively educate key editors and reporters about the scope of the challenge and the response, and provide media-friendly story opportunities. It is wise to respond quickly to media requests, and to have people ready to discuss their stories. On the whole, it is far better to engender a collegial relationship rather than to have an adversarial one develop by chance.
### 3.4 Summary

#### Delivering TDM programs

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## Delivering TDM programs

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Appendix A: **TDM measures**

This Appendix provides a concise scan of measures that could be delivered through a community TDM program. These are presented in three sections:

- **modal measures** that make sustainable travel options more competitive to driving alone, by improving their profile and making them more accessible, comfortable, convenient, affordable or safe
- **outreach measures** that allow municipal governments to reach out and engage organizations and individuals, both to create delivery channels for municipal measures and to motivate independent action by partners
- **leadership measures** that municipalities can undertake within their own operations to further TDM objectives directly, and to act as role models for other organizations

Consistent with the discussion in Section 1 of this guide, most of these measures in this Appendix address the social and economic factors behind the travel choices that individuals make. However, some measures that target physical factors are included because they have strong links to the delivery of other TDM measures. For example, physical improvements to bicycle parking are included because they are often delivered as part of workplace or school travel plans, or within municipal leadership initiatives. Otherwise, this Appendix does not address major transportation infrastructure or land use measures such as public transit services or facilities, bicycle lanes or trails, high-occupancy vehicle lanes on freeways or arterial roads, or transit-oriented development.

### A.1 Modal measures: Improving travel options

#### A.1.1 Active transportation

**Promote a culture of active transportation**
- Messaging campaigns to advance active transportation’s competitive position
- Special events to promote walking and/or cycling at a community-wide or neighbourhood scale
- Awards to recognize corporate, community or individual contributions to active transportation

**Increase trial of active transportation options**
- Special events to promote walking and/or cycling at a community-wide or neighbourhood scale
- “Open street” events (e.g. ciclovias) to encourage fun, family-oriented trial of active transportation
- Promotion of bike sharing services (e.g. BIXI service in Montréal, QC)
**Improve Cyclist Convenience, Confidence and Safety**
- Maps that illustrate active transportation facilities and recommended routes
- Trip planning (online or in-person) to help individuals plan appropriate routes
- Wayfinding signage to help active transportation users find their way to major destinations
- Cycling skills courses for adults, youth and children, provided at various levels of detail and in various locations

**Integrate Walking, Cycling and Transit**
- Minor enhancements to walking routes that link key destinations to transit stops and stations
- Bike parking at transit stops and stations
- Bike racks on buses
- Bike-friendly policies and storage areas on rail transit vehicles

**Helpful resource**
Transport Canada’s *Bike Sharing Guide* helps planners and decision makers determine if public bicycle sharing is viable in their community and, if so, how to design, implement, and operate a successful system. Material in the guide is drawn primarily from European experiences and has been assessed for relevance to the Canadian context. See www.tc.gc.ca/urban for more information.

**Make bicycling parking more visible, secure and convenient**
- Relocated, expanded, signed and better lit bike racks in public locations and at major destinations
- Guidelines and assistance for workplaces and other destinations in purchasing and locating bike racks
- Provision of discounted bike racks to institutions and workplaces, or free bike racks to be returned or paid for after a trial period

**Encourage better shower and change facilities at destinations**
- Work with employers, property managers and institutions to improve employee shower and change facilities

**Helpful resource**
Transport Canada’s *Bicycle End-of-Trip Facilities: A Guide for Canadian Municipalities and Employers* can help municipal agencies and employers create attractive bicycle parking and related facilities to encourage bicycle use. The guide provides guidance on how to determine where, how much, and what type of bicycle parking and related facilities to provide, and how to design them. See www.tc.gc.ca/urban for more information.
A.1.2 Public transit

**Promote a transit culture**
- Messaging campaigns to advance transit’s competitive position
- Inclusion of transit directions in notices for public events (e.g., open houses, festivals)

**Make transit easier to use**
- Trip planning (online or in-person) to help individuals plan appropriate transit itineraries
- Provision of transit information kiosks at key destinations
- Real-time transit service information displays at key destinations, online and via wireless devices
- Online “how-to” video tutorials for new transit users
- Outreach communications and presentations (e.g., immigration centres, social service locations, seniors centres, secondary schools, workplaces)

**Make transit fare payment more convenient and affordable**
- Employer transit pass programs via discounted payroll deduction or reselling through workplaces
- Universal transit pass (U-pass) programs at post-secondary institutions
- Public transit pass programs (e.g., discounted annual subscription passes)
- Electronic fare cards, possibly integrated with other transit systems, parking meters, libraries, recreation centres and other government services

**Encourage trial**
- Promote transit use to reach special events (e.g., festivals, concerts, sporting events) by offering free or discounted transit fares (e.g., event ticket acts as game-day transit pass)

A.1.3 Ridesharing

**Enable ridematching**
- Online ridematching services for the public, with special features for employees of participating workplaces

**Make passenger pick-up and drop-off more convenient**
- Public carpool lots on community periphery, and/or arrangements with property owners (e.g., shopping malls) to permit on-site carpool parking

**Promote trial**
- Special events to promote carpooling

**Provide incentives**
- Preferential carpool parking spaces at municipal facilities and public events
- Discounted parking fees for carpools at public events

**Vanpooling**
- Promotion of public vanpooling services where they exist
- Promotion of corporate vanpooling as an initiative that major workplaces can offer
- Assistance with corporate vanpooling feasibility studies and plans in workplaces

A.1.4 Carsharing

**Support carshare operations**
- Lease of parking stalls to carshare services in public parking lots or on-street, where practical
- Favourable treatment of proposals to reduce on-site parking in new developments where carshare vehicles are provided

**Cross-promote with municipal services**
- Discounted transit passes for individual members of carshare organizations
- Discounted bike sharing memberships for individual members of carshare organizations
A.1.5 Telework

**BUILD AWARENESS AND UNDERSTANDING**
- Telework promotion and education aimed at governmental, institutional and corporate workplaces
- Assistance with corporate telework feasibility studies and plans in workplaces
- Special events to promote telework

A.1.6 Parking

**INCREASE THE COST OF PARKING**
- Monthly parking prices in areas with quality transit service no lower than the cost of a transit pass
- Daily, weekly and monthly rates in municipal parking lots that are in line with private parking operators
- Elimination of weekly or monthly discounts in municipal parking lots

A.1.7 Automobile use

**BUILD EDUCATION AND AWARENESS**
- Special events to promote alternatives to driving
- Online emission and driving cost calculators to build awareness of the benefits of not driving
- Workshops on fuel-efficient driving at neighbourhood destinations (e.g. libraries, community centres) and in workplaces

**INCREASE THE COSTS OF AUTOMOBILE USE**
- Vehicle registration levies, parking levies, road use charges—which generally face substantial legislative, political, public acceptance, social equity and technical challenges

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**Helpful resource**

Transport Canada’s *Improving Travel Options in Small and Rural Communities* guide can help practitioners—engineers, planners, health professionals, economic development officials and others—to improve travel options for residents of small and rural communities. This includes a range of actions that make personal transportation activities more sustainable—encouraging drivers to operate their cars more efficiently, or to leave their cars at home and walk, cycle, take transit or carpool instead. See www.tc.gc.ca/urban for more information.
A.2 Outreach measures: Reaching key audiences

A.2.1 Individuals and households

**BUILD AWARENESS AND UNDERSTANDING**
- Messaging campaigns to advance the competitive position of sustainable travel options
- Development of a strong central TDM program brand
- TDM program Web site with multimodal travel information
- Social media campaigns to attract and retain key audiences
- Cross-promotion of TDM measures and other programs delivered by the municipality or its partners in the fields of emissions reduction, energy conservation, waste reduction, water conservation and public health

**PROVIDE CUSTOMIZED ADVICE AND INCENTIVES**
- Individualized marketing programs (also called residential travel plans) that offer customized information and advice on sustainable travel choices to interested individuals and families
- Transportation fairs offering multimodal information and services at major workplaces
- Cycling skills courses at workplaces
- Provision of discounted or “try-then-buy” bike racks to institutions and workplaces
- Special events to promote sustainable commuting and challenges among workplaces

A.2.2 Workplaces

**BUILD PARTNERSHIPS**
- Networking with business associations, property managers and corporate executives
- TMA formation to reach out to employers and employees in target areas
- Professional development opportunities (e.g. workplace travel planning workshops) for TDM contacts in local workplaces

**PROVIDE VALUED SERVICES**
- Employer transit pass programs
- Ridematching programs with special features for employees of participating workplaces
- Emergency ride home (ERH) subscription program, or assistance and advice in establishing workplace ERH programs
- Assistance with development of workplace travel plans and commuter surveys to assess baseline activities and attitudes, and to measure travel plan impacts

**PROVIDE WORKPLACE TRAVEL PLAN ADVICE AND ASSISTANCE**
- Workplace scans to assess opportunities and challenges related to sustainable commuting
- Assistance with development of travel plans
- Assistance with commuter surveys to assess baseline activities and attitudes, and to measure travel plan impacts

Helpful resource

Transport Canada’s *Workplace Travel Plans: Guidance for Canadian Employers* is written for employers interested in helping their employees find more efficient and sustainable ways of commuting to work. It helps employers to define their own goals and objectives, then to develop a tailored travel plan that will give them a positive return on their investment.
A.2.3  **Post-secondary institutions**

**BUILD PARTNERSHIPS**
- Networking with administrators
- Professional development opportunities (e.g. travel planning workshops) for TDM contacts in post-secondary institutions

**PROVIDE VALUED SERVICES**
- Universal transit pass (U-pass) programs for students
- Employer transit pass programs for staff and faculty
- Ridematching programs
- Emergency ride home (ERH) subscription program, or assistance and advice in establishing workplace ERH programs
- Transportation fairs offering multimodal information and services
- Cycling skills courses
- Assistance and advice with bike parking improvements
- Special events to promote sustainable travel options

**PROVIDE TRAVEL PLANNING ADVICE AND ASSISTANCE**
- Campus scans to assess opportunities and challenges related to sustainable commuting
- Assistance with development of travel plans
- Assistance with commuter surveys to assess baseline activities and attitudes, and to measure travel plan impacts

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**Helpful resource**

The Canadian Urban Transit Association’s *U-Pass Toolkit: The Complete Guide to Universal Transit Pass Programs at Canadian Colleges and Universities* is a comprehensive guide to implementing universal transit pass programs. It is available from CUTA upon request. See www.cutaactu.ca for more information.

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A.2.4  **Schools**

**BUILD PARTNERSHIPS**
- Communications and meetings with school board administrators, school principals and staff
- Professional development opportunities (e.g. school travel planning workshops) for TDM contacts in schools

**PROVIDE VALUED SERVICES**
- Traffic safety audits and improvements in the vicinity of schools
- Crossing guard programs
- Cycling skills courses for school staff and students
- Bike parking improvements
- Special events to promote sustainable commuting by school staff and students
- Curriculum resources
Provide travel planning advice and assistance

- School scans to assess opportunities and challenges related to sustainable travel
- Assistance with development of travel plans
- Assistance with travel surveys to assess baseline activities and attitudes, and to measure school travel plan impacts

A.2.5 Other audiences

Neighbourhood business groups
- Promotion of “shop locally” campaigns

Festivals
- Advice and assistance with integrating sustainable transportation principles and practices into festival planning and implementation (e.g. user information, valet bike parking, transit cross-promotions)

Tourists and visitors
- Provision of local transit, cycling and walking information at hotels and major destinations, and through tour operators

A.3 Leadership measures: Showing the way

A.3.1 Municipal travel plan

Improve and promote sustainable travel options for employees
- Develop and implement a workplace travel plan for municipal facilities, addressing both employee commuting and local business travel

Improve and promote sustainable options for client and visitor travel to or from municipal facilities
- Public bike parking improvements, preferential carpool parking, and sustainable transportation information provision at municipal facilities

- Inclusion of information on sustainable travel to municipal facilities in public meeting notices, event invitations and bulletins

A.3.2 Zoning and development approvals

Require or encourage TDM-supportive features in new developments
- Zoning by-law changes to require bike parking, showers and change rooms
- Guidelines and checklists for inclusion of TDM-supportive features in new developments

Helpful resource

Green Communities Canada’s Active and Safe Routes to School program has developed a comprehensive set of School Travel Planning Tools that can help with the development and implementation of school travel plans. See www.saferoutestoschool.ca for more information.
- Training for development approvals staff on dealing with developers from initial consultation to final approval

**REQUIRE TRAVEL PLANS FOR NEW DEVELOPMENTS**
- Policy requiring development and implementation of a travel plan for new commercial and residential developments of a minimum size, parking capacity or traffic volume generation

**ENCOURAGE INNOVATIVE DEVELOPMENT FEATURES**
- Encourage the inclusion of proposals to include carshare memberships, public bike memberships and/or annual transit passes with the purchase of a new home or condominium

**REDUCE PARKING SUPPLY REQUIREMENTS**
- Zoning by-law changes to eliminate or reduce requirements for minimum parking capacity
- Zoning by-law changes to introduce or reduce limits for maximum parking capacity
- Cash-in-lieu-of-parking option for new developments to fund public parking facilities and services rather than build private on-site parking
- Favourable treatment of proposals to reduce on-site parking in new developments where carshare vehicles are provided

**Helpful resources**
ACT Canada’s publication *TDM Supportive Guidelines for Development Approvals* addresses the use of development applications, site plan reviews and contact with developers, landowners and facility managers to enforce and implement TDM principles. See www.actcanada.com for more information and to download the free guidelines.

The Institute of Transportation Engineers publication *Promoting Sustainable Transportation Through Site Design: An ITE Recommended Practice* describes comprehensive site development practices to promote the use of sustainable travel to non-residential or mixed-use developments. See www.ite.org for more information on the document and how to purchase it.
Incorporating TDM Into the Land Development Process

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The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the U.S. Department of Transportation or the State of Florida Department of Transportation.
Unfamiliarity with the plans, processes and procedures of the local government land development process, transportation demand management (TDM) professionals can be frustrated in their efforts to improve mobility and reduce traffic congestion. This report provides detailed information to transportation professionals regarding how to incorporate TDM strategies into the land development process. The report documents efforts to secure TDM strategies as part of development approvals, summarizes the long range planning groundwork that frames the land development process, provides several case study examples from Florida and nationwide and also identifies several institutional barriers to the use of TDM as part of the land development process. A major finding is that transportation professionals interested in using TDM in land development must get involved long before development proposals are submitted. This requires participation in review and updates of the MPO long range transportation plan and transportation improvement program as well as local government comprehensive plans. Further, it involves appraising how well the local government land development regulations implement the intent of the comprehensive plan and reviewing traffic analysis methodology and underlying assumptions. These ground laying activities will begin the integration of TDM principles and strategies into the land use and transportation planning processes resulting in physical infrastructure, regulatory tools and operations management to support TDM as part of the solution as land development proceeds.
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EXECUTIVE SUMMARY

Problem statement

Transportation planning and system development in Florida, including the use of transportation demand management strategies, begins with both federal and state law. These laws, combined with escalating right-of-way and construction costs and shrinking revenue sources, have influenced transportation decision makers to place more attention on maximizing the use of the existing transportation system through the approach of transportation demand management (TDM). However, numerous barriers and obstacles exist for the incorporation of TDM into the land development process. Consistent prioritization of funding for private automobile and truck transportation service over the years reinforces existing travel behavior and public expectations at the local level. Historically, urban transportation planning carried out by both state and municipal governments nationwide has accommodated the demand for travel and safeguarded this accommodation from land development. TDM is concerned with managing (reducing in many cases) the demand for travel by seeking to create conditions that meet travelers’ needs and at the same time alter their behavior to reduce adverse impacts and to generate greater efficiencies. The land development process is where these two philosophies to transportation system development and management (managing vs. accommodating) come into conflict and can potentially be resolved.

Study purpose and objectives

While TDM usually has been applied as an effort to convince employees to use alternative transportation, there are diverse settings and contexts for using TDM, both on-site and off-site, and providing for physical facilities as well as management and operations. In addition to alternative mode use, TDM strategies influence travel behavior by time of day or day of the week, trip frequency, trip length, regulation, route and cost. For example, single-occupant vehicle commuters can still participate in TDM by relocating to a work site branch office closer to home (proximate commuting), telecommuting one or more days of the week or staggering work hours.

One of the challenges in the use of impact fees, impact fee offsets, concurrency assessments and trip reduction ordinances is determining a reasonable and effective dollar amount required that covers the costs of needed facilities and can be demonstrated to represent the impact from the development. In the case of a concurrency management system, if trip credits are awarded in exchange for the conduct of a TDM program, the challenge is to refine a method for calibrating the credit amounts of developments of different sizes so that it encourages an effective TDM program and provides a worthwhile financial savings to the developers.

The goal and objectives of this study were based on the premise that a systemwide integrated approach to achieving transportation goals should be used and that transportation demand management is a critical component in conjunction with land use planning, transportation system construction and transportation systems management for the development of a cost-effective and functional intermodal and multimodal transportation system. The report provides information for municipal planners, traffic engineers, land development proposal reviewers and TDM professionals working for commuter assistance programs, transportation management associations and in other capacities. This study was sponsored by the Florida Department of Transportation and funded through the National Center for Transit Research.

The geographic focus of this study was the state of Florida; however, the findings and recommendations will have application to municipalities nationwide. The purpose of this study was to determine ways that TDM could be more effectively incorporated into the land development
Incorporating TDM into the Land Development Process

process, so that the necessary foundation for later TDM program implementation is laid. This goal was achieved through the study objectives of:

✓ Reviewing the federal and state legal framework;
✓ Exploring the many means of influencing travel behavior, with examples of TDM strategies, how these may fit into the land development process and what parties may be potential implementing partners;
✓ Identifying challenges preventing the inclusion of TDM in the land development process;
✓ Summarizing current practice at the local level;
✓ Providing case study examples both nationwide and from Florida; and
✓ Providing recommendations for incorporating TDM into the land development process.

Report appendices include excerpts from development agreements, analysis of site impact methodology, example of long range transportation plan TDM policies, and traffic impact fee reduction incentives.

Findings and Conclusions

A total of 38 recommendations are provided in this report, which fall under six general categories, including:

- Immediate actions for specific proposals
- Involvement in the MPO planning process
- Involvement in State government processes
- Seeking refinement in methodologies
- Developing professional relationships

A few of the findings and recommendations are highlighted below.

The mission of the Florida Department of Transportation is to advance transportation for statewide purposes, which is in some ways fundamentally different from the transportation interests of local urban areas. The state roadway system primarily serves through movements for regional mobility purposes while municipal roadways of varying functional classifications attempt to juggle access provision while meeting level of service standards. The presence of state roads, built to specifications for moving through traffic, affects the pattern of local land development in that there is an attraction to build near available capacity. Resulting dispersed land development is difficult to serve with transportation alternatives.

Vital to the administration of the land development process is maintaining the confidence of land developers that each one is treated fairly and in the same manner as all other developers. This places a responsibility on any such method to determine the magnitude and quality of future impacts of development, to attribute the impacts accurately to the responsible party, and to identify mitigating measures that will both directly address those impacts as well as serve the development of the contributing party. The rational decision making process and range of answers generated for the development of the transportation system is linked to the kinds of data collected, the degree of detail and scope of the collected data and the analysis techniques used. The analysis techniques used incorporate assumptions about desired outcomes as well as drive particular analysis outcomes.

One finding from the literature review that has strong relevance to the application of TDM in the land development process is the analysis conducted by Donald Shoup of UCLA regarding the use of
Incorporating TDM into the Land Development Process

The Institute of Transportation Engineers (ITE) trip generation and parking rates. Shoup found that local governments tend to overly rely upon the accuracy of these rates despite cautions provided by ITE for their appropriate application. In Florida, local governments primarily use ITE rates for determining concurrency, the extent and type of needed transportation improvements as part of land development and in the application of transportation impact fees. However, the ITE trip rates primarily represent land development patterns that provide no other choice besides private automobile driving and therefore demonstrate little use of alternative transportation. The lack of use of transportation alternatives is misinterpreted as a lack of need for transportation alternatives. Reinforcing this outcome is also the misapplication of ITE parking generation rates that are likewise generated from locations that offer no transit service and which result in overestimates of needed parking. Use of ITE traffic and parking generation rates should be supplemented with traffic counts when possible. Additional analysis should be conducted with the intent to estimate the nature and magnitude of transportation demand under conditions where transit service reaches a level of quality described in long range planning documents and after a program of parking management, where transit oriented development phasing has reached completion, and where there is a high quality pedestrian environment and TDM programs in place.

TDM professionals should get involved in the land development process as early as the rezoning application stage. TDM professionals should request a copy of the application. A first question for TDM professionals to consider, in an evaluation of a project, is whether a rezoning request preserves the intent of the Comprehensive Plan, especially with respect to urban infill, revitalization, and urban redevelopment within a TCEA. TDM professionals should check to see if its location lies within a TCEA or some other district requiring special considerations. TDM professionals have an opportunity to use the TCEAs or other special district designation as a means to promote TDM strategies for consideration as congestion mitigation and mobility enhancement.

As a committee member and regular participant in metropolitan planning organization (MPO) activities, the TDM professional has the opportunity to influence MPO guiding policies which directly impact the content of the Long Range Transportation Plan as well as the Transportation Improvement Program (TIP) and subsequent project funding. The commuter assistance program (CAP) executive director should not only educate the MPO Board and committee members regarding the benefits of TDM strategies, but also offer specific ways for including them in the various MPO products. This report has included a number of useful policies for use in long range transportation plans. The CAP representative also should assist in developing alternative revenue sources and seek earmarks for TDM strategies.

The focus of TDM program budgeting often has been based upon short term time frames. For example, CAPs may be evaluated based upon annual work plans supported by annual budgets; therefore, some of the most important work with far reaching and lasting impact (TDM strategies corresponding to land development) takes a back seat if performance results must be demonstrated within the year. The CAP representative should work with MPO staff to consider more realistic time frames not only for implementation of TDM strategies but also for tracking and measuring program results. Match these with work programs and budgets that coordinate with those time frames.

Of all features in the site plan and building plan, the availability and amount of parking is the cornerstone of shifting a balance toward the use of other modes, as well as other means to reduce the need to travel. Limiting the availability of parking has a strong impact on the use of the transportation system but efforts can backfire if satisfactory alternative transportation is not concurrently in place. TDM professionals should advocate for a more complete multimodal system. As the level and quality of multimodal transportation service increases, parking limitations can gradually be established. TDM professionals should stimulate discussion through arranging forums...
Incorporating TDM into the Land Development Process

among bankers, developers and local governments about the marketability of development with reduced parking. TDM professionals should suggest a plan for staging the gradual reduction of parking availability in coordination with redevelopment, which includes triggers or thresholds that precipitate the institution of parking reductions.

In the future, renewed consideration and research should be focused upon refining the Development of Regional Impact (DRI) traffic impact methodology and the 9J-2.045 F.A.C. Transportation Uniform Standard Rules to recognize that transportation demand calls for a wider offering of mobility services and authorize their use. Such methodology and authorized mobility measures would recognize that the demand for transportation alternatives will not be obvious or easily measurable while the basic system providing for alternative mobility service is not fully in place.

TDM professionals should encourage planners and engineers to weigh the limitations of using various TDM performance measures against the particular goals to be achieved. Examples include reducing single occupant vehicles (SOV), average vehicle occupancy (AVO), and average vehicle ridership (AVR), understanding that their use will limit the actions taken. Reducing SOV limits TDM strategies to mode shifting and does not recognize that SOV drivers can also participate in TDM. AVO does not incorporate the effects of bicycling, walking or telecommuting. AVR is a measure associated with work sites, limiting TDM application to commute travel. AVR also does not incorporate the effects of bicycling, walking and telecommuting. These are all useful measures but they should be applied only with the understanding of what they do not consider and should perhaps be used with other measures such as a vehicle employee ratio (VER), also known as vehicle trips reduced (VTR), which is the number of vehicles per 100 employees. Other measures might include reducing vehicle trips (VT) or reducing vehicle miles traveled (VMT).

Available transportation planning methods fall short of enabling an evaluation of a trade-off among modes. Research should continue to focus on this missing piece, starting with the Strategic Intermodal System geodatabase. TDM professionals should become more active in the discussion about the application of multimodal LOS standards as part of the transportation approval process. Ideally, TDM professionals should generate support for the future development and application of a method to make tradeoffs across modes. Preserving roadway level of service standards for private motor vehicles as specified in the local Comprehensive Plan appears to drive the process thereafter. In the long range transportation planning process, TDM professionals should suggest exploring the use of alternative standards for combined people-moving capacity across modes along corridors carrying heavy directional traffic.

Benefits

These study results provide practical insight and specific recommendations, not only to TDM professionals, but also to municipal traffic engineers and planners and land development proposal reviewers. The recommendations include immediate actions and longer range activities in several arenas. They also identify a broader range of stakeholders. Implementation of these recommendations will accelerate a transition toward a more integrated transportation system that provides better, more cost-effective service and mobility choices.
INTRODUCTION

While the use of transportation demand management (TDM) offers the possibility of relief from today’s congested roadways, a key to the successful use of these strategies is incorporating them into the land development process. Local governments are responsible for the regulation of land development activities, from developing generalized long range plans that guide future growth to negotiating development orders that will shape travel characteristics at the site-specific level. While federal and state governments encourage alternative transportation, local governments still face a number of barriers to strengthening transportation options through the land development process. The challenge is to incorporate TDM into all stages of the land development process thus making it integral to the process rather than an afterthought. This study examines how TDM is incorporated into long range transportation plans, local government comprehensive plans, land development regulations, and site development. It also discusses the various challenges of incorporating transportation demand management into the land development process and identifies opportunities for TDM professionals to champion TDM strategies throughout the process.

![Figure 1: TDM is a Key Strategy for Achieving Transportation Goals]
A common past approach to achieve transportation goals was to emphasize one particular strategy alone, such as either expanding the physical capacity of the system or applying TDM strategies, with the expectation that each should function as a stand-alone strategy. As illustrated in Figure 1 above, this report is based on the premise that a systemwide integrated approach to achieving transportation goals should be used. This is achieved by expanding the physical capacity of the transportation system combined with land use controls, TDM and transportation systems management. What this means for TDM is to incorporate TDM strategies into the land development process from the very beginning long range transportation and land use planning stages, through land use regulatory regimes, and continuing through site development negotiations and property management stages.

TDM encourages better management of existing transportation infrastructure, services and resources. Examples of TDM tactics include public transit services, ridesharing, compressed work week, telecommuting, limiting parking, and provision of bike and locker facilities by employers. Interest regarding methods of including TDM strategies in land development processes is growing among planning professionals. The purpose of this report is to identify where the integration of TDM strategies occurs within various stages of the land development process and how TDM professionals can influence this process. The report provides information for municipal planners, traffic engineers, land development proposal reviewers and TDM professionals working for commuter assistance programs, transportation management associations and in other capacities.

According to the Victoria Transport Policy Institute (VTPI), “Transportation Demand Management or TDM (also called Mobility Management) refers to various strategies that change travel behavior (how, when, and where people travel) in order to increase transport system efficiency and achieve specific objectives such as reduced traffic congestion, road and parking cost savings, increased safety, improved mobility for non-drivers, energy conservation and pollution emission reductions.” There are many different TDM strategies with a variety of impacts. Some improve the transportation options available to consumers, while others provide an incentive to change travel mode, time or destination. Some reduce the need for physical travel through mobility substitutes or more efficient land use (1).

While TDM usually has been applied as an effort to convince employees to use alternative transportation, it is much more than that. As illustrated in Figure 2 below, there are diverse settings and contexts for using TDM, both on-site and off-site, and providing for physical facilities as well as management and operations. In addition to employees, TDM can be applied to residents, visitors, patients and many other groups defined by specific travel patterns and needs. In addition to alternative mode use, TDM strategies influence travel behavior by time of day or day of the week, trip frequency, trip length, regulation, route and cost. For example, single-occupant vehicle commuters can still participate in TDM by relocating to a work site branch office closer to home (proximate commuting), telecommuting one or more days of the week or staggering work hours.

**Methodology**

The project involved the following research approach:

- Review the literature and current policies in Florida and other states, if applicable, as they relate to MPO long range transportation plans, local comprehensive plans, and various land development regulations, including trip reduction ordinances.
Incorporating TDM into the Land Development Process

- Investigation of 16 selected Florida municipalities. Identification and documentation of specific case studies illustrating the process of development review between local governments and land developers.

- Summarization of general findings and conclusions regarding the incorporation of TDM in the land development process.

### On-Site and Off-Site Activities

**On-site (public or private land development)**
- Employment sites
- Residential communities
- Large scale developments within a campus or with some unifying organizing characteristics
  - Airports
  - Schools and universities
  - Hospital complexes
  - Industrial parks
  - Tourist attractions
  - Location-specific special events (convention center, hotels, etc.)
- Freight transportation

**Off-site transportation facilities (publicly owned)**
- Special events, such as a parade along a transportation facility
- Transportation corridor planning and maintenance of traffic
- Incident/emergency management

**Figure 2: TDM Tactics Apply to a Range of Land Development Types**

This report begins with a review of the federal and state legal foundation that provides requirements and limitations as well as opportunities for land development and the use of TDM to support it. Secondly, a discussion is presented about the many means of influencing travel behavior, with examples of TDM strategies, how these may fit into the land development process and what parties may be potential implementing partners. Thirdly, barriers and challenges to the inclusion of TDM in the land development process have been identified. The report next summarizes current practice at the local level for incorporating TDM into the land development process, providing case study examples both nationwide and from Florida of long range planning by the metropolitan planning organizations, local government comprehensive plans, land development regulations and the site development approval process. Recommendations for incorporating TDM into the land development process are provided. Appendices include excerpts from the Sarasota County Development Agreement, a discussion of Florida Developments of Regional Impact and the methodology used for assessing site impacts, an example of Long Range Transportation Plan TDM policies from Pinellas County and the City of Sarasota, traffic impact fee reduction incentives from Clark County, Washington and the comprehensive transportation review methodology from the City of Rockville, Maryland.
LEGAL FOUNDATION

Transportation planning and system development in the state, including the use of transportation demand management strategies, begins with both federal and state law. These laws, combined with escalating right-of-way and construction costs and shrinking revenue sources, have influenced transportation decision-makers to place more attention on maximizing the use of the existing transportation system through the approach of transportation demand management (TDM).

Federal Law – Metropolitan Planning Organizations (MPOs)

A long range transportation planning process is undertaken by metropolitan planning organizations (MPOs) across the nation (in urbanized areas where the population is greater than 50,000). The metropolitan planning process is a continuing, cooperative and comprehensive process involving local government officials and other transportation stakeholders. The MPO planning process has been guided by the Transportation Equity Act for the 21st Century (TEA-21) and its predecessor, the Intermodal Surface Transportation Act (ISTEA) that “…shifted the focus of transportation planning away from narrowly addressing traffic congestion through new highway construction to holistically resolving identified transportation needs through enhanced multimodal transportation alternatives and improved long range transportation decision-making” (2). Now the MPO planning process is given new direction through the federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). In August 2005, SAFETEA-LU was signed into law by the President, which authorizes federal surface transportation programs for highways, highway safety and transit for the five-year period, 2005-2009. The full implications of the new law on TDM as it relates to land development are not fully known as passage of the new law coincided with the end of this research study period.

TEA-21 established that the MPO transportation planning process must address seven emphasis areas, among them to “increase the accessibility and mobility options available to people and for freight…”(3). It also established the legal framework for MPO organizational structures and responsibilities. Although the MPO planning process primarily addresses transportation, land use is ultimately affected. According to the Federal Highway Administration, “Not only does the transportation system provide for the mobility of people and goods, it also influences patterns of growth and economic activity through accessibility to land” (4). The Unified Planning Work Program (UPWP), the Long Range Transportation Plan (LRTP), and the Transportation Improvement Program (TIP) are the key documents produced by the MPO planning process.

Florida Law

Local Government Comprehensive Plan. In Florida, the Local Government Comprehensive Planning and Land Development Regulation Act, Chap. 163.3161 F.S, both authorizes and requires local governments to control future land development to ensure stable and orderly growth that includes an intermodal transportation system. This is accomplished through local government comprehensive plans (LGCP) that, among other things, “facilitate the adequate and efficient provision of transportation…”(5). The Act also provides that no public or private development can be permitted except in conformity with the LGCP. At the same time, all ordinances and programs adopted under the authority of the Act must be developed and applied with sensitivity to private property rights.

Municipalities having populations greater than 50,000 and counties having populations greater than 75,000, or local governments within the boundaries of a metropolitan planning organization, must include a transportation element within their LGCP that specifically includes mass transit, ports,
Incorporating TDM into the Land Development Process

aviation, recreational traffic, and parking (6). The intent of the transportation element is to ensure a comprehensive, multimodal transportation system.

LGCPs must also include a five-year, financially-feasible, capital improvements element (CIE). The CIE must include principles guiding the expansion or increase in public facilities, principles to correct existing deficiencies in public facilities, an estimate of public facility costs, and provisions for “standards to ensure the availability of public facilities and the adequacy of those facilities,” a concept commonly known as concurrency or adequate public facilities (7). Chapter 163.3180 F.S. states that public facilities, including transportation facilities, must be available to provide adequate service concurrent with the impacts from new development. This state law is implemented through local government concurrency management plans as guided by Florida Administrative Code 9J-5. Concurrency management planning directly affects local capital improvement programming as well as the land development process.

In 1999, the Florida Legislature amended Chapter 163 authorizing local governments to establish multimodal transportation districts (MMTD) (8). The purpose of the legislation was to provide a planning tool that Florida communities could use to systematically reinforce design elements that support walking, bicycling and transit use. It also enabled Florida communities to advance transportation concurrency through development of a high quality multimodal environment, rather than the typical approach involving road widening for automobile capacity. A multimodal transportation district is an area where primary priority is placed on “assuring a safe, comfortable, and attractive pedestrian environment, with convenient interconnection to transit” (9).

**Land Development Regulation.** While the local government comprehensive plan sets the policy framework guiding new development, land development regulations (LDR) adopted by a local government implement the comprehensive plan by specifying minimum standards for development. Chapter 163 F.S. requires each local government to unify its set of land development regulations into one Land Development Code. State law explicitly encourages local governments to use such land development regulations as subdivision regulations, incentive zoning, planned unit development, and impact fees. It is within the land development code that local governments can specify criteria for inclusion of TDM strategies in land development.

**Development Agreements.** A development agreement is a formal, consensual, binding contract between a local government, the land developer/owner, and if appropriate, other parties (i.e. the Florida Department of Transportation or adjacent land owners). In *Bargaining for Development*, David Callies *et al.* state, “The landowner generally wishes to guarantee that the local government’s land use regulations, conditions, and exactions remain fixed during the life of a prospective land development on the subject parcel. The local government, on the other hand, seeks as many concessions and land development conditions as possible beyond what it could reasonably require through subdivision exactions, impact fees, and other conditions under the normal exercise of its regulatory authority or police power” (10). In short, the agreement ties land development rights to the provision of public facilities.

Chapter 163.3220-163.3245 authorizes local governments, by ordinance, to enter into development agreements with “any person having a legal or equitable interest in real property located within its jurisdiction” (163.3223 F.S.) and sets the parameters. Among other things, development agreements must include a legal description of the land, its owners, a timeframe for the agreement not to exceed 10 years, permitted uses, and information regarding the roles and responsibilities of the parties in terms of the provision of public facilities, confirmation of consistency with the local government’s comprehensive plan and LDRs. Land development regulations in place at the time the development
agreement is executed govern the development throughout the timeframe established in the agreement.

The flexibility of the development agreement makes it a useful tool for local governments by allowing them to address a variety of issues. For example, Sarasota County adopted a Development Agreement Ordinance (Ord. No. 2004-086 now Article VIII. Sec. 94-261 through Sec. 94-268 of the Sarasota County Code.) in late 2004 with the stated intent, “to promote and facilitate orderly and planned growth and development by providing a degree of certainty in the development approval process” (11). The Ordinance includes sections on findings, regulations, applicability, effect on other ordinances and regulations, local laws and policies governing development agreements, forms, enforcement, legislative act, severability, codification, filing and an effective date. During the adoption hearing, county staff promoted the benefits of the ordinance by indicating that it would allow the County to enter into public-private partnerships and encourage developers to participate in public improvement projects in which they might not otherwise participate (12). Appendix A contains the Sarasota County Development Agreement Ordinance. Development agreements are used principally for developments of regional impact.

**Developments of Regional Impact.** Developments of regional impact (DRI) are designated as such by their size and have greater impact on land development patterns than the transportation system. Most local governments in Florida use development agreements exclusively for Developments of Regional Impact (DRIs). Pursuant to Chapter 380 F.S., developments meeting specific criteria that have the potential to impact more than one county must undergo the DRI review process, including the documentation of impacts on the regional transportation system, as part of an Application for Development Approval (ADA), which must be approved by the State Department of Community Affairs. All impacted local government jurisdictions and any agencies with jurisdiction, such as the Florida Department of Transportation, participate in the DRI review process which is overseen by a regional planning council.

Under the current DRI review process, level of transportation service is measured in terms of roadway capacity leading to developer-funded improvements to maintain automobile/truck level of service (LOS). The estimated traffic impact is the basis for determining the developer’s fair share cost in contributing to roadway improvements that are necessary to maintaining automobile/truck LOS.

The DRI transportation impact analysis focuses primarily on the impacts of the private automobile, with little attention devoted to a large array of potential considerations. Any multimodal strategies are addressed in one question on the DRI application, “What provisions, including but not limited to sidewalks, bicycle paths, internal shuttles, ridesharing, and public transit, will be made for the movement of people by means other than private automobile? Refer to internal design, site planning, parking provisions, location, etc.” Rule 9J-2.045(6)5 F.A.C. authorizes provision of “…programs that provide alternatives to single occupancy vehicle travel…” as long as such programs “…assure that public transportation facilities shall be constructed and made available when needed to accommodate the impacts of the proposed development…”. This guidance does not define or specify TDM but rather public transportation capital improvements. Earlier language that was removed during an amendment process allowed explicitly for buses and vehicles for vanpools. Appendix B contains a detailed discussion of the relationship between DRIs, FDOT Site Impact Methodology, and bus transit. Other factors intrinsic to the traffic impact methodology such as guidelines for acquiring and applying mode split (trade-off between private auto trips and transit trips) further impede the inclusion of multimodal strategies. Because the traffic impact analysis is focused on private automobiles/trucks, developer contributions to pay for traffic mitigation go to roadway...
Incorporating TDM into the Land Development Process

improvements. Transportation improvements, as provided by developers, also must meet certain tests as provided by state law, summarized below (13):

- The transportation need that must be mitigated must be attributable to the proposed development paying for the mitigation.
- The amount of the contribution must correspond to the amount needed to mitigate the impacts from the development.
- The funds must go toward improvements to serve that development.
- Developers of DRIs cannot be required to contribute funds for mitigation unless the host local government has an ordinance in place requiring non-DRIs to mitigate their impacts.
- Developers of DRIs cannot be charged twice to mitigate for the same impacts, as in the case that a local host government charges impact fees.

These requirements pose special difficulties for developers to provide TDM improvements as mitigation for roadway impacts of a DRI. For example, if a high quality bus service, commensurate with highway level of service, is not in place, then it is not possible to reasonably estimate the need for transit service by a new development unless there is a way to measure latent demand for transit service. As a result, a very low number of bus trips is estimated. Consequently, a small amount of money or capital facilities is estimated to pay for bus mode share. Funds must be demonstrated to benefit the development. If there is an impact fee ordinance in place, then funds cannot go toward operations. This leaves capital facilities only, such as buses, bus shelters, and vans.

To encourage the desired results of engaging land developers to select TDM options as part of the DRI process, local governments should make full use of the planning and regulatory processes available to them to guide development toward locations where it is effective to provide identified TDM services. These include:

- the long range transportation planning process and the transportation improvement plan of the MPO,
- the local government comprehensive planning process, especially alternative concurrency provisions provided in 9J-2.045(6)2, F.A.C., pursuant to supporting Transportation Concurrency Exception Areas (TCEA) and Transportation Concurrency Management Areas (TCMA), where such mobility measures are specifically adopted in a local government comprehensive plan that has been deemed in compliance per F.S. 163.3180(5) and (7).
- urban development boundaries, and
- zoning and other tools within the land development code.

The Florida Department of Community Affairs (DCA) Interagency Implementation Team for transportation has plans to update F.A.C. 9J-2 to reflect changes from the recently passed Senate Bill 360. It is not known at the time of this report if F.A.C. 9J-2.045(6)2 and 5 will be revised.

Additionally, local governments could provide disincentives for a development that is located outside the existing or planned service area of transit, while offering incentives that make it more desirable to build in areas within the existing and planned bus service area.

The passage of Senate Bill 360 (“The Pay as You Grow Plan for Florida’s Future”) may herald some changes and opportunities for incorporating TDM into the land development process. These include the following:

- Local governments will have an opportunity to improve their development review processes.
• Local governments may adopt a 10-year long-term (15-year if approved by DCA) concurrency management system. The longer time frame is more conducive to demonstrating TDM impacts.
• Funding for infrastructure and technical assistance will be provided.
• Local governments must consult with FDOT and cooperatively develop a plan to mitigate impacts on the Strategic Intermodal System in TCEAs and TCMAs.
• New standards are required for TCEAs on mobility, design, urban infill, etc. TCEAs will be required to demonstrate multimodal strategies, connectivity, and urban design standards through the land development code. Existing TCEAs must be upgraded to the new standards.
• Regulatory incentives will be provided for having designated urban service boundaries and Urban Infill and Redevelopment Areas.
• The development of model TCEA strategies and evaluation criteria will be applied to three pilot communities.

However, one of the options given to developers is to pay for a project that is in the 5-year capital improvements element. This emphasis on capital improvements makes it more difficult to consider programmatic TDM strategies.

In the future, renewed consideration and research should be focused upon refining the DRI traffic impact methodology and the 9J-2.045 F.A.C. Transportation Uniform Standard Rules to recognize that transportation demand calls for a wider offering of mobility services and authorize their use. Such methodology and authorized mobility measures should recognize that this demand for transportation alternatives will not be obvious or easily measurable while the basic system providing for alternative mobility service is not fully in place.
RELATING TDM TO THE LAND DEVELOPMENT PROCESS

As part of this study, it is helpful to identify the relationship between TDM and the land development process including the range of specific actions that can be considered and their timing in the process. Figure 3 below illustrates how TDM tactics can apply to all stages of the land development process. There are TDM tactics that represent physical facilities as well as operations and management tactics. In addition, TDM can apply to facilities, operations and management that are on-site and off-site.

Chronology of the Land Development Process

**Long range**: Prior to land development or during negotiations for development agreements.
**Time horizon**: generally up to 20 years.
**Approach**: planning and financing, proactive articulation of the desired form of land development.
**Tools**: Long Range Transportation Plan, Metropolitan Planning Organization Transportation Improvement Plan, Local Government Comprehensive Plan, and development agreements

**Mid range**: Prior to land development or during negotiations for development agreements.
**Time horizon**: generally up to 5 years.
**Approach**: regulatory, reactive articulation of the minimum development criteria required or “gatekeeping” to prevent poorly conceived development from happening.
**Tools**: Land Development Regulations (Unified Land Development Codes in Florida municipalities), Capital Improvements Element, Level of Service standards

**Short range**: Finalization of plans and construction.
**Time horizon**: Immediate and ongoing.
**Approach**: measurement and negotiation.
**Tools**: traffic impact methodologies, site development review process, incentives, impact fees.

**After land development**: Ongoing management and operations.
**Time horizon**: indefinitely over useful life of development
**Approach**: contractual agreements
**Tools**: property leases and provisions of development agreements regarding subsequent development phasing

Examples of Corresponding TDM Tactics

**Onsite Physical Facilities**: includes infrastructure and amenities

- **Long range**: Location decisions for major land use types, marketplace development of ecosystem assets, urban growth boundaries, transit oriented development planning
- **Mid range**: Limit parking supply, site design standards
- **Short range**: Bike lockers, showers

- **After land development**: Parking supply adjustments, physical improvements and maintenance to existing facilities

**Offsite Physical Facilities**: includes infrastructure and amenities

- **Long range**: Capital facilities financing and planning for alternative modes
- **Mid range**: High occupancy vehicle lanes
- **Short range**: Connective sidewalks, transit shelters

- **After land development**: Parking supply adjustments, physical improvements and maintenance to existing facilities

**Onsite Operations and Management**: Includes incentives, disincentives and market-based tactics

- **Long range**: Long range TDM plan
- **Mid range**: Trip reduction ordinance
- **Short range**: Agreement to unbundled parking in property lease

- **After land development**: Tax benefit programs, parking cash out, school pools, guaranteed ride home, telecommuting technical assistance

**Offsite Operations and Management**: Includes incentives, disincentives and market-based tactics

- **Long range**: Establishment of transportation management association, planning and financing for transit operations
- **Mid range**: Pricing and management of public parking
- **Short range**: Agreement to subsidize operation of a public transit route as a condition of development approval

- **After land development**: Advanced traveler information system, variable pricing, operating excellent public transportation service

Figure 3: TDM Tactics Can Apply to All Stages of the Land Development Process
Table 1 below illustrates TDM in a different way, according to its comprehensive applicability. TDM strategies are organized by their means of influencing travel behavior. First are those that have greater potential to affect travelers’ longer term decisions about work and residential location including trip length, mode, and route. For example, in the first row, trip length may be affected by realtors who often play a role in influencing travelers’ residential choices. Likewise, economic development organizations, both public and private, play a role in influencing business and employment locations. Regulation is listed next, which affects both longer term travel decision making as well as day-by-day decisions. Finally, cost, frequency, and time of day/day of week primarily influence traveler’s day-to-day decisions.

As apparent in Table 1, implementation of many TDM strategies through the land development process does not necessarily rest on the shoulders of just one entity, but requires a coordinated effort. Table 1 also shows how, by all means of influencing travel behavior through TDM strategies, land developers and TDM professionals can play a role.
<table>
<thead>
<tr>
<th>MEANS OF INFLUENCING TRAVEL BEHAVIOR</th>
<th>TDM STRATEGY (EXAMPLES)</th>
<th>SUPPORTING ACTION (LAND DEVELOPMENT PROCESS)</th>
<th>POTENTIAL IMPLEMENTING PARTICIPANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip length.</td>
<td>Transit oriented development</td>
<td>Clustering related land uses and providing more direct access <em>(comprehensive plans and land development regulations)</em></td>
<td>Land developer</td>
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<td>Reduce quantity of vehicle miles.</td>
<td>Proximate commuting by allowing employees to relocate job to the branch office nearest their homes</td>
<td>Providing incentives to employers</td>
<td>Municipal land development regulator</td>
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<td>Access management</td>
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<td>Economic development organization</td>
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<td>Realtors</td>
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<td>Employer</td>
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<td>Commuter assistance program</td>
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<td>Transportation management association</td>
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<td>Mode.</td>
<td>Developing land in support of alternative modes, such as transit oriented development</td>
<td>Locating land development to take advantage of existing underutilized transportation services such as transit routes</td>
<td>Land developer</td>
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<tr>
<td>Increase efficiency of system to carry more people in the same number of vehicles.</td>
<td>Limiting parking supply</td>
<td>Providing on-site amenities, such as lockers, showers, bicycle parking and preferential carpool parking <em>(land development regulations)</em></td>
<td>Property manager</td>
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<td>Offering alternative modes, such as transit, vanpooling, carpooling, bicycling, walking</td>
<td>Providing support services such as marketing, ridematching and guaranteed ride home</td>
<td>Municipal land development regulator</td>
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<td>Carsharing</td>
<td>Providing transportation services and physical transportation facilities off-site</td>
<td>Realtors</td>
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<td>Shared parking</td>
<td>Economic development organizations</td>
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<td>Municipal parks and recreation department</td>
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<td>Municipal public works department</td>
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<tr>
<td>Route.</td>
<td>Transit oriented development</td>
<td>Providing a grid system, street connectivity, and destinations within easy walking distance <em>(comprehensive plans and land development regulations)</em></td>
<td>Land developer</td>
</tr>
<tr>
<td>Bypass congestion.</td>
<td>Providing route alternatives</td>
<td>Implementing Advanced Traveler Information Systems</td>
<td>Municipal land development regulator</td>
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<td>High occupancy vehicle lanes</td>
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<td>Municipal public works department</td>
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### Incorporating TDM into the Land Development Process

**Regulation.**

Mandate specific traffic management actions or outcomes by local ordinance.

- State growth management provisions
- Concurrency
- Trip reduction ordinances
- Zoning ordinances
- Subdivision ordinances
- Parking ordinances
- High occupancy vehicle lanes
- Parking pricing
- Transit subsidies
- Parking cash-out
- High occupancy toll lanes
- Commuter tax benefits

- Carried out primarily by **land developers, property managers**, employers, neighborhood associations

**Cost.**

Establish incentives and disincentives.

- Highway patrol
- State land planning agency
- State DOT
- Municipal land development regulator
- Municipal public works department
- Municipal parking department
- Highway patrol
- **Property manager**
- Municipal parking department
- State DOT
- Employers
- Commuter assistance programs
- Transportation management associations

**Frequency.**

Reduce number of trips over given time period.

- Providing on-site amenities
- Compressed work week
- Telework

- Providing physical facilities, such as employee cafeteria, fitness center, bank
- Providing technical support to employers

- **Land developer**
- **Property manager**
- Employer
- Commuter assistance program
- Transportation management association

**Time of day/day of week.**

Move trips to less congested periods or avoid vehicle trip completely.

- Compressed work week
- Staggered work hours
- Telework
- Flex time

- Unbundling parking from employment site leases
- Providing technical support to employers

- **Property manager**
- Commuter assistance program
- Transportation management association
- Employer
CHALLENGES AND OPPORTUNITIES FOR THE INCLUSION OF TDM IN THE LAND DEVELOPMENT PROCESS

While carefully selected and properly executed TDM strategies can improve overall mobility, there exist various challenges of incorporating transportation demand management (TDM) into the land development process.

1. Data Availability, Analysis Methods and Transportation Concurrency

FDOT maintains a traffic and roadway database called Traffic and Roadway Information Systems (TRIS). It contains information about traffic count statistics and roadway features for the purpose of state transportation planning and development for the State Highway System (SHS). The SHS includes roads under the jurisdiction of the State of Florida and maintained by FDOT, including roads with Interstate, U.S. and S.R. numbers. Florida is in the process of changing the way it plans the transportation system of the state. The change is from thinking of each mode separately toward an approach that manages the seamless movement of people and goods in a multimodal system. This is referred to as the Strategic Intermodal System (SIS), created in 2003. Part of this process is the development of a unified geodatabase that collects data for other modes to the same depth as has been the case for highway travel (14). This planning activity recognizes that while the older database is adequate for determining which projects within each mode are the most important, more in-depth data are needed to determine if limited funding should go toward improving a port or instead building a new interchange on an interstate or some other intermodal trade-off. In order to make these kinds of intermodal trade-off decisions, an understanding of how the facility is used, and how it interrelates with other transportation modes is necessary. This newer planning strategy will reap advantageous benefits for the state and municipalities and it is a giant leap in the right direction toward intermodalism. It also is important to remember that the FDOT’s charge as a state agency is to advance transportation for statewide purposes, which is in some ways fundamentally different from the transportation interests of local urban areas.

As this relates to the site development for a new shopping center or office building in a municipality, the transportation impacts of that new development may adversely affect the through-moving capability of a state highway. From the standpoint of serving the new development, which hopes to attract tenants, employees and customers, the more important transportation objective is providing easy access to and from the development from local and regional trip origins. The transportation improvement options for these two objectives may differ. TDM seeks to provide mobility options. To this end, intermodalism is not only important to providing options, but multimodalism is also important, in the sense that someone can choose to successfully travel entirely by walking, bicycling, riding transit or avoiding travel altogether by telecommunications. Research by Liu et al. (15) demonstrates that intermodal transfers are time consuming and are avoided by travelers whenever possible; therefore, the success and functionality of multimodal options requires developing them as complete systems that connect intermodally.

Developing complete and parallel multimodal systems that interconnect is expensive and may be criticized as redundant. However, continued dependence on one mode, highway travel by private vehicle, is also expensive and has been demonstrated that it will not continue to meet growing demand. Putting “all the eggs in one basket” exacerbates vulnerabilities to incidents, natural disasters and national security threats.

FDOT has one of the most extensive and well organized transportation data collection systems and toolbox of analysis methods of all transportation agencies in the state. The smaller the local municipality, the greater the reliance upon technical assistance from FDOT and the more likely that FDOT analysis methods and data are used for local transportation planning purposes.
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In most instances, transportation concurrency as it is written in F.S. 163.3180 more specifically addresses roadway private motor vehicle traffic. While professionally accepted methods of measuring multimodal quality/level of service have been adopted by FDOT for separate transportation modes (auto/truck, transit, bicycle, pedestrian) these methods are not meant to be used for considering trade-offs among modes (16). Instead, a level of service is computed for each mode rather than the development of a composite overall transportation level of service measure. In other words, available methodologies fall short of enabling an evaluation of a trade-off among modes in a seamless transportation system. As a result, there is currently no tool to evaluate the trade-off between allotting financial and land resources to improve bicycle LOS through the creation of bicycle lanes, which means less money and right-of-way to improve roadway LOS for motorized vehicles. Likewise, signal timing to favor pedestrians at intersection crossings increases delay and degrades LOS for motor vehicles. However, through TDM strategies, local governments are being asked to change the balance of their trade-offs toward alternative modes. Vital to the administration of the land development process is maintaining the confidence of land developers that each one is treated fairly and in the same manner as all other developers. This places a responsibility on any such method to determine the magnitude and quality of future impacts of development, to attribute the impacts accurately to the responsible party, and to identify mitigating measures that will both directly address those impacts as well as serve the development of the contributing party.

The rational decision making process and range of answers generated for the development of the transportation system is linked to the kinds of data collected, the degree of detail and scope of the collected data and the analysis techniques used. The analysis techniques used incorporate assumptions about desired outcomes as well as drive particular analysis outcomes. A summary below of the FDOT Site Impact Analysis methodology used in the traffic analysis of DRI impacts is an example of this. A detailed look at the DRI process and Site Impact Analysis methodology is provided in Appendix B, excerpted from Hendricks (17).

2. Continuing Land Development Fuels Need for Alternative Emergency Response

An extreme manifestation of accommodating private motor vehicle demand is hurricane evacuation. FDOT justifiably prioritizes safety first. The primary response to this need has been preserving the functioning of the FIHS to serve high speed high volume traffic, especially as emergency evacuation routes. Highways that are designated as regional evacuation routes must also maintain a high level of service. The need to maintain a high level of capacity that will be used only in emergencies creates conditions of plentiful capacity during all other times of the year. This fuels land development growth where capacity exists, which in turn creates the need to build more capacity to maintain a high level of service to be used in times of evacuation. A certain leveling of the playing field must occur with respect to transportation quality of service across modes before people will consider other modes of travel for daily purposes. That requires some degree of greater traffic congestion combined with satisfactory service offered by other modes. With the lion’s share of transportation resources going toward maintaining private motor vehicle level of service, the balance needed is always out of reach.

A prescient report prepared by Wolshon et al. (2001) of the LSU Hurricane Center prior to the events of Hurricane Katrina included a nationwide survey of hurricane transportation evacuation planning policies. It cited generally limited planning at the state level for the evacuation of low-mobility groups (18). Potential low-mobility evacuees include low-income persons without cars, the elderly, the homebound infirm, school and hospital populations and tourists. To address this issue, the Florida Commission for the Transportation Disadvantaged (TD) has been operating for the past 25 years and oversees 49 Community Transportation Coordinators (CTC) in all 67 counties.
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Considering the four hurricanes that struck Florida in the summer of 2004, the performance of the CTCs was outstanding, especially under conditions of closed bridges, flooded roads, electrical outages, limited fuel and destroyed communications and computer systems. This Commission is recognized as one of the best in the nation in providing and coordinating transportation for elderly, disabled and low-income citizens. However, what would an urban area do if it faced the need to evacuate a large number of low-income persons without cars? The Florida CTCs last year concentrated on the most vulnerable people—the elderly, frail and those having special medical needs. But if a large population of low-income people without cars needed to evacuate, this may overwhelm the CTCs. Local emergency plans include the deployment of municipal buses and school buses to evacuate people but does this constitute sufficient capacity? Neighboring bus systems stand ready to help evacuate. But again, is this enough and would not that burden the municipality lending its bus service?

Florida has a large low-mobility population. The demographics of Florida communities in particular show not only high numbers of tourists, even in the “slow” summer season, but also senior citizens and low-income persons. The American Community Survey (19) reported that nationwide, the number of persons with disabilities that prevent them from going outside their home was over 10.7 million persons. This is approximately 4 percent of the total population nationally. A survey conducted between October 1994 and January 1995 indicated that approximately 26 million Americans (1 in 10) described their disability as severe. A person who has a severe disability is one who is completely unable to perform a daily living activity or socially defined task or who needs personal assistance (20). Figures for those who cannot “go outside home” classification of disability at the state level were unavailable; however, there were Census 2000 estimates of the total number of persons with disabilities statewide. These included over 1.9 million or 21.9 percent of the Florida population age 21-64 and over 1.0 million or 39.5 percent of the Florida population age 65 and over. Over 17 percent of Florida’s population is age 65 and over. Approximately 12.7 percent of Florida’s population is low-income (21). If Florida’s low-income population reflects that nationwide, then approximately 25 percent of low-income households in Florida do not own cars. Recent estimates for the Tampa Bay region show approximately 14,000 households in Hillsborough County and 22,000 households in Pinellas County within a Category 5 hurricane evacuation zone that do not own vehicles (22).

Transportation infrastructure in the U.S. has been developed to serve motor vehicle traffic and more recent attention upon maximizing the use of existing infrastructure in times of evacuation has focused upon highway contraflow strategies. An untested Florida DOT plan exists for the conversion of Interstate 4 in Florida between Ybor City and Orlando into a one-way eastbound evacuation route. However, in September 2005, when 200 miles of Interstate 45 north of Houston were turned into northbound only lanes, gridlock resulted for Hurricane Rita evacuees. The LSU study points out that while buses are the most common mode of transportation to evacuate low-mobility groups, many heavily populated cities do not have an adequate supply of buses to move all low-mobility evacuees that need assistance. If the priority justification behind the allocation of resources to maintain high capacity roadway service is hurricane evacuation, then the same justification should apply to maintaining bolstered public transit fleets circulating on routes with greater frequency. The resulting increase in transit quality of service due to larger in-service fleets (and the resources to operate them) would contribute toward providing satisfactory modal alternatives on a daily basis. The effects of such improved service availability would trickle down to land development location decisions and site design. But Hurricanes Katrina and Rita demonstrated that the emergency evacuation solution is somewhere beyond better transit service and more buses. It depends upon better land development that supports and is supported by the transportation system. This system must be capable of fully using strategies to manage transportation demand during times of crisis and after the crisis has passed when populations are dislocated and transportation systems are damaged. So while resources are
poured into a regional roadway system to handle motor vehicle demand during times of hurricane evacuation, the more comprehensive solution offered by land development that enables transportation demand to be managed is overlooked.

3. Transportation System Financing

The regional and statewide transportation emphasis on highway system service for freight and private automobile travel reinforces a predominantly highway oriented system at the local level, as state highways traverse urban areas. This sets the development of other modal options at a disadvantage, as highway travel receives the bulk of state transportation funding and scarce resources require allocation trade-offs. The State Transportation Trust Fund is replenished by state motor fuel tax revenues, vehicle licensing fees, auto registration fees and rental car surcharges. This reflects the principle that the road system should be paid for by its users. The downside to such revenue sources is no institutional incentive to decrease auto ownership and decrease traffic as more traffic is associated with increased revenues and enhanced economic activity.

Consistent prioritization of state highway funding over the years reinforces existing travel behavior and public expectations at the local level. Section 206.46, F.S. requires that a minimum of 15 percent of revenues distributed by the State Transportation Trust Fund is devoted to local public transit systems and capital rail projects. For all practical purposes, the State Highway System for private automobile and freight traffic is the backbone of regional and intrastate travel in Florida. While FDOT has a Public Transit Office, the state does not have a statewide passenger transit system, which is commonly provided in many European nations. Instead, the Transit Office administers grants, monitors compliance with transit regulations and provides technical assistance to locally operated transit agencies. The provision of high quality transit service is potentially the most far reaching of TDM strategies to meet local travel needs efficiently. Ensuring high quality transit success depends on a pedestrian friendly environment, most often seen in the form of transit oriented development. However, once the decision is made to fund and build an additional highway, there is the added permanent commitment to maintain and resurface it on a regular schedule. Additional highway investment for private motor vehicle travel begets the need for more highway investment. In Florida, there are over 40,000 lane miles and 6,200 highway bridges on the State Highway System, all requiring regular inspection, repair and maintenance (23). The Public Transit Office’s mission is to maximize the passenger carrying capacity of these surface transportation facilities. The goal is to promote use of transit for local trips so that state highways are free to serve regional travel purposes. However, regional and local travel modes are intertwined and reinforcing. A local transit system works better within the context of a strong regional transit system and vice versa. Transit 2020, the transit element of the Florida Transportation Plan, cites three key issues that impede achievement of transit goals.

- The level of transit service for most Floridians is inadequate and will worsen given current trends.
- Current transit funding levels are inadequate to fund existing as well as expanded capital, maintenance and operating programs; several funding sources lack stability and flexibility.
- Existing policies and institutional arrangements and practices sometimes hinder or fail to promote the achievement of transit objectives.

4. Market-based Land Use Decisions

The State specifically wants to attract high-wage jobs and private sector investment to achieve statewide economic development goals. A company’s location or expansion can be adversely affected by transportation-related problems. The Economic Development Transportation Fund,
commonly referred to as the "Road Fund," is an incentive tool designed to alleviate transportation problems that adversely impact a specific company's location or expansion decision. These grants are worth up to $2 million and are awarded by the State of Florida to the local government for transportation facility improvements as part of the land development process. Funding pays for such eligible improvements as design and engineering, signalization, construction costs of access roads or road widening, and other work. However, the potential opportunity is recognizing that private enterprises have varying transportation needs. For example, some industries have time-sensitive freight transport requirements for expressway access at high operational level of service. These include products whose transport time should be minimized, such as refrigerated pharmaceuticals and blood products. Not all private enterprises require this kind of transportation service and access but could thrive in a transit-oriented development. For example, a medical research and manufacturing operation employing 170 people, most of them high wage, is located in downtown Seattle. Through offering employer transit subsidies coupled with a parking management program, the firm reduced the number of vehicles per 100 employees driving to the site by 10 percent between 1999 and 2001. Later, the company moved even closer into the core of the downtown because a favorable loan arrangement and better suited physical facilities saved the company money. Incidentally, the move positioned the company even closer to a transit hub, making it easier for employees to use transit. This example demonstrates that some companies are better suited to downtown locations, even some manufacturing operations, like this high technology example. (24).

Use of public transit is typically not associated with high-wage workers primarily because public transit has not been developed to provide premium service. As higher income households in both the United States and in Florida make more trips than low and middle income households (25), it is even more imperative that success in attracting high wage jobs is also combined with strategies to most efficiently use the transportation system. Application of TDM principles could demonstrate that better business placement would match its particular transportation needs to the transportation service type while preserving highway access for additional enterprises that truly need it.

5. Balancing Competing Interests with Scarce Resources

A quote in John Mason’s white paper for FHWA entitled “Understanding the Communications and Information Needs of Elected Officials for Transportation Planning and Operations” states it best: Government leaders must balance available funding with the desires of their constituents. In addition, they must address not only transportation, but a myriad of additional community concerns, making it difficult for them to have an in-depth knowledge of any subject. Systematic inclusion of TDM in the land development process will involve an understanding of the trade-offs between private automobile use and increased mobility through transportation demand management. It means that transportation investments are made now, incurring some present hardship, which result in benefits that are enjoyed later. An additional challenge is that changes brought on by TDM happen gradually; in the midst of explosive population growth, the positive effects of a shift in planning approaches from accommodating traffic to managing traffic can at first be obscure.

“Local elected officials must manage public expectations about transportation. We walk a fine line between almost unlimited public demand for unfettered mobility on the one hand, and very limited public support for increased tax revenue with which to finance these improvements on the other” (Gerry Connelly, Chairman, Board of Supervisors, Fairfax County, VA) (26).
6. Roadway Functional Classification

Roadway functional classification affects land development decision-making. The functional classification of a roadway sets expectations as to how the road will perform and guides decision making and priority setting with respect to how it will be improved and maintained. FDOT’s functional classification of roadways describes how they are designed to serve a specific function for moving traffic. Local governments may have their own functional classification system but have found it advantageous to be consistent with the State and Federal functional classification systems. The definitions below demarcate the trade-off between unimpeded movement of through traffic and accessibility to destinations. For brevity, the list below omits freeways, expressways, the distinction between major and minor collectors, and the distinction between these classifications as rural and urban.

a. **Principal Arterial** - A highway which serves moderate to high volumes of traffic moving over long distances. These include interstates, freeways and expressways. They are characterized by high volumes, high capacity and continuous alignment. These facilities usually connect major population centers. Although they provide access to abutting property, such access is usually controlled through frontage roads and limitations on the number of driveway cuts. Major intersections are channelized, signalized, and spaced at intervals of at least 1/4 mile. Minor intersecting streets usually function under stop sign control.

b. **Minor Arterial** - Similar in function to a principal arterial but operating under lower traffic volumes and over shorter distances. Minor arterials generally have less restrictive access controls and more widely spaced intersections in rural areas.

c. **Collector** - Thoroughfares that provide for traffic movement between arterials and local streets. Collectors usually carry moderate traffic for moderate distances. Traffic volumes can vary depending on the density of the surrounding area. Vehicular speeds are moderate.

d. **Local Street** - A street intended only to provide access to residences, businesses, or other abutting properties.

Local decision makers have priorities that are partly based on the necessity to comply with state requirements as well as to secure funding. While some small proportion of state roads are functionally classified as local, most state roads are built for regional mobility purposes, which is different from the main purpose of most municipal roads. State roads run through and are connected to the local road systems of urban areas. As a result, the functioning of a local road affects the level of service of a state road. Conversely, the presence of state roads, built to specifications for moving through traffic, affects the pattern of local land development in that there is an attraction to build near available capacity. The functional classification of state roadways tends to favor serving through movements for regional mobility purposes while municipal roadways of varying functional classifications attempt to juggle access provision while complying with level of service standards to meet concurrency. This is a difficult balancing act with ramifications for land development. For example, In 1997, the City of Tampa evaluated the feasibility of a “neighborhood collector” classification to protect residential neighborhoods from the adverse impacts of through traffic. The downside to completely protecting neighborhoods from through traffic is that it reinforces the hierarchical system of roadways that requires major arterials to be multilane. In a hierarchical street system, arterials become the only routes available for areawide travel. This spurs the separation of land uses, which further impedes transit-oriented development.
State roads, mainly arterials, are built for regional mobility purposes both running through and connecting to the local road systems that provide for local traffic movement and access to land uses. One of the main complaints regarding these arterials is the negative impact they have on the non-automobile community. Congested arterials impede the rapid movement of buses and are often unfriendly to bicyclists and pedestrians. Planners experience resistance from developers regarding the implementation of TDM strategies. Developers have specific “formulas” for creating developments based on marketing knowledge received from their buyers. They believe, not without merit, that because their buyers are not seeking specific TDM strategies, such investments are not desired by the public and, therefore, not justified. Notably, recent interest by planners in New Urbanism and traditional neighborhood development is fostering a change in development “formulas” throughout the state. This trend shows a growing understanding on the part of the general public that lifestyle alternatives are possible. The surge of New Urbanism has brought increased interest in taming these arterials, resulting in a collaboration between the Congress of New Urbanism (CNU) and the Institute of Transportation Engineers (ITE). At the time of this writing, the CNU and ITE are working on, “…the creation of an industry-approved design guide that gives transportation engineers and thoroughfare designers design criteria that incorporate techniques and principles of new urbanism and smart growth for context-sensitive major thoroughfares for urban settings” (27).

7. Programming and Evaluation Time Frames Do Not Correspond

The focus of TDM program budgeting often has been based upon short term time frames. For example, commuter assistance programs (CAP) may be evaluated based upon annual work plans supported by annual budgets; therefore, some of the most important work with far reaching and lasting impact (TDM strategies corresponding to land development) takes a back seat if performance results must be demonstrated within the year. TDM programs often require longer time frames for implementation and for demonstrating changes in travel behavior. Because the land development process often takes longer than a year and straddles work plans of multiple years, it does not fit the evaluation time frame.

8. Lack of Knowledge and Lack of Resources

Most local government staff members are unlikely to have the full knowledge and understanding of the TDM strategies available to them. It is likely that, without specific examples of how TDM strategies can be included in the land development process from long range plans through development agreements, TDM strategies will be either weak or non-existent. Also, many TDM strategies are not capital intensive and therefore may require more effort to devise programs that establish who is responsible for implementation and how to gauge results. TDM professionals are not included among those who regularly review land development proposals or traffic analyses. Public transit and TDM agencies rarely have the staff resources to stay on top of the myriad development proposals under review at any one time, leaving it up to the local host government to advocate on their behalf. Even in the case of developments of regional impact, in which transit agencies are usually involved, it is often the case that the review process occurs over an extended period of time during which the development concept may change repeatedly in response to market conditions. Changing conditions may necessitate follow-up reviews for which transit agencies may not have the staff resources.

9. TDM is Considered a Mitigative Measure Only

TDM has traditionally been viewed and applied as a mitigative response to an already congested roadway system that primarily serves private motor vehicles. This practice of waiting until there is a congestion problem before implementing TDM strategies places increased pressure for results that
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take years to achieve. If applied systematically throughout the land development process, TDM would be regarded not so much a mitigative measure as it would a means to enhance mobility. Systematic incorporation of TDM in the land development process would incorporate travel demand management, in all its definitional aspects, right from the very beginning of the long range land use/transportation planning process through to the day-to-day travel options people consider.

10. Relationship Between Local Government and Developer

The developer often is uninformed regarding the integration of TDM into land development projects. While there are many TDM-related services and facilities that could be made possible through land developer participation, the host local government balances conditions and requests against enticements to maintain a positive business relationship with the developer. Certain considerations by the host local government can make a difference in whether the business of land development remains worthwhile and profitable. These include the following:

- Certainty of the process;
- Fair treatment in relation to business competitors as well as in relation to the negotiated responsibilities of the developer and the host local government;
- Flexibility in solution seeking; and
- Respect for time constraints of the land development process.

11. Monitoring Development Agreements

Despite a local government’s focus on creating development agreements, challenges remain in monitoring them. Most often, monitoring occurs at points in time when developers must apply for site plan or building permit approvals or submit annual reports. Occasionally, complaints from the general public trigger a review of the development agreement and the developer’s compliance with that agreement. Often, staffing constraints make it difficult for local governments to be vigilant regarding implementation of programmatic transportation improvements and services. As a result, TDM strategies that require non-physical improvements in a development agreement may have little compliance. This challenge is evident in the case studies compiled for this report.
CURRENT PRACTICE OF INCORPORATING TDM INTO THE LAND DEVELOPMENT PROCESS

For the purposes of this report, the land development process in Florida includes long range planning, land development regulations (addressing zoning, subdivision, parking, etc.), other ordinances (such as concurrency and trip reduction), as well as various permitting processes. Managing transportation demand involves each stage of the development process. Often, the land development process is weighted toward accommodating the demand for private motor vehicles at the expense of managing transportation demand. Challenges of incorporating TDM strategies into the land development process exist in each stage of the process and affect the outcome. This discussion of the land development process from long range planning through site development identifies how TDM is currently being incorporated into each stage as well as some of the factors that may work against transportation demand management.

Long Range Planning

Local governments are responsible for land development policy setting through development of generalized long range plans guiding future growth, as well as regulating development at the site-specific level. Long range planning includes both transportation planning as carried out by metropolitan planning organizations and comprehensive land use planning as carried out by local governments. Although local government comprehensive plans provide guidance for the entire jurisdiction, local governments are increasingly developing sub-area, small area, sector, or selected area plans to respond to individual land use, transportation, and economic needs as well as to resident desires in specific areas.

MPO Long Range Transportation Plan (LRTP) In a 2002 review, Kramer and Mierzejewski found that “almost all MPOs incorporated the concepts of intermodalism and multi-modalism into their long range transportation plans” (28). For the first time, the majority of Florida MPOs considered alternative modes of transportation in addition to the automobile, including bike paths, sidewalks, multi-use trails, rail lines, bus rapid transit, express bus routes, and HOV lanes. Although most MPOs allotted some funding for alternative modes of transportation, the majority of funding went to auto-related improvements.

A few MPOs, including the Tallahassee/Leon County MPO (now the Capital Region Transportation Planning Agency, CRTPA), the Broward County MPO, and the Gainesville MTPO, established unique approaches to promoting multi-modal transportation systems in their 2020 LRTPs. The CRTPA “…conducted a two-tiered walkability/bikability analysis to target bicycle and pedestrian enhancements to areas that have a high potential for bicycle and pedestrian activity.” The Broward County MPO Board included a significant number of transit-related improvements through complex alternatives testing which included both highway and transit alternatives. Finally, the Gainesville MTPO adopted a variety of multimodal projects including road connectivity projects, lane reductions to enhance pedestrian and bicycle facilities, as well as express bus service.

Most Florida MPOs are currently preparing updates to their long range transportation plans; to date, seven of them have completed the process and adopted the updated plans. Although many of the LRTP updates are not complete as of this writing, most MPOs have adopted their guiding goals, objectives, and policies (GOPs). A review of these GOPs reveal greater policy emphasis on managing transportation demand, including the following generalized objectives.

MPOs seek to change user behavior to accomplish reductions in SOV (single-occupant vehicle) dependency through increased vehicle occupancy, reduced peak period travel, and increased
availability and use of alternative modes of travel (29). The concept of changing user behavior to maximize the capacity and efficiency of the transportation system appears as a policy in MPO LRTPs. While recognition of managing transportation demand in plan updates is a positive sign, the key concept that is missed by the general objective above is that TDM comprises many other ways to manage demand besides modal options. While the emphasis in the objective is upon reducing single-occupant vehicle travel as the means to decrease traffic congestion, examples of other strategies, including congestion pricing and compressed work week, do not necessarily reduce SOV use but can decrease congestion. This illustrates the need for planners and policy makers to better understand that TDM includes influencing travel behavior by mode, time of day, trip frequency, trip length, route, cost and regulation, and that the selection of one or more objectives to accomplish the goal may or may not include SOV reduction. This recognition is especially important in Florida urban areas where parking is plentiful and small effort is being made to limit parking.

A handful of policy statements attempt to make more specific recommendations, including reducing peak period travel using TDM strategies and providing a telecommunication network that would enhance people's ability to avoid trips entirely. Examples of goals, objectives, and other policy statements expressing these planning concerns include:

- **Okaloosa-Walton TPO:** Reduce energy consumption by promoting actions to increase the occupancy in vehicles (e.g. ridesharing, mass transit, HOV lanes).
- **Collier County MPO:** Encourage employers to use incentives for transit use, such as bus passes, van pooling, and coordination of ridesharing activities.
- **Lee County MPO:** Reduce peak period travel through the use of Transportation Demand Management measures (e.g. carpooling, vanpooling, telecommuting, flexible work hours, etc.).
- **Pinellas County MPO:** Encourage the development of a telecommunication infrastructure to provide universal service access to all citizens for expanding educational opportunities via distance learning, obtaining medical information via telemedicine, increasing commerce via the purchase of goods by online shopping, and creating job opportunities via telework. These elements will foster economic development by helping citizens and businesses move intellectual property, data and information electronically. This policy is intended to reduce or even eliminate the need to travel for these purposes.

Another observation is the frequent use of “soft” verbs—actions that sound good but for which progress is difficult to measure. These actions include “coordinate with”, “promote”, “encourage”, “consider” and “continue to support”. Another common phrase is “implementing where feasible” which suggests the intent to use TDM but provides a way to justify avoiding TDM based upon professional judgment. Related to this are ambiguities in the use of wording that expressly requires an action versus that which implies it is optional (i.e., “shall” versus “will”, where standard rules for these words often do not reflect actual usage). Policy language must be clear about what is mandatory. Word selection in policies also should clearly describe the intended application of TDM. For example, the difference between the use of “transportation alternatives” and “transportation choices” may be interpreted differently by some. Critical to the initial acceptance of TDM, particularly as citizens are being asked to change their travel behavior, is the concept that TDM provides everyone with choices and the selection of one mode or action does not have to be used every time. TDM enables travelers to have the option to choose transit one day and drive to work...
alone another day when needed. TDM is intended to maximize travel flexibility while encouraging the selection of the best and most efficient travel choice for each trip.

Under the sponsorship of Bay Area Commuter Services, the regional commuter assistance program in the Tampa Bay area, long range TDM planning for municipalities was advanced through the preparation of Long Range TDM Plans for Hillsborough and Pinellas Counties by the USF Center for Urban Transportation Research. These were developed with the active participation of advisory committees comprised of their respective MPOs, city and county staff, transit agencies, FDOT and other key stakeholders. Baseline performance was measured for 2000 and peer communities were selected in regard to demographic, transit, vanpool program and congestion index characteristics. Forecasts for 2025 were developed using the Environmental Protection Agency’s (EPA) COMMUTER Model. The model estimated the impact of TDM strategies based upon several scenarios developed by the advisory committees. The plans demonstrated that success of TDM depends upon the packaging of various actions that complement and reinforce each other to achieve a desired objective. The plans also contain estimated costs of implementation and demonstrate that the impact of TDM strategies corresponds to the degree of financial support and commitment assigned to their implementation (30a and b).

The Pinellas County MPO example cited above regarding encouraging the development of telecommunications infrastructure points to a different challenge entirely. While many transportation entities at the federal, state and local levels provide programs to promote telework, they do not control telecommunications infrastructure. While the FDOT has pursued the development of a fiber optic network, it has been for Intelligent Transportation Systems (ITS) applications for optimizing highway traffic flow rather than reducing the need to travel through electronic access. Telecommunications within the transportation arena is an underdeveloped area well worth pursuing (31).

MPOs seek to make modal alternatives more viable through increased availability, improved service, and additional funding (29). Increased multi-modalism is one of the key priorities of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and remains a corner-stone of transportation policy at both the federal and state levels. Individual MPO priority statements touch on a variety of issues and subjects, each of which can be categorized generally under a desire by MPOs to create a multi-modal transportation system. Again, the majority of objectives and policies address alternative modes of transportation including bike paths, sidewalks, multi-use trails, rail lines, bus rapid transit, express bus routes, and HOV lanes. Many MPOs express a clear desire to make alternative modes of transportation competitive with the single occupant vehicle through improved travel time, accessibility, and aesthetics. Examples of goals, objectives and other policy statements expressing these planning concerns include:

- **Ocala/Marion County TPO:** Provide increased fixed route transit services by expansion of the existing transportation system into areas of high population, employment, or services, and/or by decreasing existing bus route times thereby providing more frequent service.

- **Florida-Alabama TPO:** Encourage developers in the local government site plan review process to include provisions for alternate forms of transportation such as a compact car, motorcycle, golf cart, designated car pool, and bus as well as for bicycle racks, High Occupancy Vehicle (HOV) lanes, and designated park and ride lots.
• *Gainesville MTPO:* Improve the viability of alternatives to the single-occupant automobile (bicycle, walking, public transit, carpooling, and telecommuting) as options for all users of the transportation system through accessibility, convenience and comfort.

MPOs seek to improve the connectivity of the transportation network through the provision of alternate routes (29). Some MPOs address the need to improve connections between roadways of various functional classes (arterials, collectors, local roads, etc.) to encourage an appropriate distribution of vehicle traffic across the entire roadway system and relieve congestion on the higher order roadways. A few MPOs expand upon that concept to include improved connectivity between all components of the transportation system including sidewalks, bikeways and transit ways. Examples of goals, objectives and other policy statements expressing these planning concerns include:

• *Capital Region TPA:* Improve connectivity of the collector roadway network to relieve congestion on arterial and freeway facilities.

• *Florida-Alabama TPO:* Provide design guidelines for developers to ensure multimodal connectivity in or between new developments.

• *Volusia County MPO:* Support in-fill development and the concentration of new commercial and office space in activity centers that can be interconnected by transit, bikeways and sidewalks.

MPOs seek to promote livable communities through the design of a transportation system that is both sustainable and sensitive to community visions and values (29). MPOs also indicate support of community livability through the transportation planning process, stressing the need to provide a transportation system that enhances multi-modal access to key community facilities such as schools, work places, shopping districts, recreational venues, cultural facilities and medical services. A policy example addressing livable communities is below:

• *METROPLAN ORLANDO:* Provide a pedestrian system that connects to an inter-modal transportation system in order to support neighborhood and community livability and vitality.

MPOs seek to encourage local governments to adopt urban design strategies and corresponding land development regulations that support the integration of land use and transportation (29). While MPOs encourage local governments to develop and implement urban design strategies that integrate transportation and land use, local governments are directly in control of the land development process. Some specific design concepts recommended by MPOs include designs that encourage internal trip capture, control of access along major facilities, mixed use development, transit-oriented development, walkable communities and more intense non-residential development in transit corridors while discouraging the development of strip commercial land use and improvements that support peripheral growth and urban area sprawl.

Additionally, MPOs encourage local governments to include requirements in their land development regulations to ensure that new development is integrated into the multimodal transportation system. Suggestions include regulations that require developers to integrate design elements in their site plans that would facilitate transit use (transit stops and connections, etc.), encourage walking, biking and other modal transportation modes (bicycle racks, lighted sidewalks, benches, van pool parking
spaces, etc.), and provide for multi-modal connections to adjacent land uses. Examples of goals, objectives and other policy statements expressing these planning concerns include:

- **Ocala/Marion County TPO**: New subdivisions and developments shall be required to provide multi-modal interconnections to adjacent properties to permit travel to neighboring land uses without having to use the public roadway system.

- **Collier County MPO**: The MPO will work with local governments to develop ordinances that require all new and redevelopment projects to consider alternative modes and “smart growth” design techniques.

- **Volusia County MPO**: Support in-fill development, redevelopment and the concentration of new commercial and office space in activity centers that can be inter-connected by transit, bikeways, and sidewalks.

- **Capital Region TPA**: Coordinate with local governments and other agencies, to discourage development of strip commercial land use, encourage the control of access along major facilities, encourage mixed-use development, and encourage transit-oriented development with more intense non-residential development in existing and planned transit corridors.

- **Miami-Dade MPO**: Discourage improvements that support peripheral growth and urban area sprawl.

In crafting TDM-specific objectives and policies, each MPO must remain aware of its role in establishing guiding policies for the transportation system while still being specific about what is to be accomplished and how it is to be accomplished. The following discussion includes examples from a few MPOs that specifically use the terms “transportation demand management” or “TDM” in their respective LRTPs. Note that the Collier MPO “encourages” TDM, while Pinellas County MPO establishes a more active role for itself in working with local governments regarding transportation demand management. Finally, the Hillsborough County MPO sets aside specific funding for TDM programs. Each level of inclusion serves a useful role for the population it serves.

In the first example, the adopted GOPs for the Collier MPO 2030 Long Range Transportation Plan Update specifically included TDM in the following objective and accompanying policies:

**OBJECTIVE 1.14 Encourage utilization of Transportation Demand Management (TDM).**

**POLICY 1.14.1** The MPO will encourage local jurisdictions to develop multimodal plans, services, and programs that decrease reliance on the single occupant vehicle as the dominant means of travel.

**POLICY 1.14.2** The MPO 2030 LRTP will identify methods citizens can use to commute to work and decrease overall traffic demand on the transportation system. These methods may include transit ridership, telecommuting, flexible work schedules, carpooling, vanpooling, walking, and bicycling.

It is important for TDM professionals to point out to transportation planners and policy makers that while TDM has traditionally been applied to commuter travel, commute trips only constitute 20 percent of all travel. TDM can be applied to a variety of trip purposes and land development settings. FHWA comprehensively identifies the range of application settings for implementing TDM (32).
Incorporating TDM into the Land Development Process

These are not just employment sites targeting commute trips. As illustrated in Figure 2 in the introduction of this report, these application settings include schools, special events, recreation and tourism, corridor planning and construction mitigation, freight transport, airports and incidents and emergencies.

The Collier MPO Policy 1.14.1 limits the role of the MPO to providing encouragement to local governments to make their own efforts. Although in Policy 1.14.2, the MPO takes an active role to “identify methods citizens can use,” the policy provides no further guidance regarding how to share those methods with citizens. On the other hand, the Pinellas County 2025 Long Range Transportation Plan Update provides more specific actions for the MPO. One of the objectives in the Pinellas County Plan is devoted to transportation demand management stating, “Reduce traffic congestion and positively impact air quality by decreasing the use of the single occupant vehicles (SOV) at peak hours” (33). This objective is supported by fourteen policies (Appendix C) outlining the MPO’s intent to perform various support roles in the implementation of TDM measures throughout the County. Below are just a few of the policies from this Plan:

1.7.1. Policy: The MPO shall work with local governments, transportation demand management (TDM) agencies and FDOT to develop vehicle trip (VT) reduction and vehicle miles of travel (VMT) reduction goals.

1.7.2. Policy: The MPO shall assist and support the efforts of Bay Area Commuter Services (BACS) to implement and achieve the goals of its Long Range Transportation Demand Management Plan and to carry out recommended actions derived from related studies.

1.7.3. Policy: The MPO shall assist and encourage the efforts of local TDM agencies by providing technical and funding support for promotion of alternatives to SOV travel, including carpool, vanpool, transit, walking, bicycling, telecommuting and variable work schedules.

1.7.4. Policy: The MPO shall continue to participate in events and other activities sponsored by local transportation-related agencies that support and facilitate the use of alternatives to driving alone by commuters and other travelers (e.g., Commuter Choices Week, B-BOPP, Tampa Bay Commuter, etc.).

In these and the remainder of the policies devoted to TDM, the Pinellas County MPO stresses action in terms of “work with, assist, encourage, participate, and provide technical and funding support.” Policy 1.7.1 states that vehicle trip (VT) and vehicle miles of travel (VMT) reduction goals will be the result of collaboration between the MPO, local governments, TDM agencies and the FDOT. Further, Policy 1.7.3 specifies that the MPO will provide technical and funding support to local TDM agencies.

As evidenced in the Collier and Pinellas County MPO plans, most TDM-related policies affirm the MPOs intent to influence or encourage local governments and other agencies to implement the measures because, in reality, each MPO guides transportation funding not land development or program implementation. MPOs also have the capacity to provide technical support for transportation planning where local agencies lack the necessary expertise. The goals, objectives and policies adopted by each MPO serve as a valuable tool for local governments to build on as they develop their comprehensive plans.
Each MPO adopts GOPs to serve as guidance in developing alternatives and, ultimately, expenditures for the adopted plan. The MPO solidifies its intent for the transportation system through its funding or investment choices. Whereas TDM is often mentioned within the goals, objectives, and policies of each MPO, there is seldom any funding attached to TDM programs. An example of an MPO that has included specific TDM funding in their plan is the Hillsborough County MPO. The Adopted 2025 Long Range Transportation Plan was guided by a number of Goals, Principles, and Objectives or GPOs (rather than goals, objectives, and policies), several of which either specifically include transportation demand management or refer to it. Below are the various objectives referring to TDM along with the accompanying goals and principles:

**Goal I: Vitality of the Tampa Bay Region**

**Principle 1.1 Relieve Traffic Congestion and Minimize Travel Time**
- Foster strategies that reduce the growth in peak hour vehicle travel (i.e., carpooling, telecommuting, bicycling, etc.).

**Principle 1.4 Encourage Private-Sector Transportation Investments**
- Encourage private-sector participation in providing the design, right-of-way, and construction of transportation improvements.
- Consider, where feasible, incentives for private sector participation in the development of transit stations, intermodal terminals, toll roads, and transportation demand management programs.

**Goal II: Promote Accessibility & Mobility Options Available to People or Freight, and Enhance the Integration and Connectivity of the Transportation System**

**Principle 2.2 Decrease Reliance on Single-Occupancy Vehicles.**
- Increase the percentage of persons using alternative modes, especially during peak hours.

**Goal IV: Preserve Existing Facilities and Promote Efficient System Management and Operations**

**Principle 4.4 Emphasize the Use of Existing Transportation Systems to Avoid Unnecessary Capacity Improvements.**
- Promote policies that maximize the use of the existing transportation system and explore opportunities for connectivity before building new facilities (i.e., re-striping for bicycle lanes, new technologies, access management, and transportation demand management).
- Encourage local governments and private entities to implement transportation demand management techniques in order to reduce demand and provide commuter benefits.

Although the GOPs refer to transportation demand management, the Plan text uses the term travel demand management rather than transportation demand management and describes it as follows:

*Travel Demand Management (TDM) comprises an array of strategies to address peak-hour congestion through reducing demand for road-space. In general, TDM strategies encourage*
travelers, especially commuters, to make their trip via some method other than driving alone (bus, carpool, vanpool, bike, walk); or not to make the trip at all (telecommute); or to shift their travel time to off-peak hours (compressed work week and flex-time programs).

The Plan lists the agencies within Hillsborough County (the MPO’s jurisdiction) that implement TDM programs. Each agency works with “…employers to encourage their voluntary adoption and support of TDM programs, such as carpool incentives and telecommuting.” The Plan suggests a program that “would make employer TDM programs available to at least 50,000 workers in Hillsborough County.” In order to accomplish this goal, it is envisioned that the various TDM agencies would approach those businesses employing a minimum of 500, 250, and 50 employees, respectively. Of the trip reduction facilities and incentives discussed for this program, one includes a, “…government-funded match for employer subsidies of employees’ transit fares.” An example of this incentive could involve the purchase of a transit pass by an employee for 50 percent of the normal fare. The remaining 50 percent would be split by the employer and the MPO match program.

Not only does the Hillsborough County MPO include TDM in its Goals, Principles, and Objectives, as well as a discussion in the text of the document, it establishes funding for the program beginning in 2010. Using revenue from the Transportation Management Area funds (also known as federal urban allocation funds and available to MPOs with an urbanized area population over 200,000), the funding total for the TDM program’s first five years is $12,966,712 of the $126,781,006 available; for the fifteen-year period from 2010 to 2025 it reaches a total of $35,411,232 of the $310,568,927 available. Details of the funding allocated in the MPO’s LRTP are presented in Table 2 of this report.

The Hillsborough County MPO has chosen to support transportation demand management through appropriate funding, and to establish a program goal of making TDM programs available to 50,000 employees throughout the County. Other Goals, Principles, and Objectives in the Plan address increasing transit service and availability as well as site plan, subdivision design, and land development patterns that encourage livable communities and discourage single-occupancy vehicle travel. While this type of language is contained in each MPO’s long range transportation plan, subsequent funding of programs that support the language is key to reaching specific TDM goals.

Detailed alternatives analysis, as performed by Broward County, emphasizes the trade-off between modes and enables transportation decision-makers to reach informed decisions regarding the transportation system. More up-front work is required in order to perform this type of alternatives analysis, but can result in decisions leading to a functional multimodal transportation system later. Although many MPOs include transportation demand management provisions in their GOPs, most alternatives analysis still focuses on serving private motor vehicles. While limiting, this emphasis is not necessarily incompatible with TDM if strategies of influencing travel behavior by time of day, day of week, trip frequency, route and cost are used.

### Table 2. Transportation Demand Management Projects

<table>
<thead>
<tr>
<th>TDM PROJECTS</th>
<th>JURISDICTION</th>
<th>INTERIM PLAN</th>
<th>LONG RANGE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecommuter/Compressed Work Week</td>
<td>BACS</td>
<td>$2,578,878</td>
<td>$4,298,130</td>
<td>$6,877,008</td>
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<tr>
<td>Employer Outreach Program</td>
<td>BACS TMOs</td>
<td>$4,605,180</td>
<td>$7,675,300</td>
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<tr>
<td>Vanpool Program</td>
<td>BACS</td>
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<td>$2,419,170</td>
<td>$3,870,672</td>
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<tr>
<td>Publicity</td>
<td>BACS</td>
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<td>$3,051,920</td>
<td>$4,883,072</td>
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</tbody>
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National Center for Transit Research / Center for Urban Transportation Research / University of South Florida
Incorporating TDM into the Land Development Process

Transit/Vanpool Fare Incentives

<table>
<thead>
<tr>
<th>BACS</th>
<th>HART</th>
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<td>$2,500,000</td>
<td>$5,000,000</td>
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<table>
<thead>
<tr>
<th>TOTAL</th>
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</thead>
<tbody>
<tr>
<td>$12,966,712</td>
<td>$22,444,520</td>
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</table>

Local Government Comprehensive Plans (LGCP) Both authorized and required by the Local Government Comprehensive Planning and Land Development Regulation Act, Chapter 163.3161, F.S., local governments in Florida prepare comprehensive plans to address land use, transportation, housing and environmental resources, along with other required plan elements. Local government comprehensive plans (LGCP) establish the policy direction of a jurisdiction’s land development regulations. Local governments across the state have prepared and implemented long range comprehensive plans with varying degrees of success in managing growth. Limited success in managing growth is evident through several factors, including increases in traffic congestion and decreases in accessibility and mobility.

As with the MPO long range transportation plans, most goals, objectives, and policies of local government comprehensive plans, incorporate a variety of multimodal alternatives, site plan and subdivision design guidelines, and land development patterns that encourage livable communities while discouraging single-occupancy vehicle travel. Although it is important that the LGCP strongly and clearly provide the policy foundation for incorporating TDM strategies into the land development process, most LGCPs in Florida only encourage the practice.

Due in part to traffic concerns over recent years, people across the nation have had an increased interest in sustainable communities concepts such as establishing urban growth boundaries, directing land development inward, revitalizing downtowns and creating livable communities. This interest is often reflected in the use the local government comprehensive planning process and corresponding land development code to implement these concepts. Local government comprehensive plan examples discussed here are from the City of Orlando, the City of Jacksonville, and Broward County.

City of Orlando. The City of Orlando relies on METROPLAN ORLANDO (Orlando’s Metropolitan Planning Organization) and LYNX (the Central Florida Regional Transportation Authority) to organize and implement TDM programs in the city. Objective 4.2 and Policies 4.2.1 through 4.2.6 of the Orlando Growth Management Plan below address TDM by encouraging METROPLAN Orlando and LYNX to take various actions regarding transportation demand management, obliging the City only to participate.

Objective 4.2 The City shall annually coordinate with METROPLAN ORLANDO and the Central Florida Regional Transportation Authority (dba LYNX) to undertake efforts to promote Transportation Demand Management programs focusing on the region’s major activity centers.

Policy 4.2.1 The City shall support and will participate in activities of Metroplan Orlando and the Central Florida Regional Transportation Authority (dba LYNX) to promote Transportation Demand Management programs in the region.

Policy 4.2.2 The City shall encourage METROPLAN ORLANDO and the Central Florida Regional Transportation Authority (dba LYNX) to undertake efforts to increase regional awareness on the importance of Transportation Demand Management programs in addressing traffic congestion, environmental protection, and energy conservation.
Incorporating TDM into the Land Development Process

Policy 4.2.3 The City shall encourage METROPLAN ORLANDO and the Central Florida Regional Transportation Authority (dba LYNX) to develop incentives for employers to implement Transportation Demand Management (TDM) programs. The TDM programs may include, but not be limited to, ridesharing, flexible work hours, telecommuting, preferential parking, bicycle parking, and transit subsidies.

Policy 4.2.4 The City shall encourage METROPLAN ORLANDO and the Central Florida Regional Transportation Authority (dba LYNX) to develop thresholds at which various Transportation Demand Management measures could be required by local governments.

Policy 4.2.5 The City shall encourage METROPLAN ORLANDO and the Central Florida Regional Transportation Authority (dba LYNX) to conduct transportation surveys to assess changes in alternative transportation modes use.

Policy 4.2.6 All projects that are located outside metropolitan activity centers, and that will include a concentration of more than 500 employees, shall coordinate with METROPLAN ORLANDO and the Central Florida Regional Transportation Authority.

City of Jacksonville. In an effort to increase bicycle and pedestrian travel, the City of Jacksonville’s 2010 Comprehensive Plan directs the City to support the development of pedestrian accommodations and bikeways throughout planning and land development and to “actively encourage” citizens to use those facilities. The Plan also establishes a Transportation Management Area (TMA) in the area of State Road 9A at J. Turner Butler Boulevard and Baymeadows Road (Objective 1.3). Policy 1.3.11 specifically requires a TDM plan:

Any non-residential development proposed within the TMA which will employ more than one hundred (100) persons shall submit to the City, prior to the issuance of final development agreements or permits, a plan for the use of Transportation Demand Management (TDM) strategies and incentives. Such strategies may include participation in the Jacksonville Transportation Authority’s (JTA) Suburban Mobility Management Program, participation in a Transportation Management Organization (TMO) and other strategies recommended in the MPO’s Congestion/Mobility Management Plan for the Jacksonville Urbanized Area and the MPO’s Commuter Assistance Program. Any such development shall implement its TDM plan, as submitted to the City. All non-residential development within the TMA shall participate in the MPO’s Commuter Assistance Program.

According to the City’s current planning staff, there is no actual process to implement this provision. When the City does ask developers to include transit or TDM in transportation for their development, many reasons are offered as to why such measures simply “won’t work.” The City does coordinate with the First Coast MPO who administers the Metropolitan Commuter Assistance Program (MCAP) through funding from the Florida Department of Transportation.

Broward County. Most proactive in its inclusion of TDM strategies is the Broward County Comprehensive Plan (BCCP). Its policies are measurable. When this is the case, plan policies can be evaluated regarding whether or not they have been met. The BCCP contains the following policy:

Broward County shall provide for an energy efficient roadway network through implementation of, but not limited to, the following programs, activities, or actions:
- Through participation in the MPO, increase the vehicle occupancy rate from 1.37 to 1.43 persons per vehicle through transportation demand management (TDM) strategies, such as ridesharing programs, preferred parking, and high occupancy vehicle lanes.
Incorporating TDM into the Land Development Process

- Through participation in the MPO, work to reduce the per capita vehicle miles traveled (VMT) below the year 2002 projected daily per capita VMT of 19.42 by implementing TDM strategies.
- Through its membership on the MPO, maintain and, where feasible, expand the number of ride-sharing lots in Broward County.

In its 2004 Evaluation and Appraisal Report, Broward County noted that it “has increased the vehicle occupancy rate per vehicle through transportation demand management (TDM) strategies, such as ride-sharing programs, preferred parking, and high occupancy vehicle lanes.” Broward County has begun both carpool and vanpool programs and provided funding for transit shuttles in support of these policies. The number of park and ride lots has increased from 5 lots to 23 lots. The actions taken by Broward County illustrate that stating clear, measurable goals within its Plan policies along with appropriate funding leads to successful implementation. Performance measurement enables an effective TDM program to continue to win funding and support.

It is important to select program measures with care. Performance measures will dictate what actions are taken and may de-emphasize some actions that would otherwise be highly effective in achieving the goal. For example, Broward County’s goal is to provide for an energy efficient roadway network and measures this using a vehicle occupancy rate. This performance measure places program emphasis upon ridesharing and transit use but loses the effects of bicycling, walking and telework. An example as illustrated by Burch (1994) is the widespread use of average vehicle ridership (AVR), which is a measure of the number of persons per vehicle used to commute to a work site. The preferred goal is to reduce vehicle trips rather than increasing passengers per vehicle. Therefore, vehicle trips are the variable that should be represented as the numerator in a ratio of vehicles to persons. As a vehicle employee ratio (VER), this encompasses all modes of transportation, including the contribution of bicycling and walking. (34)

While some local government comprehensive plans attempt to include provisions for multimodal transportation and transportation demand management, often other provisions of the plans maintain the status quo by protecting the roadway system from encroachment. For example, the City of Tampa Transportation Element of its Comprehensive Plan includes Objective 2.1 to implement programs to protect existing and future rights of way from building encroachment. The City requires, through its development review process, that development follow special street setback requirements as established in Chapter 27-99 Zoning, of the Code of Ordinance.

Small Area Plans (SAP) Although local government comprehensive plans provide guidance for entire jurisdictions, local governments are increasingly developing sub-area, small area, sector, or selected area plans to respond to individual land use, transportation, and economic needs as well as resident desires in specific areas. They are generally developed with oversight of an advisory group that represents area stakeholders, and may focus on a particular neighborhood, commercial district, or high growth area. A multimodal transportation district is one type of small area plan. Each of these plans also may address TDM for the specific area. The following examples illustrate how transportation demand management can be addressed in a small area plan.

City of Orlando. The overall vision for Southeast Orlando, a future mixed-use community that at buildout could have as many as 50,000 residents, is outlined in the Southeast Orlando Sector Plan (35). The transportation section of this document describes a plan designed around transit use, bicycle use and pedestrians, with “cars . . . kept in perspective.” This will be accomplished via land use patterns, densities and street layout. The Growth Management Policy Framework makes one specific reference to TDM:
In order to develop public transit systems and services that encourage public transit ridership, increase personal mobility, conserve energy resources, preserve air quality, and foster economic growth within the Southeast Orlando Sector Plan area, projects that will include a concentration of more than 500 employees shall coordinate with METROPLAN ORLANDO and the Central Florida Regional Transportation Authority to implement Transportation Demand Management programs.

Northeast Polk County’s Ronald Reagan Parkway Selected Area Plan includes a specific TDM strategy in its vision for the area:

Live-Work Residential. It is anticipated that the percentage of commuter residents in this area will increase. The proliferation of long-term residents is vital to the sustainability and stability of the area, specifically the economy and property values. Therefore, it is imperative that greater accommodation be made for residents who choose to conduct business at their residence to reduce their amount of commuting as well as bring more commerce to Polk County. It is envisioned that residential developments will designate more areas and design more residences to enable this land use activity. In addition, greater latitude should be given to isolated properties along collector roads to develop live-work units through minimized or expedited permitting (36).

Multimodal Transportation District

A multimodal transportation district is one type of small area plan that can be a useful tool for incorporating TDM strategies in the long range planning process. In 1999, the Florida legislature amended Chapter 163, Florida Statutes authorizing local governments to establish multimodal transportation districts. The purpose of the legislation was to provide a planning tool that Florida communities could use to systematically reinforce across a defined area, those community design elements that support walking, bicycling and transit use. It also enabled Florida communities to advance transportation concurrency—a policy requirement that transportation facilities be available concurrent with the impacts of development—through development of a high quality multimodal environment, rather than the typical approach involving road widening for automobile capacity.

A multimodal transportation district is an area where primary priority is placed on “assuring a safe, comfortable, and attractive pedestrian environment, with convenient interconnection to transit” (Chapter 163.3180(15)(a)F.S.). Communities must incorporate community design features that reduce vehicular usage while supporting an integrated multimodal transportation system. Common elements include the presence of mixed-use activity centers, connectivity of streets and land uses, transit-friendly design features, and accessibility to alternative modes of transportation.

Multimodal transportation districts (MMTDs) are to be carried out through local comprehensive plans, land development regulations, and capital improvements programs. The National Center for Transit Research (NCTR) at the Center for Urban Transportation Research (CUTR) prepared a report entitled, Model Regulations and Plan Amendments for Multimodal Transportation Districts that contains model land development regulations and comprehensive plan amendments that local governments in Florida can use and adapt to promote multimodal transportation systems and development patterns. The report begins with an overview of the purpose and statutory requirements for multimodal transportation districts in Florida, and continues with model comprehensive plan amendments and land development regulations to assist local governments in implementing MMTDs.
MMTD designation is accomplished by amending a local government comprehensive plan and accompanying future land use map, as provided in Chapter 163.3184, F.S. A proposed multimodal transportation district must be reviewed and approved by both the Department of Community Affairs (DCA) and the Florida Department of Transportation (FDOT). Local governments must demonstrate that an area qualifies as an MMTD based upon the following existing or planned future design elements defined in Chapter 163.3180(15)(b), F.S.:

- A complementary mix and range of land uses;
- An interconnected network of streets to encourage walking and bicycling, with traffic calming where desirable;
- Appropriate densities and intensities of use within walking distance of transit stops;
- Daily activities within walking distance of residences, allowing independence to persons who do not drive;
- Public uses, streets, and squares that are safe, comfortable, and attractive for the pedestrian, with adjoining buildings open to the street and with parking not interfering with pedestrian, transit, automobile, and truck travel modes.

Local governments may be interested in establishing a MMTD because transportation concurrency is not primarily based upon motor vehicle level of service but by demonstrating an adequate level of mobility based upon professionally accepted multimodal LOS methodologies. Within a MMTD, local governments may also choose to reduce impact fees or local access fees imposed on land development based upon the reduction of vehicle trips or vehicle miles traveled expected based upon the development pattern planned for the district.
Land Development Regulations

Many local governments are doing just that. Florida law requires each local government to develop land development regulations that facilitate their individual long range comprehensive plans. Land development regulations include a wide range of regulations including adequate public facilities or concurrency ordinances, impact fee ordinances, zoning and subdivision regulations and other requirements for the development of land within the governing jurisdiction.

Impact Fee Ordinances. An impact fee ordinance provides another opportunity in the land development process to encourage developers to incorporate transportation demand management strategies. Impact fees have been defined as “a monetary charge imposed by local government on new development to recoup or offset a proportionate share of public capital costs required to accommodate such development with necessary public facilities” (38). Florida state law explicitly encourages local governments to enact land development regulations, including impact fees, to manage growth. Impact fee programs may be either demand driven (most prevalent), facility driven (less prevalent), or a combination of the two approaches (least prevalent) (39). Demand-driven approaches translate new auto trips into cost-per-trip based on the cost to improve a mile of roadway. Facility-based approaches arrive at a fee by taking the road improvement budget in the capital improvements program and dividing it by the trip generation rate for a proposed land use.

Most jurisdictions provide some form of credit, also known as an “offset,” for developer-initiated improvements or in-kind contributions. The Model Impact Fee Authorization Statute defines offsets as “the amount by which impact fees should be reduced to fairly reflect the value of land dedications or other physical improvements provided by a developer pursuant to any local requirements. Such offsets shall apply only to external or off-site improvements or dedications” (40). These offsets, known as impact fee waivers, reductions or exemptions, provide for a full or partial exemption from impact fees to accomplish specific planning objectives. A certain percentage discount is sometimes offered as part of the impact fee formula or in the impact fee ordinance, reducing the amount of the assessment by a given percentage. Because many TDM strategies are programmatic and on-site in nature, impact fees and the use of offsets have had limited application. However, several municipalities have applied them toward physical improvements to encourage alternative transportation and traditional neighborhood development as described in the examples below.

Orlando, Florida. The City of Orlando adopted an impact fee formula in the late 1990s that includes a schedule based on vehicle miles of travel (VMT) indicators (for various development units) (41). Rates vary according to geographic location and nature of development (e.g. lower or higher trip intensity patterns). For example, downtown and traditional city rates are comparatively lower than those in the “other city” area, because of the intensive land use mix and higher use of alternative modes in those areas.

The VMT indicator is used to adjust impact fee rates for compact developments that have lesser impacts on the road network. If the VMT indicator calculated for a specific traffic zone or zones is lower than the previously determined regional VMT indicator, the impact fees are adjusted accordingly. Under this approach, residential developments in the downtown area could receive as much as a 38% discount in road impact fees when compared to the previous formula.
Following the adoption of the new impact fee schedule, the City of Orlando Transportation Planning Bureau engaged in a special study to determine the transportation benefits of the traditional neighborhood development (TND) for walking and bicycling. The purpose of the study was to determine whether and by how much to reduce the transportation impact fee for the Southeast Sector Plan, which also incorporated TND requirements and called for higher accessibility as measured by a connectivity index (42). The study involved a survey of bicycle-friendly cities including Portland, Seattle, Vancouver, Davis, and Boulder to identify their bicycle/pedestrian mode split by trip purpose. The survey results showed an average 30% bicycle/pedestrian trip share for work, schools, shopping and recreational activities in these cities.

The report recommended a revision in the Trip Generation Factor (TGF) (which addresses mode split where vehicle lane miles of travel decrease and alternative mode trips increase) in the traffic impact fee (TIF) formula from 1 to 0.7 for TND development—a 30% reduction. The report acknowledged that “due to insufficient evidence supporting whether connectivity will translate into increased mode splits across all land uses, the reduction is proposed to apply only to those uses most closely associated with opportunities for non-automotive trips.” This included the land uses in the Southeast Sector Plan that comply with TND and network connectivity criteria.

Under the Southeast Sector Plan requirements, any applicant that adds links to the bicycle/pedestrian network from the development to the surrounding network, such that the connectivity index is 1.4 or greater, receives a 30% reduction in impact fees. These connections can be in the form of bicycle/pedestrian paths, sidewalks and streets. Staff notes that larger developments are those that typically benefit from the reduction, although some smaller, stand-alone sites could benefit depending upon their contributions.

Estimating trip generation for proposed new development is a challenge in the design and application of impact fees or any other fee or regulation that relies upon trip generation. Actual trip generation can vary widely for similar land uses; however, due to lack of resources to conduct their own studies, local governments commonly rely upon the use of trip generation estimates from the Institute of Transportation Engineers. Shoup points out this precarious use of ITE trip rates for transportation planning and design purposes despite cautions provided by ITE for their appropriate application. For example, ITE describes the trip rates for land uses as estimated from observations generated at selected developments, primarily from suburban localities with little or no transit service, nearby pedestrian amenities, or travel demand management programs. There is strong evidence to suggest that most selected sites offer free parking. Half the rates are based on five or fewer studies per land use. At most sites, vehicle trips are observed during the course of one day only. Shoup also points out that many factors influence the number of vehicle trips generated at a site, and we should not expect floor area, acreage or any other single variable to accurately predict the number of vehicle trips at any site or land use. Transportation planning decisions have contributed to the design for a car-oriented system because of the systematic misapplication of ITE trip rates by local governments over the years. The ITE trip rates represent land development patterns that provide no other choice besides private automobile driving and therefore demonstrate no use of alternative transportation. The lack of use of transportation alternatives is misinterpreted as a lack of need for transportation alternatives. Reinforcing this outcome is also the misapplication of ITE parking generation rates that are likewise generated from locations that offer no transit service and which result in overestimates of needed parking (43).

Due to the above observations, it is evident that impact fees can be used to encourage the use of transportation demand management strategies, but planners must be aware of how the methodology for determining the fee may inadvertently reinforce an outcome that reflects the status quo rather than helping to shape a more balanced supply of physical transportation facilities and their use.
**City of Loveland, Colorado.** The City of Loveland Colorado enacted a credit for mixed-use development in November 2001. The program offers a 25% reduction in the road impact fee to encourage mixed-use development. The ordinance provides rationale and eligibility criteria for the reduction. However, city staff has not had much experience with administering the credit for the mixed-use development. To date, the credit has been provided at two locations—both relatively large developments (approximately 70 acres). Staff indicated that the mixed use credit program may be disbanded. One reason is that Loveland is currently a small town that is developing in a low-density suburban fashion and many developments are not designed in a pedestrian-oriented fashion. Another constraint is that the credit works for large developments, but is not applicable to small single-use developments under separate ownership that together achieve comparable results, such as where a multi-family development is built next to a commercial development with adequate connectivity. According to staff, this has raised fairness concerns.

**Palo Alto, California.** One example of the use of transportation impact fee credits to entice developers to incorporate TDM strategies in their developments is in Palo Alto, California. In an effort to reduce new vehicle trips, the City of Palo Alto is implementing a strategy to provide effective alternatives to automobile travel. The transportation impact fee (TIF) expenditure plan includes citywide transportation demand management, expanded shuttle service, bicycle facilities, and computerized traffic management (44). Using an improvements-driven approach, the recommended transportation impact fee is “based on charging new development for 7.6% of the cost of the expenditure plan (which) represents the proportion of 2025 vehicle trips that is expected to be generated by development subject to the TIF.”

The impact fees are based on p.m. peak hour trip generation (ITE or Santa Clara County Valley Transportation Authority (VTA) sources). Credits are not given for transportation improvements required before the imposition of the fee (such as for intersections). Trip reduction credits are allowed for mixed-use development, locations close to transit, and effective TDM programs. The following table indicates the maximum potential trip reductions generally allowed for by VTA.
Table 3: Maximum Trip Reduction Credits

<table>
<thead>
<tr>
<th>Trip Reduction Strategy</th>
<th>Maximum Trip Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mixed-Use Development Project</strong></td>
<td></td>
</tr>
<tr>
<td>With housing and retail components</td>
<td>13%</td>
</tr>
<tr>
<td>With hotel and retail components</td>
<td>10%</td>
</tr>
<tr>
<td>With housing and employment</td>
<td>3%</td>
</tr>
<tr>
<td>With employment and employee-serving retail</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Location Within 2,000-Foot Walk of Transit Facility</strong></td>
<td></td>
</tr>
<tr>
<td>Housing near LRT or Caltrain Station</td>
<td>9%</td>
</tr>
<tr>
<td>Housing near a Major Bus Stop</td>
<td>2%</td>
</tr>
<tr>
<td>Employment Near LRT or Caltrain Station</td>
<td>3%</td>
</tr>
<tr>
<td>Employment near a Major Bus Stop</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Effective TDM Program</strong></td>
<td></td>
</tr>
<tr>
<td>Financial Incentives</td>
<td>5%</td>
</tr>
<tr>
<td>Shuttle Program</td>
<td></td>
</tr>
<tr>
<td>-Project-funded dedicated shuttle</td>
<td>3%</td>
</tr>
<tr>
<td>-Partially-funded multi-site shuttle</td>
<td>2%</td>
</tr>
</tbody>
</table>

1For mixed-use projects, the percentage is off of the smaller trip-generator with the same number of trips reduced for the smaller generator applied to the larger generator.
2Major bus stop defined as a stop at which six or more buses per hour from the same or different routes stop during the peak period.
3If the shuttle trip reduction is being combined with the ‘Employment near LRT or Caltrain Station’ reduction, the maximum shuttle trip reduction that can be taken is 1.5%.

Clark County, Washington. Another effort to incorporate TDM in the land development process through impact fees is found in Clark County, Washington. Clark County adopted an ordinance that provided an impact fee reduction as an incentive to making specific improvements in order to achieve desired densities within transit supportive and mixed use development. However, discussions with Clark County staff reveal that this approach was never implemented (no developers attempted to use the provisions) and was later repealed due to problems with other areas of the ordinance. Initial actions eligible for credit included a 1% credit for “designation of ten percent of all non-residential parking as carpool/vanpool parking facilities if located in a manner maximizing accessibility subject to ADA requirements,” a 3% credit for “installation of parking spaces which will become paid parking (by resident or employee),” and a 1% credit for “installation of preferential carpool/vanpool parking facilities.” The complete tables of incentives are provided in Appendix E.

A new credits table within a proposed mixed used zone is currently under review in support of a provision in the recently adopted comprehensive plan, zoning map and development regulations (see Table 4). The amount of credit available is simply to create a developer incentive rather than being the result of specific analysis. The Clark County model provides several specific actions, such as the installation of bus-stops or bike lockers, and the corresponding impact fee credits that could be incorporated into local impact fee ordinances.
**Table 4. Proposed Traffic Impact Fee (TIF) Credits for Mixed Use Zone**

<table>
<thead>
<tr>
<th>ACTION</th>
<th>MAXIMUM TIF CREDIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation of on-site sheltered bus-stop (with current or planned service) or bus stop within ¼ mile of site with adequate walkways of approved by C-TRAN</td>
<td>1% credit to cover up to 80% of cost</td>
</tr>
<tr>
<td>Installation of bike lockers</td>
<td>1% credit to cover up to 80% of cost</td>
</tr>
<tr>
<td>Connection to existing or future regional bike trail</td>
<td>1%</td>
</tr>
<tr>
<td>Installation of paid parking (by resident or employee)</td>
<td>3% credit to cover up to 80% of cost</td>
</tr>
<tr>
<td>Provision of Flex Car for project</td>
<td>1% credit to cover up to 80% of cost</td>
</tr>
<tr>
<td>Total if all strategies were implemented</td>
<td>7%</td>
</tr>
</tbody>
</table>

**Atlanta, Georgia.** The City of Atlanta provides for a 50% reduction in transportation impact fees for projects within 1000 ft. walking distance of a MARTA rail station or bus stop (measured by walking path or sidewalk). This amount is a partial exemption rather than a credit and was designed as an incentive rather than based on analysis. Full exemptions are provided for “Empowerment Zones” and “Linkage Communities”—federal designations for economic development of low-income areas—as well as for projects that provide affordable housing (50% to 100% credit depending on whether it’s ADA accessible). In addition, the City may designate a development that creates numerous jobs as an economic development project and provide a waiver for this as well, if it meets certain criteria regarding the number of employees hired from within the neighborhood or City.

These exemptions are subject to a requirement that the City make up the difference in lost transportation impact fees through the capital improvement program somewhere in the City (Note: they do not divide the City into zones for transportation impact fee administration; it is citywide). The exception to this requirement is the 50% credit for MARTA area development. Because the 50% credit for MARTA area development is an incentive for transit-oriented development (considered economic development) around transit areas, the City does not reimburse this credit through the CIP. The rationale, as explained by staff, is that the added development will increase property tax revenues for the City, offsetting the loss of impact fee revenues.

Concurrency Ordinances. Also known as adequate public facilities ordinances, these regulations require that public facilities be available to meet the needs of new development at the same time the development is occupied. Florida defines its own concurrency requirements in F.S. 163. 3180.

**Rockville, Maryland.** The City of Rockville, Maryland is moving away from mitigation measures related primarily to providing additional roadway capacity through physical improvements and is encouraging mitigation for alternative modes (e.g. ridesharing programs, shuttles to transit stations, installation of pedestrian and bicycle facilities, etc.). Rockville applicants for developments may be obligated to contribute toward the improvement of offsite transportation and safety facilities to help address identified safety hazards for all modes. As stated in the *City Transportation Plan*,

> Providing safe, direct pedestrian routes between residential areas and activity centers can help reduce the number of day-to-day vehicle trips. These connections can be created or improved by installing sidewalks, adding paths to link cul-de-sacs and dead end streets, installing pedestrian signals and crosswalks, or by constructing pedestrian bridges over busy roadways. Treatments, such as lighting, landscaped buffer areas and other streetscape improvements, can heighten safety and make pedestrian facilities more attractive for users.
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The City enacted a Comprehensive Transportation Review Methodology (CTR) in September 2004 to evaluate the impacts of new development on the transportation system and to determine mitigation for alternative modes and assign corresponding “trip” credits. Because they are deemed to have a measurable traffic impact under the methodology, developments that generate 30 or more total peak hour site trips must conduct an off-site analysis for all transportation modes.

The off-site analysis includes an assessment of major intersections that are impacted by the development as well as non-auto facilities, including sidewalks, bikeways, and transit systems that lead to the development. The goal of the off-site analysis is to “ensure that the site can be accessed safely and efficiently through various modes and that adequate transportation facilities are in place to support the subject development without detriment to the overall transportation system.” Upon completion of the required multimodal analysis, applicants must summarize all issues and impacts related to site access and circulation, automobile traffic, non-auto facilities and intersection safety as well as planned mitigating actions.

Applicants are encouraged to mitigate transportation impacts by providing non-auto improvements and modifications to the transportation system for which they receive trip credits. Applicants may receive a maximum 15% trip credit for implementation of a TDM program and participation in the City’s TDM Program.

The CTR Methodology was developed as a precursor to adoption of a new adequate public facilities ordinance, which is expected in 2005. Staff indicated that the program is so new, there has not been experience with it for comment. The trip credit amounts were developed based on a review of what other communities were doing (e.g. Orlando, Portland, Montgomery County), as well as based on observations and experiences with multimodal development and mode split in the past. Staff plan to initiate a project this year to monitor outcomes through surveys and other methods, so they can determine how well the program is working and the appropriateness of the trip credits.

Although the program offers credits for participating in the City’s TDM program, staff note that “it’s tough to create a standard credit value for TDM because the developments are all so different and in different areas of the City.” Therefore, the credits are highly subjective and determined on a case by case basis based on the feasibility of potential trip reduction in the given context. See Appendix F for a full discussion of Rockville’s CTR Methodology.

Transit Oriented Concurrency. In 2005, the county commission of Broward County, Florida, amended the county’s land development code to provide for a transit-oriented concurrency system. These changes led to the creation of transit-oriented concurrency districts, defined as “compact geographical area[s] with an existing network of roads where multiple, viable alternative travel paths or modes are available for common trips.” This contrasts with the county’s standard concurrency districts, where roadway improvements are to remain the focal point of transportation enhancement efforts (45).

Because these definitions are open to interpretation, the county commission included specific locations for both types of concurrency districts within the text of the amendments.

The transit-oriented concurrency system begins with Transportation Concurrency Satisfaction Certificates (TCSC), which are required for issuance of a building permit from any local government within the county (with exceptions for types of development that will not generate any additional transportation impacts). For most areas of the county, including standard concurrency districts, the process of earning a TCSC is straightforward enough—usually a simple determination of adequacy, as defined by the land development code (45).
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Within transit-oriented concurrency districts, however, Broward County has outlined specific circumstances under which a TCSC will be issued. They include (but are not limited to):

- Projects located on land platted between March 1979 and the effective date of the ordinance, provided the planned development is consistent with current zoning approvals;
- Projects located on property where the county has made a vested rights finding with regard to transportation concurrency, provided the planned development is consistent with current zoning approvals;
- Projects taking place as the result of an approved DRI or FQD development order issued prior to the adoption of the *Broward County Comprehensive Plan* in 1989;
- Projects that will not increase the number of dwelling units, the type of unit, or will not cause an increase in the number of peak trips generated; and
- Developments that will promote public transportation.

However, if a proposed development within a transit-oriented concurrency district does not meet any of these criteria for obtaining a TCSC, the developer can simply pay to the county a Transit Concurrency Assessment (45).

Property owners wishing to develop land within transit-oriented concurrency districts can earn credits for transit-oriented development: “A property owner may apply for credit against the County’s Transit Concurrency Assessment by demonstrating that a proposed development satisfies all the criteria for a specific level of credit.” Credit level definitions and the degree of credit earned for each level are described in exhibits within the text of *Broward County Resolution 2005-291*, included as an attachment to this document. The amount of credit potentially available to the developer increases with each level, as do the layers of approval required (46).

Level 1 credit applications can be determined during the Development Management Division’s building permit review, and require no additional application forms. Level 2 credit also requires a review of a current approved site plan, and levels 3 and 4 require not only a site plan review but an agreement between the county, municipality and developer. This agreement is intended to “ensure the implementation of all required criteria, to provide for enforcement mechanisms . . . to specify the degree of credit granted, and to specify the property which would benefit by the grant of the credit” (46).

Additionally, under certain circumstances, a developer may opt not to pay some or all of the Transit Concurrency Assessment, and may instead implement or participate in the implementation of an alternative transit improvement. This alternative improvement must be intended to enhance transit ridership, and cannot focus predominantly on the occupants or users of the applicant’s property. The alternative improvement must be determined to be beneficial to the regional transportation system within the relevant district (45). This approach would appear to resolve some of the site impact analysis methodology issues arising from Developments of Regional Impact, described in Appendix B.

**Trip Reduction Ordinances.** Trip reduction ordinances (TRO) are regulations enacted by local governments usually for the purpose of reducing the number of trips generated during the peak periods of traffic congestion. They are most commonly used in areas with severe air quality problems in an effort to reduce emissions. TROs usually target work sites employing over 100 employees and require the following:
• work sites must conduct a yearly survey of trip making by employees during the a.m. peak period,
• employers must provide some combination of trip reduction incentives,
• employers must demonstrate a good faith effort to reduce trip making to the work site, and
• employees must reduce trip making by some percent over a designated period of time.

TROs often are considered by business groups to be draconian in nature; however, there are ways to formulate them for effectiveness and acceptance by those expected to implement them. There are over forty municipalities in the United States that have TROs. They are more often used on the West Coast in such places as Los Angeles and Irvine, California, the Puget Sound region of Washington State, and Tucson and Phoenix, Arizona, but can also be found in Alexandria, Virginia and Cambridge, Massachusetts.

TROs are the regulatory mechanism most adapted for use in the final stage of land development, in which property managers/owners and property tenants are required to carry out a specific plan developed for each work site as approved by the host local government. TROs are most often tied to a property manager and tenants because the relevant TDM measures are usually programmatic in nature rather than physical. A typical work site trip reduction program includes an employee transportation coordinator who is an employee assigned to promote the use of commute alternatives, administer trip making surveys, provide alternative transportation information, and serve as liaison between the work site and the host local government. Typical services offered by a participating work site include preferred parking for carpools and vanpools, free emergency guaranteed rides home, telework options, flex time or compressed work week schedules and subsidized bus passes.

The Parking and Transportation Demand Ordinance of Cambridge, Massachusetts is included as a case study in this report. Unlike other TROs, it is an example of the use of physical parking availability as a means to control traffic demand. In this way, the implementation stage is during the physical redevelopment of a site. Cambridge is also an example of a municipality that is essentially built out, but where redevelopment pressure is strong. As such, this example may be useful to Florida municipalities, such as Pinellas County, that are largely urbanized.

To date, the City of Boca Raton is the only Florida municipality that has passed a TRO, in response to conditions placed upon a citywide DRI. Detailed guidance was provided to the City by CUTR for the development of the ordinance. The conceptual framework for the development of an effective TRO centered upon 9 principles (47):

1. Take a long-term outlook
2. Foster public-private partnerships
3. Build in flexibility and choices
4. Allow voluntary participation
5. Seek continual improvement
6. Establish tiered levels of participation
7. Select performance measures carefully
8. Make it easy to administer
9. Coordinate with existing programs and services

To gauge effectiveness, it is important to implement a process for documenting baseline trip making conditions before the implementation of the TRO, and survey the results of program efforts after implementation.
Land Developer Engagement Through TMA Participation

In cases where the land development process has been engaged to incorporate TDM strategies, a commonly employed condition that is sometimes required in trip reduction ordinances has been funding the start-up of a transportation management association (TMA) or requiring land developers or property managers to purchase memberships in an existing TMA. In some cases, this strategy has been misapplied where public-private interest in a TMA is weak; however, approximately 140 TMAs are currently in existence nationwide and many have land developer participation. TMAs have shown potential as a TDM strategy to organize business and community efforts toward common localized transportation goals. Based upon data collected by the 2003 Transportation Management Association Survey, TMAs nationally have provided a wealth of services to TMA members, to non-members and to the general public (48). Such services have included:

- Employee Transportation Coordinator training
- Rideshare matching
- Telecommuting program assistance
- Subsidized transit passes
- Direct rideshare incentives
- Shuttle/Local transit provision
- Direct shuttle service operation
- Guaranteed Ride Home
- Vanpool subsidy program
- Regional/Local advocacy
- Site design assistance
- Multilingual translated information
- Active living program
- Promotional events
- Trip reduction plan preparation
- Parking service provision
- Parking pricing and/or management
- Promotional materials/newsletters
- Tax benefit program assistance
- Carshare program
- Bicycle program
- Cycling Safety workshops
- Walking program
- Pedestrian amenity review
- Visitor services
- Relocation assistance
- Electric vehicle promotion
- Construction/traffic advisories
- Government reporting/compliance
- Alternative fuel infrastructure development
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Individual Site Plan Evaluation

A review of sixteen municipalities in Florida indicates varying degrees of integration of TDM into long range comprehensive planning, municipal land development regulations, and in the development agreement process itself. For example, in Jacksonville, Florida, the commuter assistance program does not currently work directly with City staff in reviewing development proposals for potential use of TDM strategies. Some limited involvement in the process does occur through the MPO staff and the MPO Transportation Coordinating Committee (TCC) where the Metropolitan Commuter Assistance Program (MCAP) is a voting member. In the past, the commuter assistance program was part of Jacksonville’s Transportation Division, and, therefore, was more directly involved. Now organizationally apart from it, efforts are underway to reestablish a coordinative process between the commuter assistance program and the Transportation Division.

Below is a summary of the major steps of the land development process. The City of Tampa, located in Hillsborough County, is used as a specific example throughout the discussion. All municipalities create their own processes; therefore, the details may be different from one locality to another, but most municipalities share the many issues raised and follow this general process. Suggestions for how TDM professionals can get involved in the process are interspersed in the process description.

Where Municipal Plans, Policies, and Regulations Coincide with an Individual Development Proposal

To understand the process of an individual land development proposal and opportunities presented by it, it is necessary to step back and briefly review the policy and regulatory context. The City of Tampa’s major concerns for its transportation system include achieving and maintaining LOS standards, rights-of-way preservation, and access control on state-maintained roadways. These emphasis areas are explicitly stated as well as run as major themes throughout the policy language of the City’s Comprehensive Plan and the Land Development Code. It is suggested that as TDM professionals consider how to engage in the land development process, a first step is to become thoroughly familiar with their local government’s Comprehensive Plan and the land development regulations that are required to implement the Comprehensive Plan. The familiarization process results in an understanding of the major themes, concerns and goals for land development in the municipality and how transportation planning is intended to advance those goals.

This familiarization process will also demonstrate that while the Comprehensive Plan is the overriding document, it is frequently written in a style that leaves the Plan intent dependent on the interpretation of staff that administer the land development regulations. It is also possible and likely that, in a review of such Plan policies and the regulations that advance them, areas of inconsistency may be found. It may be found that regulations do not implement policies well or that no implementation mechanisms exist for advancing Plan policies. As with any kind of law, there is usually something lost in the translation between the spirit and intent of a policy and the regulations.

To be enforceable, adherence to regulations must be measurable and are often written in “black and white” terms, such as quantitative standards, numerical thresholds and minimums, or as specific actions that must be taken. With that understanding, municipal land development codes are required to be reviewed by the zoning administrator on a periodic basis, and comprehensive plans undergo a continual process of evaluation and revision. TDM professionals should seek ways to get involved in these review processes because the plans, policies, and regulations are the litmus test against which every development proposal is reviewed. For example, because roadway LOS standards are the gatekeepers of transportation approvals for development, TDM professionals should become more active in the discussion about the application of multimodal LOS standards as part of the transportation approval process. Ideally, TDM professionals should generate support for the future
Incorporating TDM into the Land Development Process

development and application of a method to make tradeoffs across modes. Ultimately, this would change the definition of transportation LOS standards in the comprehensive plan to enable land development to proceed at the appropriate densities and qualities that support high quality transit service.

A concurrency management system is the set of procedures and processes that a local government uses to assure that development orders and permits are not issued unless the necessary facilities and services are available concurrent with the impacts of development. For the purpose of issuing development orders or permits, the City Land Development Coordination Division allows no less than a peak hour roadway Level of Service Standard D, as set forth in Chapter 17.5 of the City of Tampa Code, except for those road segments classified as backlogged, constrained or within a Transportation Concurrency Exception Area (TCEA). For any development proposal, TDM professionals should check to see if its location lies within a TCEA or some other district requiring special considerations.

Level of service of a roadway segment is initially measured by its volume to capacity (v/c) ratio. If a road segment volume exceeds the adopted v/c ratio, further study is done based upon specific roadway characteristics in addition to travel speed. If further studies indicate that the adopted standard is not being met, then regulatory actions are required before the issuance of development orders and permits. The interpretation and application of transportation concurrency requirements of land development are the foundation for what is considered and approved thereafter. The outcome of the analysis relies heavily upon the initial methodology and underlying assumptions agreed upon by the developer’s consultant and the local government as well as the professional judgment of the consultant. The transportation analysis happens early in the process, as discussed further below.

The entirety of Tampa is within a designated Transportation Concurrency Exception Area (TCEA), except for the northeast portion of the city known as New Tampa. As such, these portions of the City contain not more than 10 percent vacant developable land. TCEAs are designated locations where roadway LOS standards are not being achieved, and where, due to redevelopment, urban infill or revitalization goals, the area is exempted from roadway LOS standards. Within Tampa’s TCEA, alternative forms of mobility may have to be made available by the land developer’s proposal. For example, Policy 2.7.2 of the City of Tampa Transportation Element specifies various activities that may be used to decrease automobile travel on or encourage the efficient use of the Florida Intrastate Highway System and other identified roadways within the TCEA. The one specified activity that relates to land development is the potential requirement that transit, bicycle, and pedestrian design considerations are included in the design of all redevelopment and new development. TDM professionals have an opportunity to use the intent of TCEAs as a means to promote TDM strategies for consideration as congestion mitigation and mobility enhancement. This is because local governments with TCEAs must adopt, as part of their comprehensive plans, guidelines and policies that specify programs to address transportation needs in such areas. These may include timing and staging plans, parking control and pricing strategies, the availability of public transportation, other transportation demand management programs, transportation system management programs, and the use of creative financing tools for the provision of transportation services and facilities.

For example, in 1998, the City of Tampa completed a Congestion Management System, which gives higher priority to corridors serving the TCEA and recommends improvements for congested corridors within the TCEA as priorities to be included in the MPO’s Transportation Improvement Program. Concerning the use of City funds, the City will likewise prioritize congested corridors in the TCEA. The Congestion Management System establishes measures and standards to assess mobility patterns and the performance of roadways and transit. It identifies congested corridors and areas, identifies short and long range transportation strategies, and establishes a monitoring process to assess the

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effectiveness of congestion management strategies. While the Congestion Management System emphasizes physical improvements to the roadway system, these can go hand in hand with demand-side strategies offered by TDM.

Reliance Upon External Agencies

The City of Tampa’s Comprehensive Plan is the responsibility of the City to implement; however, many policies in the Transportation and Land Use Elements call for actions by various external agencies. In order to work successfully in the land development process, TDM professionals should establish working relationships with key technical people within the following agencies:

- FDOT oversees the Florida Intrastate Highway System (FIHS) and assesses the use of high occupancy vehicle (HOV) lanes on the Intrastate System;
- MPO responsibilities include the Long Range Transportation Plan, the Transportation Improvement Plan and the Congestion Management System. Policy guidance directs the MPO to consider the needs of projects identified to support infill development when it prioritizes highway system needs and improvements in developing the Long Range Transportation Plan.
- The Hillsborough County City-County Planning Commission administers the Future Land Use Map and Designations and the Plan Amendment Review Process.
- HARTline develops the Transit Development Plan (TDP). The 2004-2013 TDP lists bus rapid transit (BRT) projects and “transit emphasis corridors.”

Transit emphasis corridors are identified bus routes targeted for physical improvements. Improvements may include traffic signal priority systems, slip lanes, “super stops” with passenger amenities, and intelligent transportation systems applications. Using Tampa’s Transit Development Plan (TDP) as an example, four transit emphasis corridors have been identified. The goal is to locate "super-stops" where the corridors intersect and to have high frequency at the stops. If this proves successful, BRT may be used along other corridors. Two “super express corridors” were also identified, in which improvements are planned to increase the speed of the service and make it more attractive to passengers. Funding has been earmarked for these improvements. Where special emphasis is placed upon enhanced transit service development, TDM professionals should advocate for special incentives to attract land development projects along these corridors. Incentives should particularly reward land developer efforts that arrange transit-oriented development at major transit node locations and bus stops.

Rezoning: Where a Land Development Proposal Usually Begins

Zoning is a police power of the local government to regulate the subdividing of land and to specify allowable uses, lot size, building height, dimensions and placement, population density, parking, and other standards to protect public safety, welfare, and property value. In Tampa, the zoning ordinance is consistent with and implements the objectives of the City’s Long Range Comprehensive Plan, as required by State law. Often, property owners and land developers seek rezoning. This can be accomplished if it is found that a rezoning results in land usage that remains consistent with the Comprehensive Plan. The City Council can initiate a rezoning for reasons of broad scale future land use planning. More often, rezoning occurs one parcel at a time. Land development often begins with a petition from the property owner/land developer for a rezoning, either of an individual parcel or of some larger area.
A pre-application conference with the city traffic engineer must be held prior to the submittal of the rezoning petition in order to determine what traffic information is required in the application. The land developer must explain in the rezoning application why the change is necessary to promote public safety and welfare and how it conforms to the objectives of the Tampa Comprehensive Plan. A transportation analysis, prepared by a professional traffic engineer or approved by the city traffic engineer, must be submitted with all rezoning applications. The analysis must include the total trips generated by the rezoning and the distribution of the trips onto adjacent streets. Institute of Traffic Engineers (ITE) trip generation rates or other approved source must be used as the basis for trip generation calculations.

As also discussed in the above section on impact fee ordinances, ITE trip generation and parking generation rates must be used with caution. Most local governments nationwide use ITE Trip generation and parking generation rates. Shoup demonstrates how improperly used ITE rates may lead to an overestimation of the need for private motor vehicle level of service and a conclusion that transportation alternatives are neither needed nor desired. For example, ITE describes the trip rates for land uses as estimated from observations generated at selected developments, primarily from suburban localities with little or no transit service, nearby pedestrian amenities, or travel demand management programs. There is strong evidence to suggest that most selected sites offer free parking. Half the rates are based on five or fewer studies per land use. At most sites, vehicle trips are observed during the course of one day only. Shoup also points out that many factors influence the number of vehicle trips generated at a site, and that floor area, acreage or any other single variable does not accurately predict the number of vehicle trips at any site or land use. It is recommended that TDM professionals should raise questions about the application of the ITE trip rates and suggest that the rates be supplemented with traffic counts. Based upon the magnitude of the proposed development, TDM professionals can suggest to the local government to consider requiring supplemental traffic counts if similar developments can confidently be found for comparison purposes. Additional analysis should be conducted with the intent to estimate the nature and magnitude of transportation demand under conditions where transit service approaches a level of quality described in long range transportation planning documents and after a program of parking management. Based upon the area vision for the development site, other conditions may include where transit oriented development phasing has reached completion, where a high quality pedestrian environment has been achieved and where TDM programs have been established.

The Tampa City Code requires that no zoning change be permitted if it reduces roadway level of service standards as specified in the Comprehensive Plan. However, the Comprehensive Plan also specifies that, as early as the rezoning process, the City can require a developer to provide on-site transit amenities “where appropriate” and “adequate.” While it is not practical for TDM professionals to attend all meetings relating to a rezoning, it is recommended that TDM professionals should meet in advance with the municipal traffic engineer to review the methodology used to determine what information is needed for a rezoning application and provide general suggestions to the traffic engineer regarding how the assessment of a rezoning application can be made to incorporate TDM considerations.

The zoning administrator must distribute copies of the application to the appropriate agencies and one copy of the application to the City Clerk for presentation to the City Council to set the public hearing. Any department or agency has the right to enter written or oral testimony into the record at the public hearing. Written testimony is submitted to the zoning administrator for consolidation into a single document. At this stage, TDM professionals should request a copy of the application and provide written and oral testimony suggesting how the proposal could incorporate TDM strategies to enhance transportation level of service and reduce congestion.
A rezoning application is essentially a reactive process in which an application is submitted describing what the developer wants to do. Reviewing parties then approve it contingent upon changes or conditions, or disapprove it based upon whether the application meets minimum requirements. To save the developer and all other stakeholders time, preferred development types and characteristics should be explicitly communicated via a neighborhood plan or at least during the pre-application conference. This includes a discussion of building height, square footage and dimensions, parking configuration, occupancy classification, and minimum building setbacks. Ideally, TDM professionals should be involved in the development of prior neighborhood, area, or district plans and have garnered interest and support to apply TDM principles, such as transit oriented development, into future land development. These are items commonly reserved for later review in the building plan approval process; however, waiting that long to discuss them, the developer already has a detailed plan for what he wants to do. Disapproving detailed plans and asking for another concept at this point only wastes time, costs money, and frustrates land development efforts.

Subdivision Review

The City of Tampa’s subdivision ordinance (Ch. 23) is distinct from the zoning code (Ch. 27) but these are both part of the City’s Land Development Code. Both processes are followed concurrently in the development process. While zoning concerns the compatibility of land uses and defines densities, building types, surface paving and other development attributes, the subdivision process addresses the manner in which land is divided to provide mechanisms for bonding and construction of public improvements, ensure safe and convenient access and traffic control, and to provide authority requiring timely installation by the developer of adequate and necessary physical improvements. Figure 4 shows the development review process for planned developments, which are specially defined in the zoning code, and which are eligible for increased densities given that they provide certain amenities or design features. Planned developments are generally large projects with lengthy build-out schedules that are designed to contain mixed uses. They must be designed in such a way that residential and non-residential uses are compatible. The special zoning classification for planned developments provides flexibility.
Fig. 4. City of Tampa’s Development Review Process for Planned Developments

Subdivision review occurs in stages. The first stage is the preliminary plat review. This review occurs usually in conjunction with the detailed site plan review in the same meeting. A plat is essentially a map that is a complete and exact representation of the subdivision of land. The purpose of the preliminary plat review is to ensure consistency with zoning and subdivision standards and the Comprehensive Plan. The preliminary plat for a phased development must show all construction phases and the proposed development schedule. Each development phase must be capable of operating independently and in conjunction with successive phases, with respect to vehicular...
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circulation and access and other transportation facilities. The preliminary plat includes physical boundaries, existing site conditions, subdivision design, development schedule and a transportation analysis and concurrency review using ITE trip generation rates.

The Subdivision coordinator arranges for the preliminary plat review and the detailed site plan review to be discussed in the same meeting. The detailed site plan review includes lot layout, location of local streets, location of projected utility lines and improvements and location of drainage.

After preliminary plat approval, construction drawings are submitted that detail the installation of improvements to serve the subdivision. A temporary certificate of concurrency is issued at this stage. If public improvements are needed as a result of the development, the developer and the City enter into a subdivision agreement in which the developer agrees to post performance security prior to final plat approval for any public improvements not yet installed and accepted. The subdivision agreement also provides that the developer install all improvements in accordance with approved construction drawings. When the City approves the subdivision final plat, it accepts any dedicated improvements for maintenance by the City and a final certificate of concurrency is issued.

**Process Timing.** Not only do development review steps proceed in a particular order, but the timing of the review and revisions are important to the developer because lateness of plan revisions may subject the proposed development to any changes in the Code since initial approvals were granted. For example, after the rezoning, there is a conceptual site plan review. The zoning administrator provides recommendations to City Council. After a “reasonable period of time” following receipt of staff recommendations, City Council approves or disapproves the conceptual site plan. The applicant has three months to revise and resubmit the plan, after which the plan is subject to Code changes.

The detailed site plan review and the preliminary plat review can be conducted at the same meeting after City Council approves the conceptual site plan review. The applicant has 45 days to respond to comments on the detailed site plan and three months to respond to preliminary plat comments. After these deadlines, the plans are subject to Code changes. If the detailed site plan is disapproved, the applicant has 45 days to respond to comments, after which the applicant must pay a resubmittal fee. After the detailed site plan is approved, the building plan can be submitted for review. If it is disapproved, the applicant has another 45 days to revise and resubmit the building plan, after which the applicant must pay a resubmittal fee. After plan approval, the issuance of construction permits must happen within six months.

Upon approval of the preliminary plat, the applicant has six months to submit construction drawings after which time the preliminary plat approval expires. After construction drawings are approved, the applicant has six months to begin construction of required improvements. If the deadline passes, plans are subject to Code changes. After submittal of final plat review, the applicant has three months to revise and resubmit the plat, after which the plat is subject to Code changes.

**Site Plan Approval Process**

In Tampa, there are two review and permitting processes, one for projects that involve developing one’s personal residence (one- and two-family dwellings) and another process for commercial projects, which include housing developments for profit. The Commercial Development Services office in the Business and Housing Development Department processes applications. The process consists of three phases: 1) review and approval of a site plan, 2) review and approval of a building plan, and 3) interagency coordination prior to issuance of construction permits. The City has a Construction Services Center, which functions as a one-stop shop where applications are submitted and where all communication is funneled. The purpose of the Construction Services Center is to
streamline the application review and permitting process for the convenience of the customer, the land developer.

The Tampa Development Review Committee (DRC) reviews applications for land development. They provide technical assistance to land developers and City agencies. These applications include land rezoning applications, applications for approval of special use permits (described below), and planned developments. Planned developments become their own designated zoning classification. Members of the DRC include representatives of City agencies and others, such as the Department of Public Works, Department of Sanitary Sewers, Water Department, Legal Department, Sanitation Department, Police and Fire Departments, Department of Parks, Recreation and Cultural Services, State Department of Transportation, County School Board, County Health Department, designated land planning agency, Tampa Electric Company, the gas company, the Federal Housing Administration, HARTline, the Architectural Review Commission and the Barrio Latino Commission. The zoning administrator establishes meeting dates and these meetings are open to the public. A local TDM representative should request an appointment to serve on the Development Review Committee.

**Special Use Permits**

Special use permits are not rezonings but are applied for and granted for cases of land development that are unusual or complex in nature and the special use permitting process is intended to increase the efficiency in processing such applications. S-1 special use permits are for those that have impacts of a temporary nature or impacts that affect adjacent properties. These applications are decided by the zoning administrator. S-2 special use permits are those that may have potential impacts of areawide or citywide consequence and that may constitute a substantial deviation from the zoning code. In these cases, the zoning administrator ensures the land developer’s application is complete, does an analysis, and files a recommendation to the City Council. A public hearing is required and the City Council decides on the application. After a special use permit is approved, any minor changes to the plans can be approved by the zoning administrator as long as the proposed changes are in harmony with the action of the City Council. If there is a substantial deviation requested, then it must be treated as a new application and the City Council must approve it. The special use must not set a precedent for encouraging more intensive uses. The Code provides specifications for many individual special uses.

**Internal and External Review**

Site plan review and approval can be done before or concurrently with the building plan approval process. Site plan review involves several City departments. These include those listed below. Transportation and land development coordination are just two of several reviews. This extended list illustrates the complexity of the land development process.

**City Departments**

- Land Development Coordination Division
  - Zoning Office
  - Subdivision Review Office
- Fire Marshal
- Historic Preservation Office
- Tree and landscaping
- Sanitation
- Wastewater Department
• Stormwater Management Division
• Transportation Division
• Water Department
• Parks Department
• Other departments depending on the nature of the development project

The developer must also receive review and approval from outside agencies, including:

• Hillsborough County Environmental Protection Commission (EPC) and the Florida Department of Environmental Protection (FDEP)
  o If the proposed project involves wetlands, SWFWMD, FDEP and EPC must issue approvals.

• Southwest Florida Water Management District (SWFWMD)
  o If the proposed project increases the amount of impervious surface or requires on-site stormwater management, SWFWMD must approve the project.

• Florida Department of Transportation (FDOT)
  o If the proposed project is located along a State road, FDOT will review the application regarding traffic impact, driveway connection location and design, and drainage connection to the State Stormwater Management Facility.

If the construction is new, the developer applies for a unique address assignment from the Right-of-Way and Mapping Division, by submitting an application form. If the proposed development is in a designated Historic Special Review District, an additional application must be submitted to the Architectural Review Commission. If the proposed development is in another Special Review District, additional requirements apply, such as other design guidelines. Special Review Districts include:

• Central business district
• Channel district
• Commercial overlay districts
• Mixed use overlay districts

The Zoning Office determines if the proposed development is a Development of Regional Impact (DRI), based upon project location, size and scope. A DRI project must submit additional information to the Land Development Coordination Division. The Subdivision Review Office also reviews the project. A permit technician assigns a tracking control number to the application which the developer uses to follow his application through the review process and to post inquiries. The application is submitted with a plan review fee. The site plan application includes a Site Data Table of required information. This includes the amount of parking required for the site, with a breakout of parking calculations if it is a mixed use facility. In addition, the amount of parking included on the site plan must be stated with the number of compact parking spaces provided, if used. Of all features in the site plan and building plan, the availability and amount of parking is the cornerstone of shifting a balance toward the use of other modes, as well as other means to reduce the need to travel.

City of Tampa Parking
The City of Tampa sets forth the minimum required number of off-street parking spaces in its code of regulations, Article XVIII, Section 27-242. For redevelopment and development projects in the
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zoning categories of YC-1 and YC-3, an in-lieu parking fee ordinance exists that has traditionally waivered all parking requirements for these areas.

**Table 5. Minimum Number of Required Off-Street Parking Spaces Per Land Use Category***

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Number of Parking Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grocery</td>
<td>4.0/1,000 sq.ft. GFA</td>
</tr>
<tr>
<td>Regional Mall</td>
<td>4.0/1,000 sq. ft. GFA</td>
</tr>
<tr>
<td>Strip Shopping Center</td>
<td>4.0/1,000 sq.ft. GFA</td>
</tr>
<tr>
<td>Business and Professional Office</td>
<td>3.3/1,000 sq.ft. GFA</td>
</tr>
<tr>
<td>Multiple-family dwelling</td>
<td>1.5 for 1-2 bedrooms,</td>
</tr>
<tr>
<td></td>
<td>2.0 for 3 or more bedrooms</td>
</tr>
<tr>
<td>Single or two-family dwelling</td>
<td>2.0/dwelling unit</td>
</tr>
</tbody>
</table>

*Rates excerpted from Table 10-1, Section 27-242, Tampa City Code

The challenge of parking is that satisfactory alternative transportation options must be in place as parking availability is decreased. Parking availability must be decreased and made more expensive in order to encourage the shift toward other modes once they are offered. Lastly, risk averse bankers are hesitant to offer financing to developers who propose site plans with reduced parking. TDM professionals should stimulate discussion through arranging forums among bankers, developers and local governments about this issue. TDM professionals should suggest a plan for staging the gradual reduction of parking availability in coordination with redevelopment. Valk recommends that such a plan would call for strategies working in tandem, including managing existing parking, expanding parking supply, reducing parking demand, protecting residential parking, creating a financing program and monitoring results to make changes as needed. Existing parking can be managed through enforcement of time limits and parking pricing. Parking supply should be expanded only after setting specific parking demand and access thresholds that when met, trigger parking construction. Parking demand can be reduced through offering a combination of incentives and services to use transportation alternatives as well as the adoption of regulatory measures. Residential parking can be protected through the use of residential parking permit programs, where needed. A financing program can use existing revenue to fund capital improvements, construction and operations. Additional revenue from increased parking fees and fines can support parking demand reduction efforts. The parking plan should include a schedule by which all elements of the program are implemented. The plan should contain specific parking demand and access thresholds to establish when more aggressive actions should be taken. Actual conditions should be recorded and used as the basis for refining actions taken (49).

**Building Plan Approval Process**

A site plan submittal package may be submitted before or concurrently with the submittal of a building plan application. The site plan and building plan must be approved before construction permits can be issued. City of Tampa offices that review the building plan application include the offices for architecture, plumbing, electrical, mechanical, and the Fire Marshal. It is the building plan application that includes a Building Data Table that includes, among many other things, the proposal for:

- Building square footage and dimensions
- Building height and number of floors
- Occupancy classification
- Minimum building setbacks and dimensions

The building plan application and approval process is probably too late for suggestions and negotiations regarding aspects of the building. Ideally, building design considerations should include
a transit orientation and include sufficient densities to support transit service. Residential development should incorporate wiring to support telework and other telecommunications applications. These considerations should be discussed at the earliest stages of the land development planning process, such as during a rezoning application, as discussed above.

The building plan application is submitted with a review fee. After the site plan and the building plan are reviewed and approved, the developer must pay additional fees prior to receiving construction permits or prior to a final certificate of occupancy. These fees include:

- Hillsborough County School District
- Sewer
- Water
- Fire line impact fee
- Transportation impact fee

Transportation Impact Fee

Tampa’s Transportation Impact Fee Ordinance includes a straightforward schedule of set fees based upon the type of land use and its size in terms of units, as identified in the Institute of Transportation Engineers’ Trip Generation, An Information Report. Units include number of dwelling units, square footage, beds, parking spaces or number of students. Revenues are used to provide roadway improvements and related infrastructure necessitated by new development. In the spirit of promoting redevelopment, the City of Tampa has a waiver in place that exempts parts of the Ybor City Historic District from paying transportation impact fees, in addition to exemptions for the East Tampa and West Tampa districts. For example, an office under 100,000 square feet in size located in the Central Business District must pay $6,056 per 1000 square feet. After the initial review of the site plan submittal package and the building plan application, the Permit Technician contacts the land developer with any questions or requested changes. The developer resubmits revised drawings, with an original for comparison purposes. If the developer already has three re-submittals for the same comment, the developer has to pay a re-submittal fee. If the developer does not respond in 45 days to plan examiner questions, the City will consider the project abandoned and will dispose of the application. For larger projects, phased permitting of construction allows for separate permits for foundations, building shell, and interior finish to help expedite construction scheduling. The submission requirements for these phases are identical to the site review and building plan review phases.

In many municipalities, an agreement can be reached in which the developer can receive an impact fee credit if there is indication that by implementing TDM the result will include reduced traffic. The challenge to this process is that the “default” transportation option is the already well-developed roadway system and the measure of transportation demand is not in units of person trips but in units of private auto trips. The burden of proof for trip reduction through TDM is on the developer. If the municipality has not already invested in a functioning TDM system, then there is no “TDM infrastructure” into which an individual site development can connect. The recent development of Broward County’s transit oriented concurrency system is one example of how an impact fee system can be altered to finance a transportation system with more options. TDM professionals should keep abreast of ongoing evaluation and refinements to this approach and consider how the concept might be applicable in their own municipalities.
Development Phasing

Policy 2.3.3 provides a means to achieve cost affordable level of service by using development phasing to assure consistency with the associated level of service standard required. Because land development is frequently built in phases, TDM professionals must be prepared for involvement in the development process as an ongoing effort that may require years for an individual development to reach completion.

A Land Development Case Study: Tampa General Hospital

The above discussion provides a general overview of the land development process using the City of Tampa as an example. A Tampa land development case study is provided below to illustrate how the process unfolds in reality. Several observations emerge: the first two are procedural and other observations are idiosyncratic to the particular proposal, but may be a common scenario in other cases. All observations give TDM professionals information about how to be proactive in generating serious consideration to the use of TDM strategies as options for mitigating congestion and enhancing mobility.

Tampa General Hospital (TGH) is the region’s only Level One trauma center and is located in the core of downtown Tampa on the north side of Davis Island. TGH is located within a TCEA. Davis Island extends to the south and is an affluent residential neighborhood. Access to the island is limited to a pair of bridges at the island’s northernmost point, which is the same location as the hospital entrance. As a result, hospital-related traffic and island resident traffic affect each other.

To keep up with the needs of the region, TGH is in the process of expanding their facility by 280,000 square feet. In addition, TGH has requested permission from the city to rezone hospital property and lease 0.4 acre of a waterfront city park (Marjorie Park) for a 1,400 space parking garage, add an additional office building on the hospital campus and add a floor to an expansion already under construction. Both the earlier approved expansion and the new rezoning request combined would almost double the total size of the hospital to 2.2 million square feet. The rezoning request was necessary because the proposed expansion included building parking partly on hospital property that was previously zoned residential. In order to build the parking facility that traversed both hospital and City property, the zoning for the hospital land in question had to be changed to Planned Development, with a land use plan category of Public/Semi-Public.

The City Council initially attached nine conditions to TGH’s rezoning application. One condition stated that prior to the issuance of a building permit, the hospital would have to prepare a parking management plan that would include a carpooling incentive program. The parking management plan was in response to the Davis Island citizens’ concerns about traffic. This carpooling program would have permitted employees who carpool to park in the hospital’s garage for free, while solo drivers must pay for their parking. Presently, the existing parking garage is owned and operated by the City of Tampa, not TGH. An hourly parking charge or an advance parking voucher can be purchased by visitors in a pack of three for $3.50 per day. Employees currently park off-site. Nationally, there are difficulties recruiting and retaining nurses and other hospital staff. Transportation services such as transit subsidies, parking cash-out, guaranteed emergency ride home and company vanpools, have been offered by employers nationwide to recruit and retain employees. TDM strategies such as offering employee transportation services are not listed in the TGH menu of employee benefits.

The other rezoning conditions involved physical improvements to the transportation infrastructure in the immediate vicinity, or to new signage. All nine conditions were agreed upon by the hospital and the City’s Transportation Department. However, ultimately the nine conditions attached to the rezoning application were eliminated by a final rezoning decision, which was intended specifically to provide for a parking facility that could more effectively meet the hospital’s parking needs.
There were a number of factors involved in the outcome of this development review. It was highly visible to the public; the Council’s final vote was held at the Tampa Convention Center to handle the more than 500 people who turned out for the meeting. Almost 75 percent of the crowd was hospital supporters and employees. The local media had a hand in casting the issues, which were presented as pitting the desires of one affluent neighborhood, which already had more than their minimum required amount of city park land, against the medical care needs of the region. In the words of the St. Petersburg Times, “Council members ultimately agreed with [TGH] that the hospital’s mission in providing health care to west central Florida and educating University of South Florida medical students outweighed the importance of saving a small, underused portion of the park.” (50).

Other concerns voiced by Davis Island residents included how a parking garage on a waterfront park would obscure the view. While these concerns were of importance to the Davis Island residents, they were trivial to the rest of the City and would not play well with the City Council. Instead of discussing how the hospital could expand, serve the needs of the region and USF, while at the same time mitigate impacts, it became a choice between hospital expansion or waterfront park preservation. In exchange for the loss of the 0.4 acre of Marjorie Park, the hospital agreed to build a 0.7 acre waterfront public walkway and give $1 million for recreational improvements on Davis Island.

Overall issues of traffic congestion became invisible toward the end of the process. Typically, issues relating to parking management or other traffic mitigation plans are worked out prior to a City Council vote, but a parking garage became the main focus of the Council’s vote. In this case, the Davis Island Civic Association initially commissioned its own transportation analysis. The hospital’s consultants also conducted a traffic impact analysis. The Hospital examined several parking options. It is not known what the traffic analyses determined. After the final vote to approve the parking garage, one Council member commented that traffic snarls may increase with the hospital expansion, but, he continued, “that’s part of living in a growing City.” Shrugging off traffic congestion as part of urban life is unusual in a state where municipalities are obliged to maintain LOS standards. Even though the hospital is located within a TCEA, which gives it some flexibility from strict adherence to standards, there still must be some plan for improving mobility. Traffic impacts do not appear to have been a major discussion point in the public hearings. The public discussion overlooked how traffic snarls can affect the functioning of the hospital. TDM strategies could have been a condition to improve level of service on the bridges connecting Davis Island to downtown Tampa, achieving positive effects for the hospital and at the same time reducing traffic impacts to Davis Island residents. In addition, TDM might have provided opportunities to reduce the impact of the garage on the waterfront park (51).

Case Study Observations and Conclusions. Many, if not most, major projects within medium to large municipalities require a rezoning; conditions are often attached. In Florida, a rezoning cannot be allowed unless there is demonstration that the rezoning continues to preserve the intent of the Comprehensive Plan. A rezoning also cannot be allowed if it results in a violation of level of service standards. Rezonings occur well before the site plan review stage. A first question for TDM professionals to consider in evaluating a project is whether a rezoning request preserves the intent of the Comprehensive Plan, especially with respect to urban infill, revitalization, and urban redevelopment within a TCEA. It is recognized that transit usage, pedestrian trips, and the reduction of motor vehicle trips can be accomplished with transit oriented development (TOD). TOD requires compact, high density, mixed use development, which may require a rezoning or may show a high level of traffic generation. Neighborhood groups may express opposition to TOD. While TCEAs, by definition, do not have to adhere to LOS standards, they must demonstrate some plan for alternative mobility. Therein lies an opportunity for TDM strategies.
Typically, issues relating to parking management or other traffic mitigation plans are worked out in the initial stages, often during the rezoning, and much prior to a City Council vote. The Council may have no questions or concerns about traffic, and the subject may never come up.

During debates over rezonings, the issue of traffic congestion might take a back seat to other issues. If traffic turns out to be key, it is often couched in terms of an “either/or” choice: “Either we allow the development to be built as proposed with abundant parking and increased roadway capacity or it cannot be done at all.” TDM professionals have an important opportunity at these junctures to point out that the development can go on and there are other options to handling the transportation needs generated by the development.

It is essential for TDM professionals to seek out the news media covering the event, to frame the transportation issues from a standpoint of mobility management and see to it that this message does not get obscured. Just as important as a good working relationship with the Zoning Administrator and the Chief of Transportation in a municipality, TDM representatives should also develop a professional rapport with journalists. Typically, particular news reporters are assigned to consistently cover transportation, growth, and development in a specific area. The best outcome is that the news media refer to TDM professionals as sources of reliable and accurate information. Journalists know everyone has a bias. Ideally, journalists will come to know TDM advocates as professionals whose bias is the desire to identify all the possible transportation options, keep the public informed and involved in the process and seek out balanced solutions.

TDM professionals should attend high visibility public hearings and sign up to speak. TDM professionals should carefully prepare and rehearse their 3 minutes allotted time to speak. Understanding that the sound byte most often reported in the news is something sensationalist:

“Don’t strangle [TGH’s] growth because of parking and expansion problems. Let it flower and let Tampa be known for its educational and medical reputation, not lap dancing.”
Les Valitutti, public hearing attendee (52)

TDM professionals should attempt to make their point succinctly, addressing emotional hot buttons with solutions backed up by reliable evidence.

Residential neighborhood input influences whether TDM provisions are included in rezoning requests on nearby land. Neighborhood input should focus on the traffic generation potential of the proposed land use and the cost/benefit to citywide concerns, and not just on the neighborhood impact of the type of proposed new use. TDM professionals should seek common ground with neighborhood groups and help them phrase their concerns as relevant to addressing citywide concerns.

It is common for proposals for new developments, redevelopments and expansions to be revised one or more times after agreements have been reached. TDM professionals should remain in the communication loop even after decisions and approvals have been issued, and expect proposed changes that will require new analyses and renegotiations. If TDM professionals want to get involved in the land development process, they must be prepared for a process that seems without end.

Even after a physical development is completed, promises, both verbal and written, about program implementation and what will or will not be permitted to take place in the future, are often forgotten or not enforced. If development pressure is there, no promise is secure. Agreements to engage in
TDM are often not followed over time. Institutional memory and the capacity to monitor developer agreements are as tenuous as the rate of planning staff turnover. As a result, municipal agency procedures must be in place to enable a new staff member to take up where a former staff member left off, to continue tracking agreement implementation and documenting reasons for changes. Once tracking is achieved, instances will be found where provisions of agreements are not being implemented as originally drawn up. TDM professionals rarely hold positions in which they can enforce agreement provisions; however, they can bring forgotten provisions to the attention of those who do. Monitoring and enforcement is time consuming and expensive for municipalities. Nevertheless, TDM professionals can create a valuable partnership role for themselves as development monitors. Enforcement divisions of local government can choose to do nothing in response to violations, but it is important for TDM professionals working in a monitoring capacity to continue to track and document what is happening, because the working relationship between a local municipality and land developers is based on a foundation of professional trust and integrity of the development process. If it comes to light that more than a few developer agreements are not followed, then municipal leaders will eventually be forced to review and strengthen the process.

More often, agreements are renegotiated after the physical land development is complete. Here again, TDM professionals should be at the discussion table. Better yet, after an initial agreement is made, TDM professionals should help make the initial agreement stick by serving as technical support to assist the developer and property owner/manager with implementation. Furthermore, TDM professionals should serve as publicists to bring positive recognition of developers and property managers with good track records of implementation to the attention of municipal decision makers.
RECOMMENDATIONS FOR INCORPORATING TDM INTO THE LAND DEVELOPMENT PROCESS

There are many opportunities to participate and provide valuable input for incorporating TDM into the land development process, from long range planning through land development and monitoring of completed developments. These recommendations provide basic guidance to that end. These recommendations are provided to municipal transportation planners, traffic engineers and land development proposal reviewers. Ideally, these professionals are in the best positions to use these recommendations to incorporate TDM into land development. However, because these professionals may be less familiar with TDM, it will be up to TDM professionals who work for commuter assistance programs, transportation management associations, or other allied organizations, to engage in most of these activities.

Recommendations for participation in the land development process are offered with the understanding that, for most organizations involved in TDM, implementation of the recommendations may constitute either a significant increase in workload or a significant shift in focus from existing activities. Adding to this condition, the land development application process is on a tight timetable. In order for TDM professionals to be useful participants, TDM involvement must be orchestrated so as not to slow the process down but to prove helpful in the transportation analysis aspects of the process as well as providing recommendations and ideas for alternative congestion reduction and mobility enhancement strategies.

Although individual TDM organizations may not be able to implement every one of the recommendations due to staffing constraints or other reasons, the best result will be realized by implementing as many as possible. If TDM professionals do not have the resources to review key development proposals and engage in the actions described below, TDM professionals should arrange to meet with local planners to provide training in TDM applications in advance of the review of specific proposals. This could include offering planners check lists of strategies or other prepared materials that outline key considerations.

To prepare to provide technical support to local planners, TDM professionals should seek professional training, such as the Florida Commuter Choice Program Certificate offered by the USF Center for Urban Transportation Research, or some other similar professional development opportunities. Alternatively, if local planners, traffic engineers and land development proposal reviewers have professional training opportunities, they can directly avail themselves of training in the application of TDM. However, it is anticipated that local governments will rely, at least initially, upon the assistance of commuter assistance programs and transportation management organizations to fill this need.

1. Immediate Actions for Specific Proposals

Consider staffing needs. A TDM agency that wants to get involved in the local government land development review process must commit a realistic amount of staff time and effort to participate because the process for each development application can take anywhere from several months to several years. In a large urban area this could easily occupy two full time positions. In a smaller but fast-growing county, this may also require two full-time staff positions with backgrounds in planning, land development, transportation, and public administration. Staff should not have to be at every meeting but there are key early meetings, when transportation analysis methodology is discussed and when various transportation alternatives are being identified.
Choose proposals strategically. Based upon staffing and time constraints, TDM professionals will not be able to pursue all development proposals. A strategy should be devised for selecting which development projects should receive more attention. This can possibly be done by:

- Identifying which development proposals have the best chance at adopting TDM strategies, or
- Identifying which development proposals have the most potential for congestion reduction results where it is straightforward to measure the difference.

For example, TDM professionals may choose to focus their attention on land development applications where comprehensive plan policies provide direction for emphasis upon certain locations. These may be:

- Constrained corridors within the TCEA (where there can be no more road widening)
- Other roadway facilities violating the LOS standard within the TCEA (where there is a choice of roadway capacity improvements and/or transit)
- Transit emphasis corridors
- “Super express” service corridors
- Other areas within the TCEA that present development opportunities and through which some influence can be brought to bear upon the process due to membership contacts of a transportation management association or other allied organization

Through Comprehensive Plan Policy for the City of Tampa, for example, the roadways that receive the highest priority are those within the TCEA which are operating below the adopted LOS standard (Policy 2.7.5). This Policy calls for capacity improvements for both roadways and transit services within the TCEA. Every 5 years, the City Transportation Division must evaluate the effectiveness of the TCEA looking at several performance measures. It is important for TDM professionals to participate in the evaluation of the TCEA to identify other possible causes to the rise or fall of the five performance measures listed below. According to Policy 2.8.1, these include:

1. The amount of transportation impact fees set aside for transit or parallel roadway capacity.
2. Evaluate programs which promote pedestrian and non-automobile travel in the TCEA including improvements to the pedestrian and bicycle infrastructure.

With respect to urban infill, urban redevelopment and downtown revitalization areas:

3. The level of development or redevelopment activity
4. Improvements to mass transit infrastructure
5. Increase in mass transit ridership

The opportunity of a TCEA is that roadway concurrency requirements are suspended, providing an opportunity for alternative approaches. The TCEA concept was developed to enable urban infill, urban redevelopment and downtown revitalization. The performance evaluation, as outlined in the Policy above looks to see if development has increased and if overall mobility has increased. It is also recommended that TDM professionals prioritize the TCEAs in their urban areas for applying TDM strategies. While the status of development activity cannot solely be attributed to transportation conditions, a demonstration of mobility enhancement through TDM could encourage a review of the roadway LOS treadmill that many urban areas in Florida run upon without progress.

Get involved at the rezoning application stage. Vitally important to incorporating TDM effectively into land development proposals is involvement as early as the rezoning application stage.
TDM professionals should request a copy of the application. A first question for TDM professionals to consider, in an evaluation of a project, is whether a rezoning request preserves the intent of the Comprehensive Plan, especially with respect to urban infill, revitalization, and urban redevelopment within a TCEA. TDM professionals should check to see if its location lies within a TCEA or some other district requiring special considerations. TDM professionals have an opportunity to use the TCEAs or other special district designation as a means to promote TDM strategies for consideration as congestion mitigation and mobility enhancement.

Challenge “either/or” thinking. TDM professionals should listen for discussion among other transportation professionals that begins to phrase the issues in “either/or” language that limits consideration of options (“Either more road capacity/parking is built or the project cannot proceed.”). TDM professionals have an important opportunity at these junctures to point out that the development can go on and there are more options to handling the transportation needs generated by the development, as offered by TDM.

Participate early in development review. The site plan approval stage comes after a rezoning approval. It is recommended that a local TDM representative request an appointment to serve on the Development Review Committee that reviews the site plan applications. At the very least, establish a process by which local government staff communicates the existence, location, and status of development proposals. This possibly could be achieved through coordination with a “construction services center” or some other “one-stop” office set up to streamline the process. While some information is public record and there are scheduled public hearings advertised in newspapers, this point in the process is frequently too late to have an influence. Getting in early in the process of development review might be as simple as being copied on emails with attachments. Approval of this inclusion likely must come from top management offices and communicated by them to the appropriate Services Center staff and technicians.

Develop a check list. Develop a check list for transportation planners and land development proposal reviewers that describes non-capital intensive TDM strategies that can be implemented.

Transform parochial interests. TDM professionals should seek common ground with neighborhood groups and help them phrase issues such that their neighborhood concern has citywide transportation implications. For example, TDM professionals should guide neighborhood input to focus on the traffic generation potential of a proposed land use and the costs/benefits to the city, and not just on the neighborhood impact of the type of proposed new use.

Provide testimony. TDM professionals should provide written and oral testimony suggesting how the proposal could incorporate TDM strategies to enhance transportation level of service and reduce congestion.

Monitor developments over time. Because land development is frequently built in phases, TDM professionals should remain in the communication loop even after decisions and approvals have been issued, and expect proposed changes that will require new analyses and renegotiations. It is not uncommon for phased development to make revisions to development plans as market indicators suggest more profitable building scenarios. TDM professionals should help make TDM strategies successful by serving as technical support to assist the developer and property owner/manager with implementation. Staff turnover erases institutional memory of development proposal history. Municipal agency procedures must be in place to enable a new staff member to take up where a former staff member left off, to continue tracking agreement implementation and documenting reasons for changes. TDM professionals can bring forgotten provisions to the attention of those who can. TDM professionals can create a valuable partnership role for themselves as development
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monitors. Preparing “standard operating procedures” for development review and monitoring can ease the task of tracking a project as well as enable the project to be handed off to another staff member if necessary.

2. Involvement in the MPO Planning Process

Participate in MPO committees and other activities. Metropolitan planning organizations (MPOs) offer a number of opportunities for TDM professionals to be involved in the MPO transportation planning process. In addition to workshops, hearings, and other public involvement activities aimed at the general public, the MPO does the bulk of its work through established committees, with ultimate voting authority in the MPO Board. Occasionally, a transit authority may be included as either a voting or non-voting member on the MPO Board. At this level, a high-ranking representative should represent the transit authority. More often, a transit authority or TDM agency may have voting or non-voting membership on a Technical Advisory Committee. Even at this level, a representative with a leadership position, such as the executive director of the commuter assistance program, should be the one to attend meetings. Other committee involvement possibilities include the Citizen’s Advisory Committee or other standing committees established by the MPO.

Attendance and participation at all committee or board meetings is essential to establishing both personal and professional credibility with other members of the committee and the MPO staff. Committee members are involved in every aspect of the MPO transportation planning process.

Influence MPO product content and advocate for funding of transit and TDM-related activities. As a committee member and regular participant in MPO activities, the TDM professional has the opportunity to influence MPO guiding policies which directly impact the content of the Long Range Transportation Plan as well as the Transportation Improvement Program (TIP) and subsequent project funding. The commuter assistance program (CAP) executive director should not only educate the MPO Board and committee members regarding the benefits of TDM strategies, but also offer specific ways for including them in the various MPO products. This report has included a number of useful policies for use in long range transportation plans. The CAP representative also should assist in developing alternative revenue sources and seek earmarks for TDM strategies. It is very important for this individual to understand and educate others regarding the trade-offs between accommodating travel demand and managing travel demand. The CAP representative should encourage planners to reconsider assumptions made in the analysis of transportation alternatives and be cognizant of the level of accuracy that analysis methods offer.

The CAP representative should work with MPO staff to consider more realistic time frames not only for implementation of TDM strategies but also for tracking and measuring program results. Match these with work programs and budgets that coordinate with those time frames.

Improve relations by involving MPO Board, staff, and committee members in transit or TDM agency activities. Raise the awareness of the MPO Board, staff, and committee members regarding various transit and TDM agency activities by inviting them to attend them or otherwise involving them in various transit or TDM agency activities.

3. Involvement in Local Government Processes

Study local planning documents. It is recommended that TDM professionals become thoroughly familiar with their locality’s Comprehensive Plan, especially the Future Land Use Element and the Transportation Element. Some local governments have Congestion Management System Plans
developed to address areas with low LOS. While the plans emphasize physical improvements to the roadway system, these can go hand in hand with demand-side strategies offered by TDM.

**Articulate the trade-offs.** In accommodating travel demand versus managing travel demand, this is an issue of making a different set of trade-offs at the policy level. The realm of TDM support at the level of long range planning includes such actions as “providing incentives”, “continuing to support”, “continuing to work with”, “encouraging”, and “coordinating”. There is a great reliance upon city administrators to interpret what TDM actions conform to and advance the policies of the local government comprehensive plan. The policies, for example, may require developers to provide facilities and on-site amenities, “where appropriate”… “as needed” and “where feasible”, which all rely on professional judgment. TDM professionals should listen to the ongoing discussions with regard to long range transportation planning because the stage is set here for land development. TDM professionals should prompt a revisiting of the difficult questions to encourage a more explicit articulation of what is being traded. Elected officials and decision makers must have the knowledge and understanding about the trade-offs in order to demonstrate leadership and the political will to make unpopular decisions that may upset the status quo of how benefits from the transportation structure are shared. Questions include:

1. How much right-of-way do we really need?
2. What level of service standard is acceptable?
3. For any course of action, what are the alternatives that we are foregoing?
4. What are the underlying assumptions?
5. Which groups are being served/not served? Which groups are most vocal and which are underrepresented? For example, is it the majority versus the low mobility groups? Is it the neighborhood versus the surrounding town?

**Participate in planning document review.** The “buck stops” where your municipality’s land development code (LDC) of regulations places requirements, prohibitions, and quantitative standards. However, the LDC must be consistent with and implement the Comprehensive Plan. For example, review the applicability of sources that the municipality originally used as a basis for development and parking standards. If there are inconsistencies or opportunities to strengthen the means by which the LDC implements the comprehensive plan, then TDM professionals have the opportunity and responsibility to point these out in the comprehensive planning update process. Seek ways to get involved in the review processes for the comprehensive plan and the land development regulations because the plans, policies and regulations are the litmus test against which every development proposal is reviewed.

**Adopt measurable objectives.** It is recommended that TDM professionals encourage long range planners to replace vague language in plan policies, such as “continue to support”, with clear unambiguous language about what is expected, based on measurable objectives. For example, “Reduce vehicle trips entering the business district during the a.m. peak period by 3 percent by the year 2010.”

**Advocate for transit oriented development incentives.** Consider policies that encourage land development proximity and connectivity, such as transit oriented development. In locations where special emphasis is placed upon enhanced transit service development, TDM professionals should advocate for special incentives to attract land development projects along these corridors. Incentives should particularly reward land developer efforts to arrange transit-oriented development at major transit node locations and bus stops.
Stage gradual parking reductions. Limiting the availability of parking has a strong impact on the use of the transportation system but efforts can backfire if satisfactory alternative transportation is not concurrently in place. TDM professionals should advocate for a more complete multimodal system. As the level and quality of multimodal transportation service increases, parking limitations can gradually be established. TDM professionals should stimulate discussion through arranging forums among bankers, developers and local governments about the marketability of development with reduced parking. TDM professionals should suggest a plan for staging the gradual reduction of parking availability in coordination with redevelopment, which includes triggers or thresholds that precipitate the institution of parking reductions.

Review staff functions. Consider whether difficulties in coordinating land development planning, transportation planning and traffic engineering are in part due to the manner in which staffing tasks are compartmentalized within departmental functions.

Stay current on innovations in the field. Local governments often have found it helpful to borrow good ideas from other municipalities. This is a sound practice as long as borrowed ideas are tailored to the unique conditions of the locality. TDM professionals should keep abreast of ongoing evaluation and refinements to Broward County’s transit oriented concurrency approach and consider how the concept might be applicable in their own municipalities.

Recognize TDM credentials. In the long run, an important way to elevate the usage of TDM is through incorporating a balanced approach to transportation engineering and planning at the college undergraduate and graduate levels. Local TDM professionals can suggest hiring criteria for key local land development administrative positions. Such criteria could include strong preference for candidates who have studied TDM, determinants of travel behavior, multiple methodologies for assessing traffic impact, and other indicators of a broadened transportation education.

4. Involvement in State Government Processes

Update the Development of Regional Impact (DRI) analysis process. In the DRI process, there is an emphasis on the use of capital improvements to resolve capacity deficiencies. Operations and management programs generally have not been used to address regional impacts. It is difficult to develop an intermodal and multimodal local transportation system if the regional and interstate transportation systems rely primarily on one mode. This is because the local system is so closely intertwined with the regional and interstate systems. State planners should revisit the long term possibilities for multimodal regional and interstate transportation systems. Florida DOT site impact analysis procedures used to evaluate DRI impacts are used with the intent to preserve level of service (LOS) on the State Highway System (SHS) and the Florida Intrastate Highway System (FIHS). Analysis tools for determining LOS focus on highway capacity for automobiles and trucks. Trip generation is characterized as motor vehicle movements. Transit share is based on existing transit usage in areas where transit service often is underdeveloped. The DRI Application for Development Approval (ADA) questions should be reviewed and updated to place greater emphasis on transportation alternatives, transit oriented development and pedestrian-friendly development design. The site impact methodology should be updated to reflect an anticipated future multimodal system, otherwise site impact analysis will tend to mirror and reinforce the existing conditions of a private motor vehicle oriented system. Broward County’s transit-oriented concurrency approach may offer concepts that could be borrowed by the DRI review process to widen the possible options for addressing regional transportation impacts with alternative modes.

Consider the impact of emergency evacuation on statewide transportation planning. It is recommended that TDM professionals suggest a reconsideration of statewide strategies for
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emergency evacuation and include TDM in evacuation strategies. Maintaining regional highway capacity for emergency evacuation attracts and disperses new land development where capacity exists, which limits mobility choices and thwarts application of many TDM strategies. It is recommended that while FIHS capacity is maintained for evacuation events, the bus fleets of urban areas should also be maintained to satisfactorily serve low-mobility populations during evacuation events. This increase in bus service capacity then can be made available daily, encouraging a trickle-down effect upon land development location decisions and site design.

Funding allocations are influenced by the source of revenues. This is because it makes sense to tie the funding of services to those who use them, when possible. It is recommended that state and local policy makers reconsider sources of transportation revenue and TDM professionals should be participants in the dialogue. Alternatives could include raising motor vehicle fees, especially registration fees for new motor vehicles and parking pricing. The increased revenue should be earmarked to complete the road system for alternative users, including pedestrians, bicyclists, and high occupancy vehicle lanes and bus rapid transit. There should also be consideration of other transportation revenue sources to remove dependence for revenue generation from private automobile ownership and usage, such as fuel taxes.

5. Seek refinement of methodology for determining transportation impact of land development.

This review recognizes that the demand for transportation calls for a wider choice of mobility services (such as transit service, vanpools, guaranteed ride home), which would result in a transportation impact from land development that is characterized differently from a mere calculation of the number of additional vehicles generated by the development. This transportation demand for varied services will be suppressed if the basic system for providing such alternative transportation services is not yet in place. Once such a system is in place, transportation impact would have to be measured differently, such as the number of additional bus boardings, the number of pedestrian crossings at key intersections, and the numbers of additional vanpools and guaranteed ride home registrants. Differently measured impacts would call for an expanded menu of service improvements that could be contributed by the developer as part of the development agreements and development orders.

Select performance measures carefully. TDM professionals should encourage planners and engineers to weigh the limitations of using various TDM performance measures against the particular goals to be achieved. Examples include reducing single occupant vehicles (SOV), average vehicle occupancy (AVO), and average vehicle ridership (AVR), understanding that their use will limit the actions taken. Reducing SOV limits TDM strategies to mode shifting and does not recognize that SOV drivers can also participate in TDM. AVO does not incorporate the effects of bicycling, walking or telecommuting. AVR is a measure associated with work sites, limiting TDM application to commute travel. AVR also does not incorporate the effects of bicycling, walking and telecommuting. These are all useful measures but they should be applied only with the understanding of what they do not consider and should perhaps be used with other measures such as a vehicle employee ratio (VER), also known as vehicle trips reduced (VTR), which is the number of vehicles per 100 employees. Other measures might include reducing vehicle trips (VT) or reducing vehicle miles traveled (VMT).

Incorporate TDM as conditions for rezoning approvals. TDM professionals should meet with the municipal traffic engineer to review the methodology used to determine what information is needed for a rezoning application and provide general suggestions to the traffic engineer regarding how the assessment of a rezoning application can be made to incorporate TDM considerations.
Reconsider trip and parking estimates. TDM professionals should meet with the municipal traffic engineer to discuss the use and limitations of the ITE trip generation and parking generation rates. Local government transportation planners should evaluate the extent to which their customary use could mislead to faulty conclusions regarding the magnitude and characteristics of travel demand. Ideally, to estimate for a land development proposal, trip and parking rates will be computed from counts from other local developments that closely match the proposal in terms of its physical features and function, development environment, and areawide development goals for the future.

Encourage the development of LOS evaluation that enables trade-offs among modes. Available transportation planning methods fall short of enabling an evaluation of a trade-off among modes. Research should continue to focus on this missing piece, starting with the SIS geodatabase. TDM professionals should become more active in the discussion about the application of multimodal LOS standards as part of the transportation approval process. Ideally, TDM professionals should generate support for the future development and application of a method to make tradeoffs across modes. Preserving roadway level of service standards for private motor vehicles as specified in the local Comprehensive Plan appears to drive the process thereafter. In the long range transportation planning process, TDM professionals should suggest exploring the use of alternative standards for combined people-moving capacity across modes along corridors carrying heavy directional traffic. In the case of Tampa, one way to do this is to implement Policy 4.2.3, which calls for the City to assist HARTline to increase the modal split for mass transit by providing the highest levels of transit service on transit emphasis corridors. This Policy specifically calls for providing dedicated travel lanes for exclusive transit or high occupancy vehicle use. Especially for constrained corridors in which additional lanes cannot be built, such strategies require making a trade-off for more transit usage and less private motor vehicle level of service.

6. Develop professional relationships.

Identify key people in the local development process. TDM professionals should establish working relationships with key technical people, including those representing the Florida Department of Transportation, the planning commission, the transit agency, and the MPO. Establish a working rapport with the zoning administrator and the municipal traffic engineer. Invite such key municipal development staff to participate in a meeting of your organization, to give them first hand knowledge about what services your agency provides, your mission and goals, and express a desire to participate in the land development process. Make the case how you can be helpful to the process. Demonstrate a knowledge of the complexities of land development, issues and trade-offs, and your flexibility of thinking and desire to help solve transportation problems through strategies tailored to help properly conceived land development succeed.

Involvement at the neighborhood level sets the stage for TDM implementation. TDM professionals should be active in the development of neighborhood, area, or district plans and work to establish community support for using TDM principles in future land development, such as transit oriented development. Such support would ease acceptance of alternative building square footage, building height and number of floors, occupancy classification, minimum building setbacks and dimensions that support transit and pedestrian use. These features are proposed in writing at the building plan approval stage but are conceptualized early.

Balance specificity with flexibility. Alternative transportation facilities and amenities must maintain the character of the surrounding neighborhood and be complementary to stable residential areas. Neighborhood groups may express opposition to TOD. This requires the exercise of interpretation and sensitivity to residents who do not want to see change in their neighborhoods.
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Where there is ordinance language that is more specific and less open to interpretation, such as numerical standards, this type of regulation has more enforcement power but a less flexible impact. In the development of regulation language that advances the application of TDM, the goal is to make ordinance language as specific as possible without losing the flexibility and leeway needed to be responsive to neighborhood concerns in individual cases of development.

Seek networking opportunities. TDM professionals should consider serving on citizen review boards as part of community service activities. This can provide valuable networking and partnership building opportunities. Participate on local boards and committees to develop an understanding of different aspects of the community as well as to provide information regarding the benefits of TDM to other participants. Most TDM professionals are becoming aware of the opportunities provided by participating in technical advisory committees of the MPO. In addition, there are appointed citizen review boards that are established to secure resident participation, promote good government and to promote the effective and efficient delivery of public services. While these review boards are for citizen residents of the municipality and not professional representatives of organizations like a commuter assistance program, clearly the persons who participate on these boards have related professional backgrounds. TDM professionals who have an interest in community service as well as individual members of the CAPs or TMAs could serve on these boards to provide a TDM perspective in the decision making process. These boards include variance review boards, architectural review commissions, neighborhood planning task forces, enterprise zone development agencies, and the municipal planning commission.

Establish partnering roles. TDM partnering agencies should make a decision whether/when participation in the development approval process for a particular application should be a coordinated team approach or whether one partnering agency should attempt to be the sole voice and conduit for involvement and recommendations. This decision could be decided in advance as a general coordinating policy or it could be decided on the basis of each individual application.

Agree upon an effective division of labor. Based upon staffing and time constraints, TDM professionals will not be able to pursue all development proposals. Consequently, they should form a strategy in advance for participating in the land development process that coordinates the agreed upon efforts of the regional commuter assistance program (CAP), the local transportation management associations, the local transit agency, the bicycle/pedestrian coordinator, the FDOT District public transit office and other key TDM agencies. For example, staff of the regional CAP might provide assistance to the TMAs in the form of information regarding rezoning applications and site plan applications submitted in the TMA service areas. The CAP might also serve on the MPO Technical Advisory Committee and provide updates to local TMAs regarding long range transportation planning initiatives.

Demonstrate a coordinated effort. It is important that in this coordination effort, there be communicated to the municipal offices overseeing the land development process, a unified voice among allied organizations with regard to TDM. It can only help to demonstrate a coordinated approach. The worst that can happen is for disagreement among allied organizations to become apparent, which will communicate disorder and a strong sense that including TDM in the discussion will complicate and slow the process down rather than be of assistance. It may help for TDM agencies to decide in advance what their respective roles will be through identifying what strengths each partner agency has and how best each agency can contribute. Deciding roles in advance may reduce or eliminate friction relating to “turf”.

Be mindful of how one TDM strategy can impact others advocated by partners. In the development of combinations of TDM strategies, sometimes one strategy can offset the impact of
another. For example, a dedicated bus lane may experience a lowered level of service if it is turned into a high occupancy vehicle lane shared by carpools and vanpools. In this case, coordination with and support of the local transit agency includes carefully weighing the impact of combined TDM strategies and open discussion about what will create the best overall outcome.

**Reach out to economic development interests.** TDM professionals should aim to apply TDM to residential and business location decision making because this sets the stage for using TDM strategies more effectively on a day-to-day level. Develop working relationships with realtor associations, economic development arms of local government and chambers of commerce.

**Educate the media about the use of TDM as mobility management.** It is essential for TDM professionals to seek out the news media covering the events relating to a development proposal, to frame the transportation issues from a standpoint of mobility management and see to it that this message does not get obscured. TDM representatives should develop a professional rapport with journalists. TDM representatives should attend high visibility public hearings and sign up to speak. TDM professionals should carefully prepare and rehearse their 3 minutes allotted time to speak, to succinctly address “hot button” concerns with factual evidence. While oral testimony at the public hearing stage is likely too late to influence transportation professionals, it can have an impact on how the issue is reported in the news media. This affects receptivity by the public and by elected officials who must vote on development matters.

**Publicly praise land development that supports community transportation goals.** TDM professionals should continue to serve as publicists to bring positive recognition to developers and property managers for good track records of implementation.
CASE STUDIES
Two case examples were documented for this report as briefly described below:

- **Commute Trip Reduction Program.** Durham County, North Carolina. This ordinance requires major employers to provide employees with information on alternative transportation modes, to participate in a survey and reporting effort, and to prepare a plan to reduce commute-related traffic generated by their employees.

- **Parking and Transportation Demand Management Ordinance.** Cambridge, Massachusetts. This ordinance is one of the measures the City uses to minimize the number of single-occupancy vehicles operated within the City. Parking is strictly limited, and a variety of TDM measures are supported through negotiations with developers.

**Commute Trip Reduction Program**

**Durham County, North Carolina**

**Sources:** Interviews with Audra Foree, TDM Planner, Triangle Transportation Agency, Durham, NC and Charseem Anderson, Transportation Planner, City of Durham, NC; Durham County Code, Article V: Commute Trip Reduction Program.

Located in the Research Triangle of North Carolina, Durham County has an area of 290 square miles and is home to 236,781 people (2003 estimate). The American Community Survey estimates that, in the larger Raleigh-Durham-Chapel Hill metropolitan statistical area (of which Durham County is a part), 81% of working adults used single-occupancy vehicles as their primary means of transportation to work.

Durham County instituted a trip-reduction ordinance in 2000 for the main purpose of heading off imminent non-attainment status in local air quality. The ordinance takes an employer-based, rather than a development-based, approach to transportation demand management (TDM). Indeed, there is no land-use component to the ordinance at all.

The ordinance requires “major employers” (defined as organizations employing at least 100 people) to provide employees with information on alternative transportation modes, to participate in a survey and reporting effort, and to prepare a plan to reduce commute-related traffic generated by their employees. Technically, this plan must be approved by the county. The ordinance provides a mechanism for the county to object to any employer’s traffic reduction plan, however, no plan has been rejected to date.

Durham County is intentionally taking a less confrontational and more conciliatory approach to TDM than are other municipalities. “Employers have lots of leeway regarding compliance,” says Audra Foree, the TDM planner for Triangle Transit Authority (TTA), the lead transportation agency in Durham County. “The ordinance basically gives them suggestions; they can install bike racks, set aside designated parking spaces for carpoolers, or something else. The method they use to achieve traffic reduction is up to them.”

Suggestions for employer’s traffic reduction plans found in the ordinance include the following TDM strategies:

1. Commuter matching services to facilitate employee ridesharing for work trips;
2. Provision of vans for vanpooling;
3. Subsidized carpooling or vanpooling which may include payment for fuel, insurance, or parking;
4. Use of company vehicles for carpooling;
5. Provision of preferential parking for carpool or vanpool users;
6. Reduction of on-site employee parking or re-designation of existing parking to pooling employee parking;
7. Subsidized bus fares;
8. Construction of special loading and unloading facilities for transit, carpool, and vanpool users;
9. Cooperation with the City or County of Durham in construction of sidewalks or bicycle routes for the work site;
10. Provision of bicycle racks, lockers, and showers;
11. Providing to employees information on alternate modes and other travel reduction measures;
12. Establishing a work-at-home program, including telecommuting;
13. Establishing a program of adjustable work hours which may include compressed work weeks and flexible starting and stopping hours;
14. Parking incentives and disincentives;
15. Implementing other measures designed to reduce commute trips, such as provision of day-care facilities, restaurant, or emergency ride home services.

The ordinance does not set community-wide goals for traffic reduction, but does not hold employers to achieve any kind of citywide goal or standard, leaving them to their own devices to comply with the ordinance. As a result, the Triangle Transit Authority (TTA) acts as a consulting organization working with employers to identify the most successful (and cost-effective) methods of implementing TDM. According to Foree, the most important factor in creating an effective program is the person appointed by the employer to liaison with TTA. “An employer must designate an Employee Transportation Coordinator (ETC) at the worksite, and that person is the City’s contact point within the company for the development of the program,” she states. “We work with the ETC to implement the annual employee survey. The ETC is also in charge of keeping alternative transportation mode information at the worksite—things like bus schedules, brochures, etc.”

Charseem Anderson, a transportation planner for the City of Durham, is in charge of administering the City’s trip reduction plan with its goal “to reduce vehicle miles traveled for employees, and to encourage them to get out of the SOV (single-occupancy vehicle) mindset.” The City’s plan encourages employees to participate in the program through incentives that are associated with each alternate transportation mode. For example, employees with valid City Employee IDs ride the transit system for free and are eligible to use the guaranteed emergency ride home. City employees are also allowed to adjust their arrival and departure times in accordance with the bus schedule.

One benefit of the flexible nature of the Durham County TRO is that it helps mitigate the resistance that is common to similar ordinances in other parts of the country. While development-based requirements can often breed contentious fights over TDM requirements (due at least in part to the amount of money involved in even a slight delay in construction), in Durham, the most significant variable is the attitude of the employee transportation coordinator (ETC). “It really depends on the person who’s given the responsibility,” says Foree. “If they’re amenable to the idea of serving in that capacity, the process tends to work better. It helps if they are already of the mindset that [traffic reduction] is something that people should be doing.” Prior to Durham County’s adoption of the trip reduction ordinance, some corporations were already implementing traffic reduction plans, for example, GlaxoSmithKline. Some corporations are much less interested in coordinating trip reduction through the TTA, especially if the designated ETC is not interested in serving in that role.
“We’ve been achieving our [traffic reduction] goals within the city, but one of the biggest hurdles we face is getting the supervisors to let their employees participate,” says Anderson. For example, although many employees would like to participate in the compressed work week and telecommuting options, they are not appropriate for everyone. Oftentimes, some managers are skeptical of “the idea that their employees can still be productive if they are not under direct and constant supervision.”

Judging the success of any TDM initiative requires measurement and evaluation of the specific techniques implemented. Like most municipalities, Durham County takes a low-cost, low-tech approach to questions of verification and measurement. “We require major employers to conduct annual surveys among employees and to prepare an annual report to TTA,” says Foree. The TTA then examines those documents “to determine if the plans are compliant with the ordinance.” TTA uses an evaluation form for this purpose. Information provided on the form includes: the date on which the plan was first received; whether the employer has submitted all necessary fees; whether the employer has designated an ETC, and the identity of that person; a description of how TDM information is distributed to employees; descriptions of both current and planned trip reduction measures, to include specific goals for the following year; and the response rate of the survey. The City also tracks employee compliance through an annual survey. Typical topics covered include: basic travel habits; the type of vehicle used for travel (especially model, make, and fuel type); miles traveled; and the specific reasons the individual made the choices he or she did.

There are, however, some measurement-related pitfalls to consider. In particular, establishing a baseline can be tricky, due mainly to difficulty in obtaining baseline data. “Between years 2000 and 2002, we attempted to gather baseline info through a ‘suggested’ survey,” says Foree. Only some of the companies distributed the survey. In addition, reporting methods were not standard and were, therefore, difficult to measure, resulting in a very weak baseline. According to Foree, “In 2003, we developed and used a standard [required] survey and report, and we are now gathering the first measurements based on this standard survey. We expect to have all the results sometime in the spring of 2005.”

The ordinance does include a $1,000 one-time penalty for noncompliance. Despite the seemingly small size of the fine for most companies that would be categorized as major employers, only one fine has been assessed since the program began in 2000, indicating compliance with the ordinance.

Some employers might be put off by the possibility of high costs for program implementation, but the flexibility of Durham County’s ordinance can help mitigate those fears. In fact, the City of Durham hasn’t yet incurred any specified costs, although that may be in large part due to the unique situation of City government. For example, the City subsidizes its own transit system on which employees ride for free. Further, Anderson says, “the emergency ride home service is set up in such a way that, if they need to pay a cab fare, employees are reimbursed directly by an individual department’s travel budget, instead of by the Transportation Department’s funds.”

As a result of the flexibility and leeway inherent in Durham County’s ordinance, there is very little actual negotiation involved in the implementation of the trip reduction ordinance. The main advantage of this ordinance is ease of employer participation. Because compliance with the ordinance is determined by the number of full-time employees, it is easy for employers to determine whether or not they are subject to the ordinance. In addition, the requirements they must meet (as set forth in the ordinance) are not difficult. Thus, participation by employers is relatively simple to achieve. The disadvantage of this approach is that individual employers are not responsible for specific traffic reduction goals. Employers will almost always elect to implement the least rather than the most cost
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effective TDM strategies. As long as Durham County is able to meet its overall traffic reduction goals, this trip reduction ordinance can be deemed successful.

**Parking and Transportation Demand Ordinance**

**Cambridge, Massachusetts**

**Sources:** Interviews with Susanne Rasmussen (Director of the Environmental and Transportation Planning Division, Community Development Department, Cambridge, MA), Catherine Preston (PTDM Planning Officer, Cambridge, MA), and Jim Gascoigne (Executive Director, Charles River TMA); Cambridge City Code, Chapter 10.18

**Resources:** The following documents are available at [www.cambridgema.gov](http://www.cambridgema.gov):
- Parking and Transportation Demand Management (PTDM) Ordinance
- Interdepartmental Parking Facility Registration Form
- PTDM Employee Transportation Coordinator Designation Form
- PTDM Plan Property Transfer Form
- PTDM Small Project Plan
- Zoning Ordinance

This case study involves Cambridge, Massachusetts, a city of over 100,000 residents covering an area of 6.5 square miles. Located just across the Charles River from Boston, Cambridge is home to Harvard University, the Massachusetts Institute of Technology, and a strong high-tech business sector. The Parking and Transportation Demand Management Ordinance discussed here is but one part of the City’s TDM program, designed “to improve mobility and access, reduce congestion and air pollution, and increase safety. These programs work to reduce the level of drive-alone travel by promoting walking, bicycling, carpooling, vanpooling, public transportation, and other sustainable modes. The City works cooperatively with citizens, businesses, and institutions in Cambridge and the Boston area to implement TDM measures” (53).

Another codified example of Cambridge’s TDM program is Article 19 of the Zoning Ordinance which addresses special permits required for “large projects” whose definition varies, depending on the specific type of development being proposed (54). Applicants for a large project special permit are required to conduct a traffic study, which should “identify parking and transportation demand management measures and other mitigation measures proposed to ameliorate any adverse traffic impacts identified in the study.” Traffic mitigation measures are outlined in Article 18 of the Zoning Ordinance. Additional citywide transportation demand management efforts include support of the EZRide Shuttle, GoGreen Month, Bike Week, and a pilot project for Enhanced Bus Stop Signage.

**Background**

*The Parking and Transportation Demand Management (PTDM) Ordinance* (Chapter 10.18) was passed in November 1998 to provide some “teeth” to a stagnant *Vehicle Trip Reduction Ordinance* (VTRO) and address concerns about increased traffic within the community itself. The VTRO, passed in 1992, was a response to concerns about air quality, and, more specifically, about transportation’s contribution to declines in air quality and the resulting parking freeze imposed by the Massachusetts Department of Environmental in the early 1970s. A broader goal of the VTRO was regulating improvements to air quality and reductions in vehicle trips via a new approach to transportation. It is interesting to note that the parking freeze was actually requested by the Cambridge City Council as a tool to guard against the growth of new parking spaces that would meet increased demand from the neighboring city of Boston. The freeze applies only to the construction of
new, fee-based parking facilities, either surface or structures, and does not apply to on-street parking or accessory parking.

Another significant factor for passing the *PTDM Ordinance* was a general fear of traffic that might be brought about by the rapid growth of the biotech and dot-com industries within the city during the late 1990s; however, the very biotech firms seen by many Cambridge residents as being a major source of their city’s traffic problems were, in reality, some of the city’s earliest practitioners of TDM, developing in-house programs for their employees. Traffic fears were enhanced with the end of Cambridge’s rent control program in 1996, when the resulting change in the city’s demographics led many Cambridge residents to perceive the presence of a higher number of cars per household than in previous years.

**Parking and Transportation Demand Management Ordinance (PTDM)**

The *Parking and Transportation Demand Management Ordinance*, Chapter 10.18 of Cambridge’s *City Code*, states its purpose: “to regulate and control atmospheric pollution from motor vehicles by formalizing parking and transportation demand management planning, programs, and coordination which have been ongoing for a number of years. This Chapter will reduce vehicle trips and traffic congestion within the city, thereby promoting public health, safety, and welfare and protecting the environment.” The ordinance requires parking and transportation demand management plans for commercial parking facilities and other types of non-residential parking facilities, provided they meet certain size requirements. Elements of this ordinance include:

- Establishment of purpose, definitions, and designation of a PTDM Planning Officer;
- Registration of all parking spaces;
- Parking and Transportation Demand Management plans;
- Reduction in minimum parking requirements and maximum distance standards;
- Requirements applicable to small projects; and
- Enforcement, evaluation, and expiration.

Basically, the process involves registration of all parking spaces prior to the construction that creates the spaces. Building, expansion or operation of a parking facility requires a *Parking and Transportation Demand Management Plan* approved by the Planning Officer. The *PTDM Plan* may include requests for “fewer parking spaces that [sic] the minimum set forth by the Zoning Ordinance” or “utilizing off-site parking spaces that are further from the project site than the maximum distance requirements set forth in the *Zoning Ordinance.*” Small projects (using 19 or fewer parking spaces) are required to implement a minimum of three PTDM measures. Enforcement of the ordinance includes a per parking space, per day monetary fine for violations. The ordinance, as originally written, had a three-year sunset clause; after re-approval in 2001, it contains a five-year sunset clause, set to expire in 2006.

The city's Traffic, Parking and Transportation department maintains an inventory of all off-street parking spaces located within the city. Anytime a developer or property owner attempts to increase the number of non-residential spaces beyond the number listed in the inventory for a particular piece of property, the PTDM ordinance is triggered. This is typically a result of other building activities, and therefore is flagged during the application process for special permits, building permits, open-air parking lot licenses, garage and gasoline storage licenses, or curb cuts, for example.

The annual cost of administering and enforcing PTDM in the City of Cambridge amounts to staffing one full-time professional planner. The city is able to achieve some economies of scale, because their
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Traffic and Parking Department (which maintains the inventory and is responsible for enforcement) is able to use existing staff to carry out inspections and enforcement actions.

Negotiations between the City and the Developer

Any developer or property owner who plans on increasing off-street non-residential parking must obtain an approved PTDM plan before a building permit, special permit, certificate of occupancy, license, or variance can be issued. This means that negotiations between the developer/property owner and the City do not include whether a TDM plan is required, but what specific form the plan will take.

The starting point for these negotiations is usually the identification of comparable plans that have already been implemented and have shown a reasonable amount of success. The ideal candidate for comparison would be a similar type of business, located in an area with a similar level of transit service, and one that has at least some monitoring to show successful achievement of the mode-split commitments. Once a starting point has been selected, the developer/property owner examines the plan and determines possible modifications to better fit their specific situation. Generally, plans that have elements supporting all modes of transportation and are sufficient to meet their mode-split targets stand the best chance of being approved. Developers typically do not propose radically different plans from those suggested by the PTDM manager. In general, negotiations revolve around the degree of support for various elements of the plan—how much subsidization of transit passes will be required, whether or not there is a need for a privately-run shuttle, or how many HOV spaces will be required, etc.

The draft process itself usually takes from 40 to 60 days. The process typically consists of the following elements:

- The developer/property owner writes and submits a draft plan;
- The PTDM Manager comments on the draft;
- The developer/property owner and the PTDM manager conduct a face-to-face meeting; and
- The developer/property owner writes and submits a final plan.

In some rare cases, there may be additional drafts and comments. If the process continues for more than the 60 days designated by the PTDM Ordinance, the parties have to agree to an extension of the deadline. Extensions are usually required because the developer has a large team that needs to be consulted on the plan. On the other hand, extensions required because of difficulty reaching an agreement between the developer/property owner and the City are relatively rare; to date, there has been only one plan rejected. Any plans not acted upon by the PTDM manager within 60 days of submittal are automatically approved.

Cambridge’s experience with TDM negotiations suggests that developer resistance can vary significantly: “Sometimes, developers have been amenable to everything we suggest during permitting, and the ones we get resistance from are their eventual tenants,” says Catherine Preston, Cambridge’s PTDM manager. “Small property owners tend to be more resistant than larger property owners. At this point, we also encounter developers who have been through the process before on other projects and are somewhat accepting of it, but, based on their experience, have specific tweaks they look for.” According to Preston, it is the tenants/employers occupying the buildings who tend to be most sensitive about PTDM. For this group, the strongest resistance comes from anything that affects the supply or cost of parking for their employees. Preston cites fairness and transparency within the negotiation process as a key element of success. It is critical not to give any developer or
property owner the impression that they are being “singled out” or treated differently from others in comparable situations.

Sometimes, developers and property owners argue that there is a mistake in the inventory. In these instances, the developers and property owners may present to the City any available documentation that demonstrates the spaces in question existed prior to November 1998. However, the Traffic and Parking department makes the final determination of whether or not an increase has occurred. If one has, the project is referred to the PTDM manager, who then begins the negotiation process. There are some instances in which developers or property owners increase the number of spaces without City approval through re-striping of an existing lot or conversion of residential spaces to non-residential use. Typically, the City discovers these instances through word of mouth, whether from an annoyed neighbor, a city worker involved in a different project in the area, or a customer of the business. In these instances, Cambridge’s inspectors then visit the site and verify the number of spaces in operation, as well as their purpose.

**Monitoring and verification**

All PTDM plans for projects of 20 or more parking spaces are required to submit annual monitoring reports to the City. These include annual mode-split surveys, and biannual driveway and parking utilization counts. Surveys must have a response rate of 60% to be considered reliable, and the City has the ability to audit the surveys and counts, should that prove necessary. Any discrepancies between the survey and the counts raise a “red flag” with the Parking and Transportation Department, which then works with the property owner to determine the cause of the discrepancy.

Cambridge does not measure the progress of PTDM by traffic counts on city streets, thereby leaving project monitoring reports as the primary source of data regarding the success of the program. There are two main reasons for this:

- PTDM only impacts new, non-residential development in the City (it is not retroactive to existing parking and does not affect new residential parking), and
- The City has very limited ability to influence regional traffic passing through Cambridge (i.e., trips without an origin or destination within the city); in fact, growth in traffic passing through Cambridge has been more significant than growth in traffic generated by projects within the city itself.

In determining the level of success, Cambridge’s planning professionals look at how much traffic a new project has generated, and then attempt to estimate how much more traffic would have been generated without the PTDM ordinance: “We look at the 1990 census and determine the number of trips that would be generated with a project in that tract,” says Susanne Rasmussen, Director of Cambridge’s Environmental and Transportation Planning Division. “We then require limiting traffic increases to a maximum of that number, minus ten percent.”

**Transportation Management Association role**

Cambridge’s TDM efforts benefit from the presence of the Charles River Transportation Management Association (CRTMA), which assists regulated businesses in complying with their PTDM agreements. Boasting 20 members, CRTMA helps implement programs like shuttles, Emergency Ride Home, transportation fairs, information distribution and marketing, and car and vanpool ride-matching. This centralized implementation approach permits member businesses to achieve results in a cost-effective manner.

CRTMA Executive Director, Jim Gascoigne, describes how that process generally works:
“We meet with each member to determine their interests and needs. We work with the members to develop a specific program, where necessary, or to implement existing programs. Programs that we implement for members are the standard tools of TDM. CRTMA provides an economy of scale; in many businesses, for a fraction of the cost and aggravation of implementing the programs in-house, CRTMA can perform the function.

Our biggest success in this regard is the EZride shuttle service. The five vehicles that comprise EZRide replace ten corporate shuttles, most of which were required by PTDM agreements. The result is a publicly accessible, privately funded service that offers greater frequency, greater comfort, and more destinations (including buses, three of Boston’s subway lines, and the North Side Commuter Rail), all at a price significantly less than the cost of running an individual corporate shuttle. This service likely would not have been possible without shuttle requirements in PTDM agreements.

The PTDM got businesses into the shuttle business as a way to improve their mode-splits. CRTMA got the businesses to work together by saving them money.”

CRTMA’s involvement in Cambridge’s TDM plans actually began at a very early stage. CRTMA staffers pitched the concept of TDM to area businesses within the Chamber of Commerce, explaining why it made good business sense and, ultimately, ended up with their support.
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7. Chapter 163.3177(3)(a)1-4, F.S.

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Appendices
APPENDIX A: SARASOTA COUNTY DEVELOPMENT AGREEMENT

The following is an excerpt from the Sarasota County Development Agreement, Section 94-261 of the Sarasota County Code. (Source: www.municode.com).

ARTICLE VIII. DEVELOPMENT AGREEMENTS

Sec. 94-261. Findings.
The Board of County Commissioners hereby makes the following findings:

(a) Pursuant to Article VIII, Section I(g) of the Constitution of the State of Florida, the Sarasota County Home Rule Charter, F.S. § 125.01, and the Local Government Comprehensive Planning and Land Development Regulation Act, (The "Act"), Chapter 163, Part II, Florida Statutes, as amended, Sarasota County is authorized and required to adopt a comprehensive plan.

(b) The Board of County Commissioners of Sarasota County adopted "Apoxsee, the Sarasota County Comprehensive Plan," in accordance with the provisions of the Act, including the adoption of acceptable levels of service for public facilities including transportation, potable water, sanitary sewer, parks, drainage and solid waste.

(c) The Board of County Commissioners of Sarasota County adopted Ordinance No. 89-103, as amended, the Sarasota County Concurrency Management System Regulations and codified as Chapter 94, Article VII, in order to insure that public facilities and services needed to support development will be available concurrent with the impact of such development.

(d) Pursuant to the Florida Local Government Development Agreement Act, F.S. §§ 163.3220--163.3243 (The "Development Agreement Act"), local governments are authorized to adopt by ordinance, procedures and requirements whereby a local government may consider and enter into a development agreement with any person having a legal or equitable interest in real property located within the local government's jurisdiction.

(e) The lack of certainty in the approval of development can result in a waste of economic and land resources; discourage sound capital improvement planning and financing; escalate the cost of housing and development; and discourage commitment to comprehensive planning.

(f) Development agreements entered into pursuant to the Local Government Development Agreement Act, strengthen the public planning process, encourage sound capital improvement, planning and financing; assist in assuring that there are adequate capital facilities to support development; encourage private participation in comprehensive planning; and reduce the economic cost of a development by providing assurances to a developer that, upon receipt of a development permit, the developer may proceed in accordance with existing laws and policies, subject to the conditions of a development agreement.

(g) The provisions of this ordinance, in their interpretation and application, are declared to be the minimum requirements necessary to accomplish the stated intent, purposes, and objectives of this ordinance. Nothing in this ordinance shall be interpreted as characterizing a development agreement as anything other than a discretionary, bilateral contract between the County and the owner with consideration given by both parties to the contract.

(h) The Board of County Commissioners of Sarasota County, has determined that it is in the best interest of achieving and maintaining the quality of life in Sarasota County to provide appropriate procedures and requirements for the adoption of development agreements through the provisions of Development Agreement Regulations.

(i) The Board of County Commissioners, sitting as the Sarasota County Land Development Regulation Commission has reviewed the proposed ordinance and has found that it is consistent with the Sarasota County Comprehensive Plan.

(Ord. No. 2004-086, § 1, 10-12-2004)
Sec. 94-262. Adoption of the Sarasota County Development Agreement Regulations.
The Board of County Commissioners of Sarasota County hereby adopts the Sarasota County Development Agreement Regulations, attached to Ordinance No. 2004-086 as Exhibit "A" and made a part hereof by reference.
(Ord. No. 2004-086, § 2, 10-12-2004)

Editor's note: The Development Agreement Regulations are printed following this article.

Sec. 94-263. Applicability.
The Sarasota County Development Agreement Regulations shall be applicable throughout the unincorporated Sarasota County, Florida, and as otherwise provided by law.
(Ord. No. 2004-086, § 3, 10-12-2004)

Sec. 94-264. Effect on Other Ordinances and Regulations.
Nothing in this Ordinance shall be construed or applied to excuse or replace development approvals required under existing land development regulations, contained within Ordinance No. 97-051, the County's Land Development Regulations codified as Chapter 74 of the Sarasota County Code, nor to release any developer from its proportionate share of the cost of public facilities improvements otherwise required.
(Ord. No. 2004-086, § 4, 10-12-2004)

Sec. 94-265. Local Laws and Policies Governing Development Agreements.
Sarasota County's laws and policies set down in the development agreement as governing the development of the land at the time of the execution of the development agreement shall govern the development of the land for the duration of the development agreement, except that Sarasota County may apply subsequently adopted laws and policies to a development that is subject to a development agreement if the Board of County Commissioners holds a public hearing pursuant to the requirements of this article and determines any one of the following:
(a) The laws and policies are not in conflict with the laws and policies governing the development agreement and do not prevent development of the land uses, intensities or densities in the development agreement;
(b) The laws and policies are essential to the public health, safety, or welfare, and expressly state that they shall apply to a development that is subject to a development agreement;
(c) The laws and policies are specifically anticipated and provided for in the development.
(d) Sarasota County demonstrates that substantial changes have occurred in pertinent conditions existing at the time of approval of the development agreement; or
(e) It is demonstrated that the development agreement is based on substantially inaccurate information supplied by the developer.
(Ord. No. 2004-086, § 5, 10-12-2004)

Sec. 94-266. Forms.
Adoption of standard development agreement forms by resolution and certification of attorney.
(a) The Board of County Commissioners is hereby authorized to adopt by resolution standard forms for development agreements and security referenced in this ordinance.
(b) Development agreements submitted to the County for review shall be in the approved standard form and shall be accompanied by a certification from an attorney that the agreement is in the standard form, or that any changes, additions or deletions from the standard form are shaded or redlined in the proposed draft agreement. Additions shall be underlined; deletions shall be cross-hatched or struck-through.
(Ord. No. 2004-086, § 6, 10-12-2004)
Sec. 94-267. Enforcement.
(a) In accordance with F.S. § 163.3243, as the same may be amended from time to time, any party to a development agreement, any aggrieved or adversely affected person as defined in F.S. § 163.3215(2) which will suffer an adverse effect to an interest protected or furthered by the Comprehensive Plan, or the state land planning agency may file an action for injunctive relief in the Circuit Court of Sarasota County to enforce the terms of a development agreement or to challenge compliance of the agreement with the provisions of the Development Agreement Act.
(b) In addition, any person who violates this article shall be subject to the enforcement provisions set out in Article VIII, Chapter 2, of the Sarasota County Code, as amended from time to time, and the penalties set forth therein.
(c) Nothing herein shall constitute an exclusive remedy, and the County reserves the right to pursue any and all legal and equitable remedies in order to abate a violation of this article.
(Ord. No. 2004-086, § 7, 10-12-2004)

Sec. 94-268. Legislative Act.
A development agreement is determined to be a legislative act of Sarasota County in the furtherance of its powers to plan and regulate by agreement and, as such, shall be superior to the rights of existing mortgagees, lien holders or other persons with a legal or equitable interest in the land subject to the development agreement, and the obligations and responsibilities arising thereunder on the property owner shall be superior to the rights of such mortgagees or lien holders and shall not be subject to foreclosure under the terms of mortgages or liens entered into or recorded prior to the execution and recordation of the development agreement.
(Ord. No. 2004-086, § 8, 10-12-2004)

EXHIBIT A. SARASOTA COUNTY DEVELOPMENT AGREEMENT REGULATIONS

A. Intent and authority.
The purpose of these regulations is to provide procedures and requirements whereby Sarasota County may consider and enter into a development agreement with any person having a legal or equitable interest in real property within the unincorporated Sarasota County, under the authority of The Florida Local Government Development Agreement Act, F.S. §§ 163.3220–163.3243.

The issuance of development agreements is intended to promote and facilitate orderly and planned growth and development by providing a degree of certainty in the development approval process. The certainty accorded developments under these regulations will: encourage greater participation in the comprehensive planning process; assure there are adequate public facilities for the development; and reduce the economic cost of development.

B. Definitions.
Apoxsee, the Sarasota County Comprehensive Plan, or Apoxsee means the document adopted by the Board of County Commissioners of Sarasota County and filed with the Clerk of said Board pursuant to Ordinance No. 89-18, as the same may be amended from time to time.

Applicant means any person or his duly authorized representative who submits a request for a development agreement for the purpose of obtaining approval thereof.

Board means the Board of County Commissioners of Sarasota County, Florida.

Comprehensive Plan means the document "Apoxsee, the Sarasota County Comprehensive Plan," ("Apoxsee"), adopted by the Board of County Commissioners of Sarasota County and filed with the
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Clerk of said Board pursuant to Ordinance No. 89-18, as the same may be amended from time to time.

Day means a working day, unless specifically referenced otherwise and shall exclude Saturdays, Sundays and legal holidays.

Density means the number of residential dwelling units permitted per gross acre of land as determined by the Sarasota County Zoning Regulations.

Developer means any person, including a governmental agency, undertaking any development.

Development, includes all other development customarily associated with a development permit unless otherwise specified. When appropriate to the context, "development" refers to the act of developing or to the result of development. Reference to any specific operation is not intended to mean that the operation or activity, when part of other operations or activities, is not development. Reference to particular operations is not intended to limit the generality of this subsection.

Development Agreement means an agreement entered into between Sarasota County and a person associated with the development of land pursuant to the terms of this Ordinance No. 2004-086.

Development Agreement Act shall mean F.S. §§ 163.3220--163.3243, as amended from time to time.

Development Order means any action granting, denying, or granting with conditions, an application for a development permit.

Development Permit means any preliminary subdivision plan, subdivision or other plat approval, site and development plan approval, rezoning, certification, special exception, variance, environmental permit or any other official action of Sarasota County or any other state or local government, commission, board, agency, department or official having the effect of permitting development of land located within the geographic area subject to the provisions of the Sarasota County Land Development Regulations.

Intensity means the degree to which an area is developed based on density, use, mass, size, impact, and traffic generations.

Land means the earth, water, and air above, below, or on the surface, and includes any improvements or structures customarily regarded as land.

Land Development Codes, Sarasota County means the code adopted by Resolution No. 89-384, pursuant to F.S. 163.3202, containing land development regulations that are consistent with and implement "Apoxse, Sarasota County Comprehensive Plan".

Land Development Regulations (LDR), Sarasota County means the regulation of the development of land within the unincorporated area of Sarasota County, Florida as provided for in Sarasota County Ordinance No. 81-12, as amended and codified as Chapter 74 of the Sarasota County Code.

Laws for the purposes of these regulations means all ordinances, resolutions, comprehensive plans, land development regulations, and rules adopted by the Board of County Commissioners of Sarasota County affecting the development of land.
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**Level of Service (LOS)** means an indicator to the extent or degree of service provided by, or proposed to be provided by, a facility, based on and related to the operational characteristics of the facility.

**Local Planning Agency** means the Sarasota County Planning Commission.

**Person** means any individual, corporation, business or land trust, estate, trust, partnership, association, two or more persons having a joint or common interest, state agency, or any legal entity.

**Public Facilities** means major capital improvements, including but not limited to, transportation, sanitary sewer, solid waste, drainage, potable water, educational, parks and recreational, and health systems and facilities.

**State Land Planning Agency** means the Department of Community Affairs.

**Third Party** means a government, agency or other unit of local government which does not have regulatory authority over the use of land but provides services for which Sarasota County has adopted Level of Service standards.

C. **General requirements.**

1. **Requirements of a Development Agreement.** A development agreement shall include but not be limited to the following:
   
   (a) A legal description of the land subject to the agreement and the names of its legal and equitable owners;
   
   (b) The duration of the agreement;
   
   (c) The development uses permitted on the land, including residential densities and building intensities, structure heights, maximum square footage of commercial buildings;
   
   (d) A description of public facilities that will service the development, including who shall provide such facilities; the date any new facilities, if needed, will be constructed; a schedule to assure public facilities are available concurrent with the impacts of the development; and if necessary, any third party or other agreement assuring the provision of said public facilities;
   
   (e) A description of any reservation or dedication of land for public purposes;
   
   (f) A description of all local development permits approved or needed to be approved for the development of the land;
   
   (g) A master conceptual development plan or an agreement to amend the development agreement within one year of the execution of said development agreement to include a conceptual development plan for the land subject to the development agreement containing the following unless the Board approves a modification to these requirements:
      
      (1) The general layout of the proposed development by land use and identifying the acreage and density and/or intensity of each portion of the proposed development;
      
      (2) Access points to the surrounding road system, internal and major road rights-of-way and road widths, any proposed pedestrian and bicycle facilities, and other easements;
      
      (3) Common open space and native habitat preservation and mitigation areas, recreational areas and any public purpose lands;
      
      (4) General stormwater retention areas; and
      
      (5) The location of any on-site potable water supply (e.g., wells) or wastewater treatment facilities.
   
   (h) A finding that the development permitted or proposed is consistent or will be consistent with the comprehensive plan and all applicable land development regulations;
   
   (i) A description of any conditions, terms restrictions, or other requirements determined to be necessary by Sarasota County for the public health, safety and welfare of its citizens;
(j) A statement indicating the failure of the agreement to address a particular permit, condition, term, or restriction shall not relieve the developer of the necessity of complying with the appropriate law governing said permitting requirements, conditions, terms or restrictions; and

(k) A description of the requirements for the filing of an annual report and a statement indicating who shall file an annual report and the required submission dates.

A development agreement may provide that the entire development or any phase thereof be commenced or completed within a specific period of time.

2. Duration of a Development Agreements and Relationship to the Comprehensive Plan. The duration of a development agreement shall not exceed ten (10) years. It may be extended by mutual consent of the Board, the developer, and any third party to the agreement, subject to a public hearing in accordance with the public hearing requirements contained in subsection C.6. of these regulations. No development agreement shall be effective or be implemented by Sarasota County unless the Sarasota County Comprehensive Plan and Plan Amendments implementing or related to the development agreement are found in compliance by the state land planning agency in accordance with F.S. 163.3184, 163.3187, or 163.3189.

3. Processing of Development Agreements With Other Applications for Development Approval. Where an application for a development agreement is filed in conjunction with other applications for development approval, the review periods for processing development agreement applications may be altered to accommodate the concurrent processing of the other applications.

4. Periodic Review of a Development Agreement. Within 12 months of the effective date of a development agreement, Sarasota County shall review the land subject to the development agreement to determine if there has been demonstrated good faith compliance with the terms of the development agreement. In addition to these requirements, any person with a legal or equitable interest in land for which a development agreement was entered into with Sarasota County, or their authorized representative shall submit an annual report to the Planning and Development Services Business Center on the date specified in the development agreement, pursuant to Section G of these Regulations.

5. Amendment or Cancellation of a Development Agreement. A development agreement may be canceled by the County or amended, subject to the procedural and public hearing requirements contained in these regulations, and under one or more of the following conditions:
   (a) Where there is mutual consent of the parties to the agreement, or by their successors in interest.
   (b) Where state or federal laws have been enacted which preclude one or more parties of the agreement from complying with the terms of the agreement.
   (c) Where the Board has found, in the annual review of land subject to a development agreement, there is substantial noncompliance with the terms of the development agreement.
   (d) Where, pursuant to Section 5.B. of Ordinance No. 2004-086 [section 94-265(b)], Sarasota County, may apply subsequently adopted local laws and policies to a development agreement.

6. Public Hearing. After the Planning and Development Services Business Center has made a recommendation on the application and the proposed development agreement, the application and proposed development agreement shall be considered at two public hearings.

If the proposed development agreement is being considered in conjunction with an application for a development permit which requires review by the Planning Commission, the first public hearing shall be held before the Planning Commission, who shall review the application, proposed development agreement, recommendation by the Planning and Development Services
Business Center and public testimony and recommend its approval, approval with conditions or denial. The second public hearing shall be before the Board, who after review and consideration of the application, the proposed development agreement, the recommendations of the Planning and Development Services Business Center and the Planning Commission, and public testimony, shall approve, approve with conditions, or disapprove the development agreement. The second public hearing shall be a minimum of seven calendar days after the Planning Commission public hearing. The day, time, and place of the second public hearing shall be announced at the first public hearing.

In all other instances, both public hearings shall be held by the Board. The second public hearing shall be held a minimum of seven calendar days after the first public hearing. The day, time, and place of the second public hearing shall be announced at the first public hearing. At the conclusion of the second public hearing, the Board shall, after review and consideration of the application, the proposed development agreement, the recommendations of the Planning and Development Services Business Center and the Planning Commission, if applicable, and public testimony, approve, approve with conditions, or disapprove the development agreement.

The notice of public hearing shall state the intent of the Board to consider a development agreement and shall specify the location of the land subject to the development agreement, the development uses proposed on the property, the proposed residential densities, and the proposed building intensities and height and shall specify a place where a copy of the proposed development agreement can be obtained.

Notice of intent to consider a development agreement shall be advertised approximately 7 days before each public hearing in a newspaper of general circulation and readership in the county where the local government is located. Notice of time and place of the first public hearing shall be sent at least 7 days in advance of the hearing by mail, to the owner of the subject property or his designated agent or attorney, if any.

7. **Recording of a Development Agreement.**
   
   (a) Within fourteen (14) calendar days after the Board has entered into a development agreement or the amendment to or cancellation of a development agreement, said agreement shall be recorded in the County public land records by the Clerk of the Circuit Court of Sarasota County. A copy of the recorded development agreement, or amendment or cancellation of a development agreement, shall be submitted to the state land planning agency within fourteen (14) calendar days after the agreement is recorded.
   
   (b) A development agreement shall not be effective until it is properly recorded in the public records of the County and until 30 calendar days after having been received by the State Land Planning Agency pursuant to this section.

D. **Binding nature of the development agreement.**

The burdens of the development agreement shall be binding upon, and the benefits of the agreement shall inure to, all successors in interest to the parties of the agreement.

E. **Enforcement.**

Any party, any aggrieved or adversely affected person as defined in F.S. § 3.3215(2), or the state land planning agency may file an action for injunctive relief in the circuit court to enforce the terms of a development agreement or to challenge compliance of the agreement with the provisions of the Development Agreement Act.

The County shall withhold approval of developments or permits if provisions of the agreement are not met or fulfilled.
F. Development agreement procedures.

1. Preapplication Conference. Preapplication conferences are required prior to the initiation of an application for a development agreement. Applicants shall submit a written request for a preapplication conference with the Executive Director of the Planning and Development Services Business Center. The pre application conference shall be held with the Executive Director of the Planning and Development Services Business Center or the Executive Director's designee. The purpose of the pre application conference is to assist in bringing the application as nearly as possible into conformity with these regulations or other regulations applying generally to the property involved and/or to define specifically other information essential to the review of the petition. In addition, the following information shall be discussed:

   (a) Other applications for development approval to be filed in conjunction with the application for a development agreement. If appropriate, staff shall clarify the necessary requirements for the processing of the concurrent applications and any necessary revisions or exclusions to the review time limits;
   
   (b) The appropriate composition of the review/negotiation team necessary to process the development agreement application;
   
   (c) Other jurisdictional agencies that need to become a party to the development agreement;
   
   (d) Any known Level of Service (LOS) or land use compatibility issues which need to be addressed; and
   
   (e) Whether complexities inherent in the proposed development agreement warrant alterations to the required review times listed in Section F of these Regulations.

2. Filing an Application to enter into a Development Agreement with Sarasota County. Applications for a development agreement shall be filed with the Planning and Development Services Business Center.

   (a) There shall be no deadline for filing an application for a development agreement.
   
   (b) The filing fee shall be due upon submittal of the application for a development agreement.
   
   (c) The submittal must contain all information required by the development agreement application form and these regulations.
   
   (d) Fifteen (15) copies of the information required by the development agreement application form shall be submitted to the Planning and Development Services Business Center unless otherwise directed in writing by the Executive Director of the Planning and Development Services Business Center or the Executive Director's designee. However, when a property lies within 1/4 mile of the boundaries of the cities of Sarasota, North Port or Venice or the counties of Manatee, DeSoto or Charlotte, one (1) additional set of the required information shall be submitted.

3. Third Party Participation in a Development Agreement. If the participation of third parties is necessary or in the best interest of Sarasota County, the approval of a development agreement may be conditioned upon the participation of specified third parties in the processing of the development agreement application.

4. Sufficiency Review.

   (a) Upon receipt of an application for a development agreement, or if appropriate, upon authorization by the Board of County Commissioners for third party participation in the processing of a development agreement, the Executive Director of the Planning and Development Services Business Center will forward copies of the completed application to the designated review/negotiation team for a determination as to whether the information submitted is sufficient to assess the application for a development agreement. Each agency on the review/negotiation team shall complete its sufficiency review and forward its comments to the Planning and Development Services Business Center within fifteen (15)
days. All review/negotiation agencies must comment in writing on the sufficiency of the development agreement application.

(b) Upon receiving all review/negotiation agency comments, the Planning and Development Services Business Center shall notify the applicant, in writing, whether any additional information is needed.

(c) Should the applicant be notified of the need for additional information, the applicant may: supply the additional information requested; appeal in writing to the Planning and Development Services Business Center requesting a reconsideration of the need for additional information; or notify the Planning and Development Services Business Center in writing of the intent not to submit additional information.

(d) Should the Planning and Development Services Business Center receive a request for reconsideration of the need for additional information, Planning and Development Services Business Center shall, within ten (10) days, respond in writing to the applicant. The response shall state whether the Planning and Development Services Business Center is maintaining, withdrawing, or revising the request for additional information.

(e) The sufficiency review shall be complete upon the determination by the Planning and Development Services Business Center that all information needed to review the application has been submitted or upon the receipt from the applicant that no additional information will be forthcoming.

(f) Each member of the review/negotiation team shall be notified of the conclusion of the sufficiency review by the Planning and Development Services Business Center and sent copies of any additional information submitted by the applicant.

5. **Formal Review and Negotiation of a Development Agreement.** Unless otherwise altered, the following review time frames shall apply:

(a) Upon the conclusion of the sufficiency review, each agency on the review/negotiation team shall have ten (10) days to review the complete application and all supportive documentation. Each agency in the review/negotiation team shall then submit to the Planning and Development Services Business Center, their comments and recommendations regarding the disposition of the development agreement application.

(b) Upon receipt of all agency review reports, the Planning and Development Services Business Center shall have ten (10) days to compile a preliminary report. A copy of the preliminary report shall be sent to the applicant and all members of the review/negotiation team.

(c) The Planning and Development Services Business Center shall meet with the applicant and the review/negotiation team for the purpose of discussing the findings and recommendations contained within the preliminary report and to establish the basis for negotiating a mutually acceptable development agreement.

During the negotiations, or at any time prior to the issuance of a final report by the Planning and Development Services Business Center, the applicant may revise the submitted application for a development agreement. However, each additional submittal may initiate a new review period unless this requirement is waived by the Executive Director of the Planning and Development Services Business Center or the Executive Director's designee.

(d) At any time prior to or during the negotiation process, the applicant may be required by the review/negotiation team to prepare and submit a draft development agreement. The review/negotiation team may require inclusion of specific provisions necessary to protect the public interest which may be set forth in a standardized form provided by the County.

If the applicant submits a proposed development agreement, said proposal shall be considered part of the overall application for a development agreement. Therefore and unless otherwise notified, fifteen (15) copies of the proposed development agreement shall be
Incorporating TDM into the Land Development Process

submitted to the Planning and Development Services Business Center for distribution and review by the review/negotiation team. Each member of the review/negotiation team shall then submit to the Planning and Development Services Business Center comments and recommendations on the proposed development agreement.

(e) The applicant may, at any time prior to or during the negotiation process, elect not to negotiate further and have the application and any draft of a development agreement presented to the Planning Commission, if applicable, and to the Board.

(f) Upon completion of a negotiated development agreement or the review of the applicant's proposed development agreement and the election by the applicant pursuant to (c) above, the Planning and Development Services Business Center shall issue a final report on the application for a development agreement and set a date and time for the required public hearings. No amendments to the application shall be accepted from the applicant beyond this point in time.

6. Public Hearings. The Planning and Development Services Business Center report and recommendations regarding the proposed development agreement shall be presented to the Planning Commission, if applicable, and to the Board for consideration during a noticed public hearing(s). The applicant shall have the right, prior to the close of the public hearings, to respond to contentions advanced as part of any testimony or other evidence presented during the public hearing.

After the close of the public hearing, the Board, in the exercise of its legislative discretion, may approve the development agreement as proposed, approve the development agreement with amendments, or deny the development agreement.

In the event the petitioner has the proceedings before the Planning Commission or the Board taken down by a certified court reporter, pursuant to F.S. 286.0105, the County may require the filing of the transcript of such proceedings, and the decision of the Board shall be rendered within (30) calendar days of the filing of the transcript.

G. Annual review procedures.

1. Filing an Annual Monitoring Report. As required in a legally executed development agreement, any person with a legal or equitable interest in land for which said development agreement was entered into with Sarasota County, or their authorized representative shall submit ten (10) copies of an annual monitoring report to the Planning and Development Services Business Center for review. This report shall be submitted by the date specified in the adopted development agreement and each year thereof, until such times as the terms and conditions of the development agreement are satisfied. This report shall contain:

   (a) Any changes in the plan of development, or in the representations contained in the development agreement, or in the phasing for the reporting year and for the next year;
   (b) A summary comparison of development activity proposed and actually developed;
   (c) The identification of undeveloped tracts of land, other than individual single family lots, that have been sold to a separate entity or developer;
   (d) An assessment of the level of compliance with the conditions contained in the development agreement by the developer, the local government and if applicable, third party(s);
   (e) Any indication of change in local jurisdiction by reason of annexation for any portion of the development in the reporting year or the following year;
   (f) A list of local, state or federal permits which have been obtained or which are pending by agency, type of permit, permit number, and purpose of permit; and
   (g) The identification of any changes in local, state or federal legislation substantially affecting compliance with the development agreement.
Failure to submit an annual report or the deliberate misrepresentation or the use of gross inaccuracies in the report may be grounds for the initiation of proceedings to amend or cancel the development agreement.

2. Annual Development Agreement Review.
   (a) Within five (5) days of receipt of the annual monitoring report, the Planning and Development Services Business Center shall send a copy of the submitted report to each of the review agencies for their review, analysis, and comments.
   (b) Reviewing agencies, upon receipt of the submitted report, will have fifteen (15) days to evaluate the report and issue comments to Planning and Development Services Business Center. All review agencies must respond with a written report or comments. The review shall address the following:
      (1) The completeness and accuracy of the information contained within the submitted document;
      (2) The degree of compliance with the terms of the development agreement; and
      (3) The identification of any substantial changes warranting an amendment or cancellation of the development agreements.
   (c) Upon receipt of all review agency comments, the Planning and Development Services Business Center shall, within ten (10) days, issue a formal report on the findings of the annual review and issue a determination of compliance with the terms of the development agreement. This report shall be sent to the owner or authorized agent and shall be available for public inspection at the Planning and Development Services Business Center.
   (d) The owner(s) or authorized representative of the land which submitted the monitoring report may request, in writing, a meeting with the Planning and Development Services Business Center to discuss the contents of the report.

3. Determination of Noncompliance. In the event that it is determined that there has been a failure to comply with the terms of the development agreement, the Planning and Development Services Business Center may find the use of the land is not in compliance with the development agreement. Should the Planning and Development Services Business Center issue a finding of noncompliance, the Planning and Development Services Business Center shall submit as an agenda item at a regularly scheduled meeting of the Board of County Commissioners a request to initiate proceedings to amend or cancel the development agreement.

H. Procedures to amend or cancel development agreements.
   An application to amend or cancel an adopted development agreement may be initiated by the Planning and Development Services Business Center, the owner of real property for which a development agreement has been adopted or any third party to a development agreement. An amendment or cancellation of a development agreement may be initiated under the following conditions: following a proposed change by the owner; the adoption of state or federal laws preventing the carrying out of the development agreement; following the completion of an annual review; or a proposal to apply subsequently adopted local laws and policies to a development agreement pursuant to Section 5.B. of Ordinance No. 2004-086 [section 94-265(b)].

Applications to amend or cancel a development agreement shall conform to the general and procedural requirements for the processing of a development agreement. In addition, the following regulations shall apply:
1. Filing an Application to Amend or Cancel a Development Agreement with Sarasota County. Applications to amend a development agreement must contain all information required by the Development agreement application form relating to the requested amendment. Applications to
cancel the development agreement must include sufficient justification warranting the cancellation of such agreement.

2. Formal Staff Review. Where the proposal is for a cancellation of an adopted development agreement, the allotted twenty (20) day staff review period may be reduced.

I. **Schedule of fees.**
The Board shall by resolution establish a schedule of fees for the filing, processing and reviewing of, or an amendment to or cancellation of a development agreement, or the annual review of a development agreement and related documents submitted to the County pursuant to the Development Agreement Act and these regulations. The fee as established shall be collected and administered in the manner prescribed by Sarasota County Ordinance No. 85-91 as amended, and Resolution No. 90-212, as the same as may be amended from time to time.

(Ord. No. 2004-086, 10-12-2004)
APPENDIX B: DEVELOPMENTS OF REGIONAL IMPACT AND THE FDOT SITE IMPACT ANALYSIS METHODOLOGY

Excerpted from “Land Developer Participation in Providing for Bus Transit Facilities/Operations”. Funded by the National Center for Transit Research. Sponsored by the Florida Department of Transportation. Prepared by the Center for Urban Transportation Research, University of South Florida.

It is important to examine developments of regional impact (DRI) in this report because DRIs usually represent the largest developments and as such, have the greater potential impact on land development patterns and the opportunity to influence the development of the transportation system. The development of regional impact review process is concerned with identifying multi-jurisdictional impacts of development and establishing mitigative conditions under which building activity may be permitted to proceed. The structured DRI review process facilitates capital improvements planning.

A Florida Development of Regional Impact (DRI) is any development that, because of its character, magnitude, or location would have a substantial effect upon the health, safety, or welfare of citizens of more than one county [Chapter 380.06, F.S.]. There are different types of DRIs, including the following.

- Areawide DRIs, in which there are two or more development projects represented by separate property owners
- Downtown DRIs
- DRI Master Plan, in which construction is in phases over an extended period of time

DRIs are established by Chapter 380, F.S., which authorizes the Florida Department of Community Affairs to develop land and water management policies to guide local decisions relating to growth and development. DRIs are implemented by rules in the Florida Administrative Code, Chapter 9J-2.

The DRI designation of a land development proposal initiates a review process, in which the regional planning council, the state and other agencies have an opportunity to provide recommendations to the local government in the drafting of conditions attached to a local government development order for assuring that regional impacts have been properly addressed [A local government development order is any order granting, denying, or granting with conditions, an application for a development permit, whereas a development permit includes any building permit, zoning permit, plat approval, or rezoning, certification, variance, or other action having the effect of permitting development activity to proceed, as defined in Chapter 380, F.S.]. The regional impact review includes the documentation of impacts upon transportation as part of an Application for Development Approval (ADA), which must be approved by the Department of Community Affairs.

Transit service is addressed in the ADA question, “What provisions, including but not limited to sidewalks, bicycle paths, internal shuttles, ridesharing, and public transit, will be made for the movement of people by means other than private automobile? Refer to internal design, site planning, parking provisions, location, etc."

The end result of the DRI process is a resolution passed by the host municipality, rendering a development order (DO) in response to an Application for Development Approval submitted for a project that has been determined to be a development of regional impact. The DO must be consistent with Chapter 380, F.S., Rule 9J-2 F.A.C., the local government comprehensive plan, the strategic regional policy plan, and the state comprehensive plan.
Fourteen types of projects may be DRIs if they exceed specific size thresholds. These development types include airports, hospitals, and hotels, as well as industrial, office, retail, residential, and multi-use developments. Thresholds for determining DRI status include building square footage, acreage, and parking requirements.

If a project is determined to have a transportation impact, then a separate traffic methodology meeting must be held. This allows the regional planning council, the Florida Department of Transportation, the Florida Department of Community Affairs (DCA), the local government, and the applicant to decide on a mutually acceptable methodology for identifying a project’s transportation impacts, thus saving time and simplifying the process.

Rule 9J-2.045(7)(a)1-5, Florida Administrative Code, lists the following measures that can be used to mitigate transportation impacts and which reasonably assure that public transportation facilities will be constructed and made available when needed to accommodate the impacts of the proposed development, consistent with Chapters 163 and 380, F.S.:

- scheduling of facility improvements
- alternative concurrency provisions
- proportionate share payments for roadway improvements based upon peak hour roadway trips generated.
- level of service monitoring with binding commitments for needed improvements
- a combination of the above mitigation measures, OR the provision for capital facilities for mass transit [e.g. buses for fixed route service, vehicles for vanpool or ride share programs]

Through the DRI process, RPCs in Florida have recommended to local governments a number of conditions as part of a DRI development order, that the developer:

- consult with the transit agency to determine the transit related needs to serve the project and coordinate with any plans to extend transit to the project;
- be financially responsible for any implementation of on-site amenities;
- establish a transportation systems management plan that includes use of bus transit as a means to reduce project-related p.m. peak hour automobile trips;
- coordinate with the city to promote transportation demand management strategies; and,
- when transit is already available to the site, build bus turnout bays and reasonably sized bus shelters along public roadways to serve the development, as required by the local government, or provide the transit agency with the funds to do it.

For approving a development order that requires developer exaction, the local government must comply with Paragraphs 380.06(15)(d), (e), and Subsection 380.06(16), Florida Statutes, which are similar to requirements for impact fees.

The Florida Statutes state that DRI developments must pay their proportionate share only if non-DRIs are required to pay also. The law further states that developers cannot be charged twice for the same impact. The key for a land developer to fund transit is to demonstrate that impacts would be mitigated by doing so. The existing DRI process instructs the developer to use professionally accepted methods for assessing level of service (LOS). The tools of analysis available for determining level of service are mode specific. Most commonly in use is the Highway Capacity Manual method for determining roadway level of service. Recommended development order conditions regarding bus transit generally assume that the local government or local transit provider will run a bus route past the development site, if they are not already doing so.
FDOT Procedures for Site Impact Analysis

Proposed developments that do not meet the size thresholds constituting a DRI do not require site impact review by FDOT.

The FDOT procedure for site impact analysis is a process that is specifically geared toward determining a new development’s roadway traffic impacts upon the State Highway System and the Florida Interstate Highway System. Most FDOT activities relating to site impact assessment originate from amendments to the future land use map (FLUM) of the comprehensive plan and amendments to the comprehensive plan due to a proposed development of regional impact (DRI).

The estimated traffic impact is the basis for determining the developer’s fair share cost in contributing to roadway improvements that are necessary to maintaining roadway level of service. Considerations about transit usually only arise in relation to the ability of alternative modes to serve some of the new trips generated by the development, lessening the impact to roadway level of service.

According to FDOT’s Standard Site Impact Procedures, there is a process composed of several steps, conducted in this order:

1. Methodology Development
2. Existing Conditions Analysis
3. Background Traffic
4. Trip Generation
5. Trip Distribution
6. Mode Split
7. Assignment
8. Future Conditions Analysis
9. Mitigation Analysis, if necessary
10. Site Access, Circulation and Parking
11. Review and Permitting

It is the applicant who proposes a methodology for reviewers’ concurrence for determining site impact. The study area, also called the area of influence, is typically estimated using professional judgment and then refined during the study process. The DCA rule for DRIs requires that the study area include all facilities where traffic generated by the proposed development is equivalent to 5 percent of the maximum service volume at the LOS standard for the facility.

The methodology for determining the developer’s fair share for funding of mitigation improvements is identified in the Methodology Development (Step 1) phase of the impact analysis. The fair share is determined in relationship to the number of trips generated by the development and the capacities on an affected roadway segment.

Step 2, the Existing Conditions Analysis, includes a review of existing transit service and transit ridership.

Step 4, Trip Generation, is a separate step conducted before the estimation of person trips. Trip generation characterizes person trips as motor vehicle movements and it is considered to be the most critical stage in the site impact analysis. The amount of travel that uses modes other than automobiles is estimated using regional and local guidelines based upon existing transit usage. As a result, 3 to 5 percent is considered a maximum realistic share of travel for modes other than automobiles.
Step 6, mode split, is the analysis portion that estimates the amount of travel in person trips that will use the various modes available to the site.

References to transit appear again in Step 9, the mitigation analysis, in which the measures proposed must clearly demonstrate that they contribute to reducing traffic congestion along facilities where LOS has been made unacceptable upon the addition of the new development. The mitigation analysis includes a plan that details system improvements necessary with the phasing of the project and identifies the responsible party for implementing the improvements. Improvements typically include some combination of physical or operational changes to the roadway facilities, transportation demand management strategies, and fair share contributions by the developer.

Under Mitigation Analysis, various examples of mitigation measures are listed, including construction of new facilities and addition of general-use lanes. Where the construction of new facilities are considered, enhancements for the use of transit, such as geometric and operational improvements to accommodate bus travel are encouraged. Other encouraged mitigation measures include enhancements for the use of transit, such as the construction of park and ride lots, the construction of bus shelters and turn-out bays. The measures also include high occupancy vehicle (HOV) treatments such as the construction of HOV access ramps and the implementation of HOV priority lanes. Public transit operational improvements are other available mitigation measures. These improvements include new or modified service routes and employer subsidized transit. This measure can be used if it can be demonstrated that the necessary agreements are in place with the local transit agency and that the strategy can be demonstrated to cause a mode split shift toward transit. Transportation demand management techniques, such as providing transit subsidies, are recognized as having potential to reduce site traffic. A monitoring plan is usually put in place to measure effectiveness.

The mitigation analysis demonstrates that the proposed improvements will result in an acceptable operating condition along the roadway. The calculation of the proportionate share contribution is based upon a formula, as provided in the Florida Administrative Code. The final fee and mitigation fee considered is typically negotiated among the applicant, local governments, regional planning councils and FDOT if state highway improvements are involved.

A Summary of Stipulated Conditions Relating to Bus Transit

All RPCs in Florida were contacted with the request to provide best examples of RPC recommendations for the provision of bus service. The list below is a synthesis of conditions that RPCs in Florida have recommended to local governments as part of a DRI development order. These include recommendations that the developer do the following.

- Consult with the transit agency to determine the transit related needs to serve the project and coordinate with any plans to extend transit to the project.
- Be financially responsible for any implementation of on-site amenities.
- Establish a transportation systems management plan that includes use of bus transit as a means to reduce project-related p.m. peak hour automobile trips.
- Coordinate with the city to promote transportation demand management strategies.
- When transit is already available to the site, build bus turnout bays and reasonably-sized bus shelters along public roadways to serve the development, as required by the local government, or provide the transit agency with the funds to do so.
- Subsidize a bus route to a new mall and provide bus drop-off at the front entrance.
- Provide a parcel within the development for a transit stop that can accommodate multiple buses at one time.
• In public gathering places, provide a place where transit information can be prominently displayed.
• Encourage tenants and owners within the employment centers to provide preferential parking for vanpools/carpools.
• Disseminate information to tenants and residents about local ridesharing programs.
• Some period of time after the issuance of the development order, propose transit-related actions, facilities, and sites to the municipality and transit agency.
• Consider paying the cost for an additional bus route to the DRI or increased frequency on existing routes during later phases of construction.
• Maximize access by interconnecting parcels within the development and providing road linkages to the local street system.
• Provide park and ride spaces proximate to a multi-bus transit stop, either in conjunction with commercial development or by purchase of property.
• Designate a part-time ride share coordinator to distribute transit information.
• Include transit-oriented design (TOD) features into the project design, as specified by a transit agency design manual, such as covered pedestrian walkways linking buildings to transit stops.
• Establish a transportation management association to implement trip reduction programs within the DRI.
• Provide sidewalk access between transit stops and nearby residential and commercial development.

The Development of Regional Impact (DRI) review process focuses upon identifying impacts to the existing roadway system. DRIs are often located on large tracts of undeveloped land to which transit service has not yet extended. Developers will seek less costly undeveloped land, on the suburban fringe, where there is usually little or no transit service but is attractive because of market accessibility by the existing road system. As the suburb-to-suburb home-to-work travel pattern expands with increasing suburbanization, some transit agencies are withdrawing poorly used bus service extensions from new developments to downtowns in favor of focusing on service enhancements to existing well-used bus routes serving neighborhoods closer to the urban core.

Under the current DRI review process, level of transportation service is measured in terms of roadway capacity. Alternative transportation, such as ridesharing and transit, are identified as part of Transportation Systems Management (TSM) strategies for the purpose of mitigating development impacts on roadways rather than as a mode of transportation with its own level of service (LOS) standards. This necessarily leads to a determination of improvements, to be accomplished by the developer, which are intended to restore roadway LOS rather than improving use of transit as a mobility solution to the new development.

For example, the DRI Application for Development Approval (ADA) emphasizes and provides detailed instructions on quantifying the impacts to roadways as part of Question 21—Transportation. At the end of Question 21, after parts A through H addressing quantifying roadway impacts have been addressed, there is the general question:

What provisions, including but not limited to sidewalks, bicycle paths, internal shuttles, ridesharing and public transit, will be made for the movement of people by means other than private automobile? Refer to internal design, site planning, parking provisions, location, etc.
Alternative modes are a procedural afterthought and it is implied that not much attention is expected by the developer to seriously consider other modes of transportation. All other modes, each having very different characteristics, are combined into one “other than automobile...” category for purposes of review. The Application for Development Approval provides further instructions:

The applicant must clearly document any estimate of mode split to transit or non-motorized transportation. The proposed usage should also be supported through an agreement with the transit agency and an acceptable internal roadway design... Change in mode split must be supported by the developer based on data collected on projects of similar intensity and use.

The burden of proof is placed upon the underdeveloped alternative mode, to demonstrate a shift in mode split. The new project is not likely to be permitted to set a precedent, if projects of similar intensity and use that demonstrate a higher transit mode share cannot be found.

Despite the limitations of the current Application for Development Approval, the DRI process has the potential to be an opportunity to guide DRIs in a positive direction toward State Comprehensive Plan goals for a truly balanced transportation system.

Developers must submit annual reports regarding the phased development of DRIs, which must identify modifications that are consistent with the plans and policies of the local host municipality, the Florida Department of Transportation, and the metropolitan planning organization. This places the responsibility upon these state and local agencies to have plans and policies that set the tone for improving transit. One way to accomplish this is for the provisions of Florida Administrative Code 9J-2.045 and the instructions for determining impacts as part of the ADA to be updated to include new methods for measuring multi-modal level of service. The F.A.C. guidance and ADA instructions should be updated as these methods are refined in the future by the Florida Department of Transportation.

Other hurdles in elevating the use of public transit improvements to address the transportation impacts of DRIs are:

- providing public bus transit improvements that can be demonstrated to specifically benefit the particular DRI contributing funds, and
- demonstrating that those particular transit improvements cause a mode shift to transit.

Transportation improvements, as provided by developers, must meet certain tests as provided by state law. These tests are similar to those provided for impact fees, regardless of whether a local government has adopted an impact fee ordinance or not. These tests are that [Chapters 380.06(15)(d) and (e) and 380.06(16), F.S.]:

- The transportation need that must be mitigated must be attributable to the proposed development paying for the mitigation.
- The amount of the contribution must correspond to the amount needed to mitigate the impacts from the development.
- The funds must go toward improvements to serve that development.
- Developers of DRIs cannot be required to contribute funds for mitigation unless the host local government has an ordinance in place requiring non-DRIs to mitigate their impacts.
- Developers of DRIs cannot be charged twice to mitigate for the same impacts, as in the case that a local host government charges impact fees.
These requirements pose special difficulties for developers to provide transit improvements as mitigation for the transportation impacts of a DRI. For example, if a high quality bus service, commensurate with highway level of service, is not in place, then it is not possible to reasonably estimate the need for transit service by a new development unless there is a way to measure latent demand for transit service. As a result, a very low number of bus trips is estimated. Consequently, a small amount of money or capital facilities is estimated to pay for bus mode share. Funds must be demonstrated to benefit the development. If there is an impact fee ordinance in place, then funds cannot go toward bus operations. This leaves capital facilities—bus shelters are the likely choice.

The *Transit Capacity and Quality of Service Manual* already assigns bus shelters as an amenity and not a necessary element of bus service availability. Bus shelters do not accomplish much if bus service is not available.

If funds can go toward operations, it is possible to quantify a cost of bus service to cover bus operations to serve those generated trips only; however, this still would not help if bus service does not yet extend out to the DRI. If effective bus transit service does not already exist in the area, then it is not possible to pay some incremental bus transit cost, commensurate with the number of new trips generated by a development, such that the new development benefits from the fees paid.

It is recommended that there to be some means to enable local governments to charge development for bus transit improvements that do not necessarily serve that development, but can be applied to bus routes that may be extended to serve the development in the future.

Whether the development is a DRI or not, the contribution should be consistent with the intent to provide transportation facilities concurrent with the impact of development and to maintain a transportation LOS, commensurate with the mobility demand generated by the development.

To reinforce the desired results of engaging land developers to pay for bus transit improvements as part of the DRI process, local governments should make full use of the planning and regulatory processes available to them to guide development toward locations where it is efficient to provide transit service.

These include:

- the long range transportation planning process and the transportation improvement plan of the MPO,
- the local government comprehensive planning process,
- urban development boundaries, and
- zoning and other tools within the land development code.

Additionally, local governments could provide disincentives for a development that is located outside the existing or planned service area of transit, while offering incentives that make it more desirable to build in areas within the existing and planned bus service area.
APPENDIX C: PINELLAS COUNTY LRTP TDM POLICIES

From the Pinellas County 2025 Long Range Transportation Plan Update. Metropolitan Planning Organization, Pinellas County, FL, October 2004.

Transportation Demand Management

1.7. Objective: Reduce traffic congestion and positively impact air quality by decreasing the use of the single occupant vehicle (SOV) at peak hours.

1.7.1. Policy: The MPO shall work with local governments, transportation demand management (TDM) agencies and FDOT to develop vehicle trip (VT) reduction and vehicle miles of travel (VMT) reduction goals.

1.7.2. Policy: The MPO shall assist and support the efforts of Bay Area Commuter Services (BACS) to implement and achieve the goals of its Long Range Transportation Demand Management Plan and to carry out recommended actions derived from related studies.

1.7.3. Policy: The MPO shall assist and encourage the efforts of local TDM agencies by providing technical and funding support for promotion of alternatives to SOV travel, including carpool, vanpool, transit, walking, bicycling, telecommuting and variable work schedules.

1.7.4. Policy: The MPO shall continue to participate in events and other activities sponsored by local transportation-related agencies that support and facilitate the use of alternatives to driving alone by commuters and other travelers (e.g., Commuter Choices Week, B-BOPP, Tampa Bay Commuter, etc.).

1.7.5. Policy: The MPO shall work with transportation agencies and local governments to encourage non-work trips to be made at times other than peak to assist in the reduction of traffic congestion during those periods.

1.7.6. Policy: The MPO shall work with transportation agencies and local governments to encourage those using non-work trips to use public transportation and/or other forms of ridesharing (i.e., carpool and vanpool) whenever possible.

1.7.7. Policy: The MPO shall encourage and participate in public-private partnerships and develop incentives to encourage employer, developer and other organizations’ participation in meeting the mobility needs of County residents, visitors and businesses.

1.7.8. Policy: The MPO shall work with transportation-related agencies and local governments to encourage, promote and support employer participation in qualified transportation fringe benefit allowed under the federal IRS Code to provide tax-deductible public transportation benefits to their employees.

1.7.9. Policy: The MPO shall work with local governments, TDM agencies, employers and developers to encourage and implement effective parking management strategies, including preferential parking for carpools and vanpools, shared use parking and variable parking pricing.

1.7.10. Policy: The MPO shall provide policy direction and implementation support to city and county traffic departments, TDM agencies, FDOT and state/local emergency and police departments to maintain the flow of people and goods during major reconstruction of highway facilities.
1.7.11. Policy: The MPO shall continue to work with the Pinellas County School Board, private schools and Bay Area Commuter Services to expand the school based carpool program and to encourage the use of non-motorized modes to reduce traffic congestion in and around schools and improve safety of our children.

1.7.12. Policy: The MPO shall encourage the development of a telecommunication infrastructure to provide universal service access to all citizens for expanding educational opportunities via distance learning, obtaining medical information via telemedicine, increasing commerce via the purchase of goods by online shopping, and creating job opportunities via telework. These elements will foster economic development by helping citizens and businesses move intellectual property, data and information electronically. This policy is intended to reduce or even eliminate the need to travel for these purposes.

1.7.13. Policy: The MPO shall encourage opportunities for advancement in telecommunications and other technologies and their impacts on travel behavior to identify other means for meeting some of the transportation needs of County residents and businesses.

1.7.14. Policy: The MPO shall encourage the business community to adopt telecommunication solutions such as web conferencing and telecommuting in order to substitute for some of their needs to travel by private vehicle and/or complement the transportation needs.
APPENDIX D: CITY OF SARASOTA TDM POLICIES

From the Sarasota City Plan Transportation Chapter. City of Sarasota, Florida. November 1998. Only the objectives and policies directly referring to transportation demand management have been reproduced below.

Objective 1 - Level-of-Service for Safe, Convenient and Efficient Transportation System
To continue to provide a safe, convenient and efficient transportation system with a level-of-service that sustains the City’s natural, aesthetic, social and economic resources.

1.4 Effect of Projected Deficiencies on Future Land Use: The City shall ensure that development which increases traffic on roads which are backlogged, constrained or projected to be at deficient levels of service by 2010 be required to provide:
   - either conventional mitigation measures; and/or
   - a Transportation Demand Management or Transportation Systems Management plan for approval by the City Engineer.

1.5 LOS Study for Below Standard Thoroughfares: The City, in cooperation with the Metropolitan Planning Organization’s Congestion Management Task Force, will study and recommend specific roadway improvements, TSM and TDM measures, to alleviate congestion on thoroughfares whose LOS is, or is projected to be, below adopted standard.

1.23 Use of Transportation Systems Management (TSM) and Transportation Demand Management (TDM) to Remedy LOS Deficiencies: The City will pursue TSM and TDM measures, as appropriate, to remedy existing and projected Level-of-Service (LOS) deficiencies.

Objective 2 - Alternative Modes of Transportation
The City shall continue to provide for alternative modes of transportation, in coordination with other units of local government and the private sector, including handicapped-accessible mass transit to all existing and proposed major trip generators.

2.2 Transportation Demand Management Mitigation (TDM) Credits: The City will consider developing, in the Land Development Regulations, a mitigation bonus schedule for transit-oriented development, mixed use development, home-occupation-related development, and other commitments included in requests for development that reduce single-occupant motor vehicle trips.

2.6 Alternatives To Fixed-Route Services: The City, in conjunction with the Metropolitan Planning Organization, will examine Transportation Demand Management alternatives to supplement or complement certain Sarasota County Area Transit services. These include vanpooling for long-distance commuters, demand-responsive para-transit services to bus route outer termini, station cars, and privatization of services.

Objective 5 - A Transportation System to Enhance and Preserve City Neighborhoods
The City will continue to develop a transportation system which helps preserve and enhance the City’s neighborhoods.

5.3 Transportation Demand Management Bonuses: The City should consider reducing parking requirements in the Land Development Regulations for development that:
Incorporating TDM into the Land Development Process

- commits to a trip reduction program through a Transportation Demand Management program approved by the City; and/or
- demonstrate that time-shared parking with other nearby land uses reduces the number of spaces required at any one time.

**Objective 8 - Transportation Concurrency Exception Area (TCEA)**
The City shall manage transportation concurrency within the City’s Community Redevelopment Area (CRA), as defined in Illustration T-12A, through the use of a Transportation Concurrency Exception Area (TCEA). The purpose of the TCEA is to encourage the development of compact, dense and mixed uses in the CRA by replacing standard concurrency requirements with TCEA regulations.

The transportation and mobility needs within the TCEA shall be met through the following Action Strategies as an alternative to the statutory concurrency requirements.

8.1 **Interim Standards:** The City will apply the following interim transitional standards to development within the TCEA until the Sarasota City Plan is amended to provide permanent standards for concurrency requirements within the TCEA. The cumulative impact of any new development shall not:

- exceed 15% of the AADT on the effective date of the plan for roads which are operating at LOS “E” or “F”;
- degrade LOS below “E” for roads operating at LOS “D.”

LOS shall be calculated for the directional, peak hour LOS on any roadway impacted by the project seeking concurrency. An “impacted roadway” is defined as any roadway where traffic volume from the proposed development exceeds 4 ½ % of that roadway’s maximum service capacity at LOS “D”. The calculations shall use the software and formulas derived from the latest edition of the Highway Capacity Manual, published by the Transportation Research Board:

- Transportation facilities needed to serve new development shall be in place or under actual construction no more than 5 years after issuance of a certificate of occupancy when the cost of such transportation facilities exceeds $400,000.00.
- Transportation facilities needed to serve new development shall be in place or under actual construction no more than 3 years after issuance of a certificate of occupancy when the cost of such transportation facilities is $400,000.00 or less.
- In lieu of traditional mitigation, (i.e. roadway improvements), developers may be allowed to mitigate up to 30% of new trips by using proven TDM programs with verifiable results. “Verifiable results” shall mean that it is possible to quantify the number of new trips which are eliminated by the use of TDM measures. The City shall have the discretion to determine the appropriate percentage of new trips to be mitigated in this manner up to the 30% maximum.
- Developers may be required to participate in a Transportation Management Organization (TMO) as a condition precedent to the issuance of a development permit; and,
- Developers shall prepare and submit traffic circulation plans including ingress and egress from and to adjacent roadways for automobiles, trucks and delivery vehicles, pedestrian, mass transit, and bicycles.
- Traffic circulation plans shall be reviewed and approved by the City Engineer.
- Development agreements which commit the developer to make specified transportation improvements may be required as a condition precedent to the issuance of a development permit. Development agreements may also require the developer to participate in TSM and TDM programs.

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- Non-de minimis developments will still be required to perform traffic studies to estimate their compliance with the LOS standards. If these studies estimate that a development traffic impact does not meet the new LOS standards, the City shall require enforceable development agreements which commit the developer to make certain improvements to meet those standards.

During this interim period, developments which cannot meet the above standards shall not be approved.

8.6 **Transportation Demand Management (TDM) Developer Requirements:** The City shall study the feasibility of amending the LDRs to require any development locating within the TCEA to implement and maintain a trip reduction program and/or to pay into a TDM trust fund if the impact of such development on any segment of roadway within the TCEA would exceed 4.5% of that roadway’s two-way service volume at LOS “D.”

8.7 **Transportation Management Organization:** In cooperation with the Sarasota Downtown Association and residents within the TCEA, the City shall pursue establishing a Transportation Management Organization (TMO) to make recommendations to the City Commission concerning Transportation Systems Management and Transportation Demand Management strategies. Such recommendations may include both implementation of new strategies and modification of existing strategies.
APPENDIX E: TRAFFIC IMPACT FEE REDUCTION INCENTIVES, CLARK COUNTY, WASHINGTON

(These incentives were never implemented and later repealed.)

### Traffic Impact Fee (TIF) Reduction Incentives for Transit Supportive Zoning District

<table>
<thead>
<tr>
<th>ACTION</th>
<th>TIF REDUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development within the Transit Supportive Zoning District*</td>
<td>2%</td>
</tr>
<tr>
<td>Construction of on-site but off-road internal pedestrian/bicycle network</td>
<td>12%</td>
</tr>
<tr>
<td>Construction of direct walkway connections to the nearest arterial for non-abutting developments</td>
<td>3%</td>
</tr>
<tr>
<td>Commercial Development which would be occupied by an employer subject to, and complying with, section [___]</td>
<td>4%</td>
</tr>
<tr>
<td>Direct pedestrian/bicycle connection to destination activity (such as a commercial/retail facility, park, or school) if residential development, or to origin activity (such as a residential area) if commercial/retail facility</td>
<td>2%</td>
</tr>
<tr>
<td>Installation of on-site sheltered transit stop (with current or planned service or bus stop within ¼ mile of site with adequate walkways if approved by [local government transit agency])</td>
<td>1%</td>
</tr>
<tr>
<td>Installation of one secure bike parking space per 10 vehicular parking stalls</td>
<td>1%</td>
</tr>
<tr>
<td>Connection to existing or future regional shared use path (either 1% directly, or by existing, safe access)</td>
<td>1%</td>
</tr>
<tr>
<td>Development of a trip reduction plan to be implemented by property management</td>
<td>5%</td>
</tr>
<tr>
<td>Designation of ten (10) percent of all non-residential parking as carpool/vanpool parking facilities if located in a manner maximizing accessibility subject to ADA requirements**</td>
<td>1%</td>
</tr>
<tr>
<td>Total if all strategies were implemented</td>
<td>22%</td>
</tr>
</tbody>
</table>

* Automatic reduction for developing within Transit Supportive Zoning District and compliance with the provisions of this Ordinance.

** Requires regular maintenance.

### Traffic Impact Fee (TIF) Reduction Incentives for Mixed Use Districts

<table>
<thead>
<tr>
<th>ACTION</th>
<th>TIF REDUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of direct walkway connection to the nearest arterial</td>
<td>1%</td>
</tr>
<tr>
<td>Installation of on-site sheltered bus-stop (with current or planned service) or bus stop within ¼ mile of site with adequate walkways if approved by C-TRAN</td>
<td>1%</td>
</tr>
<tr>
<td>Installation of bike lockers</td>
<td>1%</td>
</tr>
<tr>
<td>Connection to existing or future regional bike trail</td>
<td>1%</td>
</tr>
<tr>
<td>Direct walk/bikeway connection to destination activity (such as a commercial/retail facility, park, or school) if residential development, or to origin activity (such as a residential area) if commercial/retail facility</td>
<td>1% (if existing) 2% (if constructed)</td>
</tr>
<tr>
<td>Installation of parking spaces which will become paid parking (by resident or employee)</td>
<td>3%</td>
</tr>
<tr>
<td>Installation of preferential carpool/vanpool parking facilities⁷</td>
<td>1%</td>
</tr>
<tr>
<td>Total if all strategies were implemented</td>
<td>10%</td>
</tr>
</tbody>
</table>

⁷ Automatic reduction for developing within the mixed use district
APPENDIX F: COMPREHENSIVE TRANSPORTATION REVIEW METHODOLOGY, CITY OF ROCKVILLE, MARYLAND

- Comprehensive Transportation Review Methodology. City of Rockville, Maryland. This methodology is designed to evaluate the impacts of new development on the transportation system, to determine mitigation for alternative modes and to assign corresponding “trip” credits.

City of Rockville, Maryland

Contact: Katherine Kelly
Transportation Planner - Department of Public Works
240-314-8527
kkelly@rockvillemd.gov, www.rockvillemd.gov

The City of Rockville, Maryland is located in the Washington DC metropolitan area and is characterized by lower density suburban style development. Given the regional context, the City experiences a significant amount of through traffic on its major thoroughfares. The Transportation Plan describes the City as follows:

“The suburban nature of many areas in Rockville makes people dependent on the automobile. Residential neighborhoods are separated from commercial areas. Cul-de-sacs and dead end streets divide uses that are physically proximate. Some neighborhoods have no sidewalk or walkway system. There is competition between the automobile and pedestrians at intersections. All of these factors force many residents to disregard walking as a viable means of transportation.”

As a result, Rockville is moving away from mitigation measures related primarily to providing additional roadway capacity through physical improvements and is encouraging mitigation for alternative modes (e.g. ridesharing programs, shuttles to transit stations, installation of pedestrian and bicycle facilities, etc.). Rockville Applicants for developments may be obligated to contribute toward the improvement of offsite transportation and safety facilities to help address identified safety hazards for all modes. As stated in the City Transportation Plan,

“Providing safe, direct pedestrian routes between residential areas and activity centers can help reduce the number of day-to-day vehicle trips. These connections can be created or improved by installing sidewalks, adding paths to link cul-de-sacs and dead end streets, installing pedestrian signals and crosswalks, or by constructing pedestrian bridges over busy roadways. Treatments, such as lighting, landscaped buffer areas and other streetscape improvements, can heighten safety and make pedestrian facilities more attractive for users.”

The City enacted a Comprehensive Transportation Review (CTR) Methodology in September 2004 to evaluate the impacts of new development on the transportation system, to determine mitigation for alternative modes and to assign corresponding “trip” credits. Because they are deemed to have a measurable traffic impact under the methodology, developments that generate 30 or more total peak hour site trips must conduct an off-site analysis for all transportation modes (see Table F1). Smaller developments evaluate only on-site multimodal access and circulation needs.
The off-site analysis includes an assessment of major intersections that are impacted by the development as well as non-auto facilities that lead to the development. The goal of the off-site analysis is: “to ensure that the site can be accessed safely and efficiently through various modes and that adequate transportation facilities are in place to support the subject development without detriment to the overall transportation system.”

Below is a summary of components of the CTR:

- **Component A—Introduction and Existing Conditions:** Project description.
- **Component B—Site Access & Circulation:** Analysis of internal circulation, entrance configurations, vehicular access and other relevant access and on-site features; the Proposed Site Access and Circulation Transportation Statement; and the Proposed Conditions Site Plan.
- **Component C—Automobile Traffic Analysis (Off-Site):** Analysis of auto traffic using the technical guidelines for traffic analysis in the traffic study area.
- **Component D—Non-Auto Off-Site Analysis:** Analysis of access to the development from activity centers via alternative modes of transportation using the guidelines for creating an inventory of pedestrian, bicycle, and transit facilities in the non-auto study area and for analyzing intersection safety ratings for these modes of transportation.
- **Component E—Summary, Mitigation, and Credits:** Summary of the report findings and impacts; recommended mitigation plans.

<table>
<thead>
<tr>
<th>Total Peak Hour Site Trips*</th>
<th>Required TR Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 30</td>
<td>Component A – Introduction</td>
</tr>
<tr>
<td></td>
<td>Component B – Site Access and Circulation</td>
</tr>
<tr>
<td></td>
<td>Component E – Summary, Mitigation and Credits</td>
</tr>
<tr>
<td>30 or more</td>
<td>All Components Required</td>
</tr>
</tbody>
</table>

* Peak hour site trips are calculated using the trip generation rates referenced in Section IIIC5.
* Note: Not all types of development applications are subject to CTR standards. Refer to Table 1 to determine types of development applications that must comply with CTR standards.

Non-Auto On-Site Analysis
The non-auto on-site analysis must address availability of sidewalks and bicycle facilities on the site frontage and in some cases through the site. Bicycle facilities are those identified in the Bicycle Master Plan. Transit facilities are based on projected daily ridership (existing ridership data plus additional ridership projected from the new development).

Non-Auto Off-Site Analysis
The non-auto off-site analysis must address access to the development from activity centers via alternative modes of transportation. Activity centers are defined as “areas with destinations such as schools, shopping, recreational facilities, and other points of attraction.” Under the guidelines, developers must conduct an inventory of pedestrian, bicycle, and transit facilities in the non-auto study area along routes to activity centers within a certain radii of the site, and evaluate intersection safety ratings for these modes of transportation.

Activity center routes to evaluate are determined in coordination with City staff based on “land uses surrounding the access route, volume of activity, and priority of the City to attract persons to the activity center(s).” The extent of the non-auto study area is based on trip generation and a radii based on City analysis of walk sheds to non-auto facilities and national studies of how far individuals will travel to use non-auto facilities (Table F2). The City also designated transit oriented areas (TOAs) where “viable non-auto options exist within 7/10ths of a mile accessible walking distance” from
Incorporating TDM into the Land Development Process

Existing and programmed transit stations and major access routes to transit facilities. TOAs provide for lower LOS thresholds than non-TOAs given the viability of multi-modal options.

### Table F2: Non-Auto Study Areas

<table>
<thead>
<tr>
<th>New Minimum Activity Center Routes Evaluated</th>
<th>30-350</th>
<th>351-500</th>
<th>500+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility to Activity Centers</td>
<td>.25 mile radius</td>
<td>.35 mile radius</td>
<td>.35 mile radius</td>
</tr>
<tr>
<td>TOA Designation</td>
<td>TOA</td>
<td>Non-TOA</td>
<td>TOA</td>
</tr>
</tbody>
</table>

Note: The radii of a study area can be expanded up to .5 mile for developments in TOAs when considering installation of transit facilities. For example, if installation of bus facilities is planned within a TOA, the radii of the study area can be as large as .5 mile for all developments regardless of peak hour site trips generated.

Selected sidewalks and bicycle facilities within the non-auto study area must be evaluated for connectivity from the site to activity centers. The City of Rockville’s *Synthesis of Pedestrian Policies Manual* is used to guide improvements to pedestrian facilities. Determinations of deficiency for bicycle facilities are based on bicycle level of service (BLOS) standards established by the City based on the “levels of comfort” that riders feel on designated facilities. BLOS is calculated based on volume of directional traffic, speed limit, lane width, pavement surface, percentage of heavy vehicles, and other roadway and sidewalk characteristics and conditions.

The City’s goal for the bikeway network is to maintain a Bicycle LOS (BLOS) of “C.” This is accomplished primarily by providing facilities that connect and are accessible. Routes are determined by staff, based on the City’s Bicycle Master Plan [see City of Rockville Bikeway Master Plan Update as adopted April 2004 at http://www.rockvillemd.gov/masterplan/bikeway/index.html]. All bicycle facilities in the City’s Bikeway Master Plan that lie within the non-auto study area, including shared roadways, signed-shared roadways, bike lanes, shared-use paths, or widened sidewalks, must be identified in the inventory.

The transit inventory along activity center routes must include the location of bus routes, frequency of service, hours of operation, existing daily ridership levels, and bus stops and amenities (concrete pad, bench, bus shelter and connectivity to the sidewalk network) at existing and programmed bus stops. The transit inventory must also include lighting features (overhead streetlights) at transit stops and nearby parking areas, as well as availability (posting) of schedules or real-time transit information.

Another interesting feature of the methodology is the requirement for each applicant to conduct an intersection safety analysis for all modes. The intersections to be rated for safety are determined in the scoping meeting, when the non-auto study area is being identified. Each intersection is evaluated and given a rating that ranges from poor to excellent, based on a table of safety rating indicators. Applicants must also determine if intersection crossing times are adequate based on City standards. For example, if the flashing walk time is less than the length of the lanes divided by four (4), then crossing time is deemed inadequate.

**Summary of Development Application Issues and Impacts**

Upon completion of the required multimodal analysis, applicants must summarize all issues and impacts related to site access and circulation, automobile traffic, non-auto facilities and intersection safety. All impacts must be noted in a chart listing impacts on the left and intended mitigating actions on the right.
Mitigation
Trip credits for mitigation are applied against new peak hour site trips before any other trip credits or reductions (apart from pass-by reduction) are applied for the development application. No additional credit will be applied if modal split is used in traffic analyses. Mitigation plans must be approved by the Traffic & Transportation Division and may consist of:

- Implementation of, or monetary contribution towards, proximate physical roadway modifications that increase auto capacity sufficiently to bring LOS to acceptable levels;
- Implementation of, or monetary contribution towards, physical non-auto improvements that appropriately address project-specific impacts through an alternative means, and
- Participation in the City’s TDM Program or alternative TDM program.

Table F3 summarizes types of mitigation an applicant can consider and maximum credits.

<table>
<thead>
<tr>
<th>Mitigation</th>
<th>Maximum Credits Allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-site mitigations to roadway network that a developer offers to implement. Goal is to lessen the impact from trips generated by the development.</td>
<td>Variable credit, depending on improvement</td>
</tr>
<tr>
<td>Off-site mitigations to non-auto facilities that a developer offers to implement. Implementation of a Transportation Demand Management program.</td>
<td>15% of trips 10% of trips</td>
</tr>
</tbody>
</table>

* Note: On-site mitigations (per minimum standards) for access, circulation, pedestrian, bicycle and transit facilities are required and therefore are not eligible for mitigation credits.

The maximum total amount of trip reductions and credits per development application are outlined in Table F4. These are 30% of new peak hour site trips generated in a TOA and 20% of new peak hour site trips generated in a non-TOA, after pass-by trip reduction is applied and before any other trip reduction or credit is applied. Trips are credited against the total trip generation for the site and not at specific intersections and credits differ within and outside of the TOA. However, mitigation will be targeted toward intersections that are impacted by the new development. Drive-through facilities are not eligible for modal split reductions, mixed use reductions, or trip credits but may be eligible for other trip reductions.

<table>
<thead>
<tr>
<th>Type of Trip Reduction or Credit</th>
<th>Maximum Credits Allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modal split reduction</td>
<td>15% TOA  N/A Non-TOA</td>
</tr>
<tr>
<td>Mixed-use development reduction</td>
<td>10% TOA  5% Non-TOA</td>
</tr>
<tr>
<td>Non-auto improvements credits</td>
<td>15% TOA  10% Non-TOA</td>
</tr>
<tr>
<td>TDM credit</td>
<td>15% TOA  10% Non-TOA</td>
</tr>
<tr>
<td>Combined trip reductions and credits ceiling</td>
<td>30% TOA  20% Non-TOA</td>
</tr>
</tbody>
</table>

Applicants are encouraged to mitigate transportation impacts by providing non-auto improvements and modifications to the transportation system. Applicants may receive trip credits only for non-auto improvements approved by the Traffic & Transportation Division that are beyond minimum requirements or that are not already required on site. Trip credits are applied as mitigation according to the rates outlined in Table F5 and may include a combination of facilities, given that certain facilities and programs are more effective in reducing trips than others. Mitigation involving transit facilities must be done in coordination with the Department of Public Works and the regional transit agency, taking into account the effects such facilities may have on operational costs and transit planning.
### Table F5: Maximum Trip Credit Rates for Non-Auto Facilities

<table>
<thead>
<tr>
<th>New Peak Hour Site Trips Generated</th>
<th>30-100</th>
<th>101-200</th>
<th>More than 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility</td>
<td>TOA</td>
<td>Non-TOA</td>
<td>TOA</td>
</tr>
<tr>
<td>Shared bicycle/ped. Path at least 8’ wide, 130’ long</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Sidewalk at least 4’ wide, 130’ long²</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Bicycle lane at least 4’ wide, 130’ long²³⁴</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Indoor shower for bike commuters</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Curb extension at intersection⁵</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bike locker (holds 2 bikes)</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Bike rack (&gt;5 bike slots)</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Concrete pad at bus stop⁶</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Bus bench⁶</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Bus shelters⁷</td>
<td>5</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Bus pull-off⁷</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Multimodal Transit Center⁸</td>
<td>N/A</td>
<td>N/A</td>
<td>25</td>
</tr>
<tr>
<td>Enclosed (indoor)</td>
<td>N/A</td>
<td>N/A</td>
<td>20</td>
</tr>
<tr>
<td>Covered (outdoor)</td>
<td>N/A</td>
<td>N/A</td>
<td>10</td>
</tr>
<tr>
<td>Transit information kiosk¹⁰</td>
<td>7</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Transit information board¹¹</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

¹ “Per facility” refers to the number of credits granted per installation of one facility of the indicated type. Credits are applied above and beyond minimum N/A requirements for adequate public facilities or what is otherwise required on-site.

² When a sidewalk or bike facilities installed is not an exact multiple of 130’ long, remaining fractions will be prorated.

³ Facilities must link to existing or programmed portions of the bicycle network in the Bicycle Master Plan. Total width, length and location will be determined by the Traffic & Transportation Division at time of development approval, based on development type and size.

⁴ Bicycle lanes that require street lane widening will be credited the same amount as shared bicycle/pedestrian paths.

⁵ This facility must decrease the distance pedestrians must travel to cross a street.

⁶ Other than those required in the non-auto study area. Concrete pads must be installed before a bench or shelter is installed. Locations based on ridership numbers and by determination of the Traffic & Transportation Division.

⁷ Bus pull-offs are not desirable along roads classified as arterial due to speed and volume of traffic. Installation of pull-offs will be determined by the Traffic & Transportation Division in coordination with Montgomery County Department of Public Works & Transportation.

⁸ Subsidization of a bus stop, portion of a bus route, or extension of service where service is scheduled to be eliminated by Montgomery County Department of Public Works & Transportation due to low ridership or other factors.

⁹ A facility that is a dedicated space for transit information with a public waiting area. Commercial lobbies do not qualify. Must include no less than 1 seat for a transit resource person and no less than 5 seats in the public waiting area. Must be within .7 mile (3696 feet) of at least two bus stops and/or Metro stations.

¹⁰ A facility with transit information and a resource person but no public waiting area.

¹¹ A facility that includes maps and schedules (when possible) of transit services.

The City also has a transportation demand management (TDM) program and TDM policy, which aim to reduce single-occupancy auto (SOV) trips and implement demand management throughout the City. In a TOA, a maximum of 15% trip credit may be applied for a developer’s implementation of a TDM program (see CTR Appendix L for qualifying activities) and participation in the City’s TDM program. Development in non-TOAs may be eligible for a maximum of 10% TDM trip credit. TDM trip credit is summarized in Table F6.
The City received a Transportation Community Services Program grant (TCSP) from the Federal Highway Administration to assess accessibility to the Town Center. The planning effort will evaluate the accessibility of the Town Center from all portions of Rockville, for existing conditions, the next five years, and through the Master Plan buildout of the area. The analysis will identify strengths and weaknesses in pedestrian, bicycle, transit, automobile, and truck access to the Town Center. Upon completion of the baseline analysis, the project will prioritize implementation of improvements using a Geographic Information Systems (GIS) model and a series of public participation and coordination activities. The findings will be fed into the master planning process.

The methodology was developed as a precursor to adoption of a new adequate public facilities ordinance, which is expected in 2005. Staff indicated that the program is so new, there has not been experience with it. The trip credit amounts were developed based on a review of what other communities are doing (e.g. Orlando, Portland, Montgomery County), as well as based on observations and experiences with multimodal development and mode split in the past. Staff plan to initiate a project this year to monitor outcomes through surveys and other methods so they can determine how well the program is working and the appropriateness of the trip credits.

Although the program offers credits for participating in the City’s TDM program, staff note that “it’s tough to create a standard credit value for TDM because the developments are all so different and in different areas of the City.” Therefore, the credits are highly subjective and determined on a case by case basis based on the feasibility of the potential trip reduction in the given context.

Issues faced in program development include the need for proactive coordination with the County and adjacent jurisdictions. One issue that arose was how best to achieve a continuous multimodal network where an abutting jurisdiction does not have similar requirements. The challenge of developing a coherent multimodal network on a site-by-site basis was another issue that arose. Staff indicated that there is some benefit to both a facility based as well as a policy based approach. The facility based approach is straightforward in that credits can be readily provided for developments that contribute toward development of the facility. The policy based approach, which is administered site-by-site, can then address the more micro issues of site network layout and continuity with adjacent sites.
Integrating Demand Management Into the Transportation Planning Process

**Introduction**

Travel demand management (TDM) has been included in many transportation plans over the past three decades to address key policy objectives, including energy conservation, environmental protection, and congestion reduction. For the purpose of this article, TDM is synonymous and used interchangeably with the terms “transportation demand management” or simply “demand management,” and is defined as a set of strategies aimed at maximizing traveler choices.

Many recent transportation plans appropriately place TDM very high in policy level discussions. TDM is seen as a vital part of an approach to plan, design, and operate “smarter,” “more efficient” transportation systems in a region. For example, the Washington State DOT’s plan for fighting congestion, “Moving Washington,” includes managing demand as one of three equal pillars of their approach, along with strategic road capacity expansion and operational efficiency improvements.¹

In addition to policy objectives, TDM strategies are usually listed within the set of projects that are found toward the end of most transportation plans. However, in many transportation plans, these projects often concentrate on traditional commuter ridesharing concepts, such as the funding of ridesharing programs, vanpool subsidies, or telecommuting assistance, which primarily strive to reduce long-term trips to address air quality goals.

Often, TDM is lost between high-level policy statements at the beginning of the planning process and specific projects that conclude most plans. TDM is not viewed as a vital day-to-day operational philosophy on how to manage and operate transportation systems to address a wide variety of issues such as mobility, accessibility, land use, and livability.

Although these traditional TDM strategies are still vital and serve large sections of the population, new approaches to manage travel demand have emerged in recent years with the advent of technology (and, more important, connectivity) in the transportation arena. Personal technology and communication advances show promise in making personal travel decisions more dynamic and fluid. In parallel, transportation systems management is progressing toward a more “active” management of the system, recognizing the day-to-day need to influence traveler decisions early in the trip-making process.

Together, these developments create new opportunities for demand management. Currently, our day-to-day efforts to manage and operate the transportation system are all about managing demand, since we usually cannot increase capacity or influence land use in the short term. One example is advanced real-time traveler information, provided via variable message signs or on-board devices. This is fundamentally a demand management strategy to help travelers learn of bottlenecks, slowdowns, and incidents in order to avoid them by traveling a different route or at a different time. Acknowledging that most of what we do to operate our transportation system today is managing demand goes a long way toward understanding the need to better integrate TDM into the transportation planning process. Likewise, TDM is sometimes overlooked as a solution strategy because of skepticism over actual impacts, and difficulties with measuring results.

**New Conceptualization of Travel Demand Management**

To address this gap in current transportation planning practices and the growing role of demand management, FHWA has developed a desk reference titled *Integrating Demand Management into the Transportation Planning Process*. This ar-
Managing demand is about providing travelers, regardless of whether they drive alone, with travel choices, such as work location, route, time of travel and mode. In the broadest sense, demand management is defined as providing travelers with effective choices to improve travel reliability.2

Figure 1 illustrates this view of contemporary TDM strategies by using a trip-chain graphic. At the heart of the conceptual framework is the need to understand the difference between TDM and traffic management. The figure shows the need to integrate TDM and traffic management into a larger framework of travel choices and congestion reduction techniques. These choices begin with consideration of overall travel demand and work their way through traffic demand and network demand. The set of strategies shown on the right side of the figure are not exhaustive and are meant to show the type of strategies that focus on traffic management and/or TDM. However, the key to the conceptual framework is to show differences between types of demands and how offering choices can influence these demands.

FHWA Guidance—An Overview

The intended users of this desk reference are transportation planning professionals who are seeking information on the role of TDM in meeting the specific needs of the planning process. The desk reference is fundamentally organized around two aspects of transportation planning: policy objectives and scope of the planning effort. The reference discusses how TDM relates to seven key policy objectives that are often included in transportation plans, such as congestion and air quality. It then

discusses how TDM might be integrated into four levels of transportation planning from the state down to the local level. The reference also includes information on tools available for evaluating TDM measures and on the known effectiveness of these measures. Figure 2 (from the desk reference) provides a cross-walk of the major sections in the document.

The desk reference presents a definition of TDM that is broader than traditional commuter ridesharing to encompass many travel choices, including mode, location, route, and time of day. As such, this concept of TDM includes many strategies that are not always thought of as TDM, such as road pricing, traveler information, and measures aimed at improving the operational efficiency of existing facilities. In essence, the desk reference presents TDM as an operational philosophy that seeks to balance demand reduction strategies with smart capacity enhancements as part of a more holistic approach to urban transportation.

Figure 2 provides a matrix that shows, in very general terms, how TDM “fits” into the seven policy objectives and four planning levels. In some cases, the fit is better, such as with land use, which is most effectively dealt with at the local level where local police powers allow for zoning and development approval. Other issues, such as air quality, are better handled at a higher level, such as the metropolitan or state levels. Overall, this figure is provided to show, at a glance, the range of policy objectives and planning levels described in the Desk Reference.

Travel Demand Management and Policy Objectives

The reference elaborates on the role of TDM in addressing seven key policy objectives: mobility/accessibility, congestion, air quality, economic development, land use/transportation integration, goods movement, and livability (expanding transportation choices to enhance community quality of life). By including objectives related to economic vitality, the environment, and livability, these policy
areas also encompass the basic components of sustainable transportation. The reference discusses the general relationship to TDM, offers specific TDM strategies to address each objective, provides case examples, and gives advice on how to integrate TDM into the planning process. For example, the guidance provides advice on how to integrate TDM into efforts to address mobility. An agency can take the following steps to advance TDM for regional mobility and accessibility:

- Incorporate the strategies and related objectives of TDM into the general planning factors in the transportation planning process;
- Ensure that the congestion management process incorporates those TDM strategies that enhance regional mobility and accessibility so that they work in concert with other strategies to maximize the efficiency potential for the transportation system;
- Incorporate the TDM strategies for regional mobility and accessibility as potential solutions in major investment studies to help address the factors influencing project solutions while efficiently and effectively meeting the needs of the community; and
- Ensure that TDM strategies are part of the public involvement dialogue to gain the broad support of the community.

**Travel Demand Management at Four Planning Levels**

Although it is critical to understand the role of TDM at a policy level, understanding how TDM fits into the agency’s planning processes is the primary focus of the desk reference, as it directly drives funding, implementation, and desirable outcomes for regions. Consistent with emerging guidance in planning for operations, the reference identifies guidance at four planning levels:

- Statewide planning—System planning, policy direction, statewide TDM programs. This primarily falls under the purview of the state DOT.
- Metropolitan planning—Long-range regional transportation plans, congestion management process activities undertaken by metropolitan-level planning organizations.
- Corridor planning—Major investment studies, congestion management process as part of specific corridors.
- Local planning—Land use planning activities conducted by city planning organizations, including TDM planning by developers for new developments.

In each case, the guidance is based both on experience to date (with examples and illustrations) and on how TDM integration might be improved to make it more effective in addressing key policy needs during the planning process. The specific types of transportation plans to which TDM has or can be integrated are enumerated for each level. Key takeaways are provided for each level to provide sound planning tips. For example, metropolitan planning organizations can advance TDM initiatives as a comprehensive part of addressing urban mobility challenges by:

- Coordinating local, regional, and state planning for TDM activities;
- Incorporating TDM goals and objectives in long-range plans;
- Seeking a role for TDM as an integral strategy in congestion management plans;
- Embracing TDM as a short-term operations and long-term sustainability strategy;
- Building awareness and motivation among member jurisdictions that have not pursued TDM;
- Encouraging communities that support TDM to take specific action;
- Challenging communities that have taken TDM action to ratchet up their efforts by providing model ordinances, regulations, and local planning guidelines;
- Setting aside funding for TDM initiatives;
- Better coordinating in-house planning efforts with in-house TDM operations (where applicable); and
- Developing TDM-specific performance measures to evaluate project-specific and systemwide performance.

Another key feature of the desk reference is a focus on appropriate performance measures to link TDM to specific plan goals at each planning level. Linking performance measures to planning objectives is consistent with other FHWA guidance on planning for operations using an objectives-driven, performance-based planning process.

For example, at the corridor level, it can be challenging to measure performance of TDM in a corridor setting. Unfortunately, many performance measures used for highway operations and congestion are not the same measures used to gauge TDM program performance. This can create a dilemma as planners and operators of the highway system seek to understand the impact of TDM on a particular highway. Indicators linked to congestion in a given corridor include:

- Travel time reliability;
- Delay (including vehicle hours of travel); and
- Level of Service.

Performance indicators more appropriate to TDM include:

- Vehicle trip reduction;
- Vehicle-miles traveled (VMT) reduction;
- Person-miles traveled (VMT) reduction;
- Person throughput (high-occupancy vehicle use);
- Mode shift; and
- Transit service reliability.

The measure that comes closest to linking the two disciplines is person throughput. Knowing vehicle occupancy, including transit, can help planners understand the efficiency of the facility in moving travelers, not vehicles. Some TDM measures, such as VMT reduction, can be converted to congestion measures such as delay by using some simplifying assumptions about volume and speed relationships.

**Travel Demand Management Effectiveness**

The guidance also provides an overview of the tools and techniques available to evaluate TDM during the planning process. This includes the ability to forecast the estimated impacts of various TDM strategies as well as the need to establish performance-based planning objectives. Finally, it discusses the ability to perform benefit/cost analysis on TDM, and gives an overview of the known effectiveness.
of various TDM strategies in terms of fulfilling key performance objectives (e.g., VMT reduction, mode shift, congestion relief, emissions reduction). Acknowledging that our understanding of TDM effectiveness is still evolving, the centerpiece of this chapter is a matrix conveying the relative effectiveness of various TDM strategies to address the previously mentioned seven policy objectives.

The desk reference includes examples, case studies, and best practices to support the information in each section. It also includes extensive references to other resources that deal with specific aspects of planning and TDM.

Use Of The Guidance
The desk reference, as well as other recent guidance on TDM, traffic management, and the transportation planning process, will encourage transportation planners to take a more measured and thoughtful approach to integrating TDM into the planning process. This will expand choices and elevate demand management to address transportation and related issues. The desk reference will allow for a better understanding of where, how, and when to include TDM in the planning process and provide more concise descriptions of its benefits.

Acknowledgments
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Transportation Reform Demonstration Project:
Creating jobs and economic development in Michigan by removing barriers to coordinated federal, state and local public transportation investment and management.

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INTRODUCTION

The Michigan Sense of Place Council, representing numerous state agencies under the direction of Governor Snyder, has partnered with Smart Growth America to provide technical advisory services to six communities of Michigan pursuing livable communities initiatives. Assistance was offered in two primary areas – community mobility management and strategic transportation demand management (TDM). The effort in the SEMCOG region focuses particularly upon TDM as a mitigation strategy during major capital construction.

TDM is a suite of strategies that reduces congestion by spreading out peak travel to different times of day and different modes other than driving alone. TDM programs can be administered at many levels – from a regional agency, municipality or individual employers – and works by providing a variety of competitive travel choices and incentives to change behavior.

The SEMCOG project has progressed in four stages:

1) assessment of existing TDM programs, local resources, and major project status and phasing,
2) discussion of alternative approaches and strategies,
3) development of strategic implementation plan,
4) proposed performance measurement and tracking framework.

This memo outlines that fourth and final component. It identifies a number of recommended measures meaningful to the transportation demand management strategy as well as a recommended process for data collection.
PERFORMANCE MEASUREMENT PROCESS

For TDM strategies to have long term value, information on the impact and performance of the package of strategies is necessary. This not only provides valuable information in making adjustments to management strategies, but also provides the business case for continued application in future projects and regionally.

Performance Measurement Framework

Identifying the right performance measures is often the most difficult stage of the performance measurement process. Numerous performance measures would be important to document the success of TDM programs, however only a handful of measures can be realistically and effectively collected on an ongoing basis. The performance measurement framework outlined in Figure 1 below provides an overview of criteria used to develop the performance measures:

Figure 1  Performance Measurement Framework

<table>
<thead>
<tr>
<th>Performance Measurement Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistent</td>
<td>Comparable data should be collected year after year. This means data needs to be collected and reported the same way each time on the same geography.</td>
</tr>
<tr>
<td>Readily available</td>
<td>Data should be drawn from existing data sets wherever possible.</td>
</tr>
<tr>
<td>Useful</td>
<td>Data collected should meaningfully inform how the suggested TDM strategies are performing and what adjustments are prudent to make.</td>
</tr>
<tr>
<td>Timely</td>
<td>Data should be collected on a regular basis – for example, quarterly during construction and annually thereafter – and reported within 6 weeks of data collection.</td>
</tr>
<tr>
<td>Reported</td>
<td>Data and findings must be recorded and transmitted to project owners and partners to inform additional actions.</td>
</tr>
</tbody>
</table>
Performance Measurement Matrix

TDM strategies focused on in the implementation plan are designed to mitigate the impacts of specific construction projects. Although it will be important to track the impact of these strategies during the construction projects, there is also an opportunity to measure the lasting effects of the proposed TDM strategies. Therefore, two types of performance measures are included in the matrix below:

- **Construction Measures** track the impact of the strategy during a specific construction project
- **Ongoing Measures** track the impact of the strategy over time at a regional level

Figure 2 below provides a matrix of identified construction and ongoing performance measures, the data source and data source contact, frequency of data collection, the baseline condition, and a target to assess the performance of each measure against the baseline. Where relevant, examples of other communities utilizing these or similar metrics are provided as reference. The measures outlined in Figure 2 require data that is readily available today. Figure 3 provides a matrix of performance measures that can be tracked if strategies outlined in Phase III are implemented.
<table>
<thead>
<tr>
<th>TDM Strategy</th>
<th>Construction Measure</th>
<th>Ongoing Measure</th>
<th>Data Source Data Collection Responsibility</th>
<th>Frequency (Construction)</th>
<th>Frequency (Ongoing)</th>
<th>Baseline</th>
<th>Targets</th>
<th>Notes (including reference communities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish transit pass program and distribute free/reduced cost passes</td>
<td># of free/reduced cost pass users on routes during construction</td>
<td>Ridership on routes after construction</td>
<td>Transit service providers (SMART, DDOT, PeopleMover)</td>
<td>Monthly</td>
<td>Annually</td>
<td>The average number of transit riders on routes serving or paralleling the corridor</td>
<td>Construction: 10% increase in combined ridership of all routes. Ongoing: 5% increase in combined ridership.</td>
<td>n/a</td>
</tr>
<tr>
<td>Biking</td>
<td># of bike counts on parallel routes during construction</td>
<td>n/a^1</td>
<td>MDOT construction project management^2</td>
<td>Monthly</td>
<td>n/a</td>
<td>No baseline presently available. Bicycle counts should be conducted prior to establishment of construction zone. TBD – must be determined based on baseline volumes.</td>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td>Business Support</td>
<td>Change (+) in # of employees participating in Commuter Challenge</td>
<td>Change in # of employees participating in Commuter Challenge</td>
<td>SEMCOG</td>
<td>Annually</td>
<td>Annually</td>
<td>700 people participated in Commuter Challenge in 2012</td>
<td>10% increase per year</td>
<td>Participants in the Bike Commute Challenge in Portland, Oregon, increased by 9% over a three year period.</td>
</tr>
<tr>
<td>HOV Lanes</td>
<td># of cars in HOV lanes during construction</td>
<td>n/a</td>
<td>MDOT (sensors)</td>
<td>Monthly</td>
<td>n/a</td>
<td>n/a</td>
<td>To be determined if HOV lanes are implemented during and/or post-construction</td>
<td></td>
</tr>
<tr>
<td>Increase usage and availability of Park &amp; Ride</td>
<td>Change (+) in utilization of park &amp; ride spaces within</td>
<td>Change in utilization of park &amp; ride</td>
<td>MDOT: Statewide Carpool Parking Lot website: <a href="http://mdotcf.state.mi.us/p">http://mdotcf.state.mi.us/p</a></td>
<td>Monthly</td>
<td>Annually</td>
<td>Utilization: MDOT: 46%^4</td>
<td>Construction: 4% - 5% increase in utilization</td>
<td>Estimated based on King County park-and-ride utilization reports which show a 2% increase in utilization</td>
</tr>
</tbody>
</table>

^1 It is assumed that MDOT, as construction manager, will complete bicycle counts and monitoring during construction. Any counts conducted following construction would likely be the responsibility of local jurisdictions.

^2 While bicycle count information is not currently collected and recorded by MDOT this data can be quickly and relatively affordably collected via automated count technologies. Several non-motorized count technologies are available. Several can either be mobile devices (moved between construction locations) or permanent installations (for ongoing counts. For a summary of automated bicycle and pedestrian count technologies and equipment providers please see the National Bicycle and Pedestrian Documentation Project Automatic Count Technology Memo (June 2009) available at bikepeddocumentation.org/index.php/download_file/-/view/22
<table>
<thead>
<tr>
<th>TDM Strategy</th>
<th>Construction Measure</th>
<th>Ongoing Measure</th>
<th>Data Source</th>
<th>Data Collection Responsibility</th>
<th>Frequency (Construction)</th>
<th>Frequency (Ongoing)</th>
<th>Baseline</th>
<th>Targets 1. During construction</th>
<th>Targets 2. 3 years post-construct</th>
<th>Notes (including reference communities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ride; Park &amp; Pool</td>
<td>affected construction area&lt;sup&gt;a&lt;/sup&gt;</td>
<td>spaces</td>
<td>SMART: carpoolpark/maps/metro.pdf</td>
<td>SMART: SMART staff</td>
<td>SMART: 55%</td>
<td>Ongoing: 3% - 4% annual increase in utilization</td>
<td>Utilization per year over the last 4 years.&lt;sup&gt;v&lt;/sup&gt; Assumed a slightly improved growth in utilization for areas within the affected construction area.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanpool</td>
<td>Change (+) in # of vanpool riders within the affected construction area&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Change in # of vanpool riders within the same geography</td>
<td>vRide tracks origin/destination of vanpool users and new fleets per month. Vanpools report to NTD and data can be gleaned from NTD web site. vRide can track vanpool usage in a specific geographic area during construction.</td>
<td>Monthly</td>
<td>Annually</td>
<td>Existing vanpool ridership along the construction corridor (baseline depends on construction project and will need to be determined on an as-needed basis)</td>
<td>Construction: 12% increase in # of vanpool riders</td>
<td>Ongoing: 10% annual increase in # of vanpool riders</td>
<td>Assumed slightly higher ridership in construction zones due to targeted marketing. Target based on vRide existing change in ridership over the last four years.</td>
<td></td>
</tr>
<tr>
<td>Congestion Management</td>
<td>Travel time index along construction project corridor</td>
<td>Travel time index along construction project corridor</td>
<td>SEMCOG Travel Time Index</td>
<td>Monthly</td>
<td>Annually</td>
<td>I-94: TTI 2.191, Congestion High I-75: TTI 2.045, Congestion High</td>
<td>Construction: Moderate congestion (Freeway: 1.3 – 1.8; Arterials: 1.5 – 2.0)</td>
<td>SEMCOG tracks travel time index (TTI) on an annual basis, <a href="http://www.semcog.org/uploadedFiles/Programs_and_Projects/Transportation/Congestion/CngDefThrshold.pdf">http://www.semcog.org/uploadedFiles/Programs_and_Projects/Transportation/Congestion/CngDefThrshold.pdf</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commuting alternatives (non-SOV travel)</td>
<td>Employee mode choice</td>
<td>Employee mode choice</td>
<td>Employee travel survey (administered by major employers)</td>
<td>Before construction 6-8 months into construction</td>
<td>Annually</td>
<td>Region and employers to set&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Recommend that the region set mode split targets for employees in the region as a whole and distinct targets for sub areas of diverse contexts (e.g. urban, suburban, and suburban edge).

<sup>b</sup> Recommended to set targets for employees in the region as a whole and distinct targets for sub areas of diverse contexts (e.g. urban, suburban, and suburban edge).

<sup>c</sup> Recommend that the region set mode split targets for employees in the region as a whole and distinct targets for sub areas of diverse contexts (e.g. urban, suburban, and suburban edge).
<table>
<thead>
<tr>
<th>TDM Strategy</th>
<th>Construction Measure</th>
<th>Ongoing Measure</th>
<th>Data Source Contact</th>
<th>Data Source</th>
<th>Frequency (Construction)</th>
<th>Frequency (Ongoing)</th>
<th>Baseline</th>
<th>Target</th>
<th>Notes/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Localized travel app</td>
<td>Number of travel app hits within the affected construction area</td>
<td>Number of travel app hits</td>
<td>Travel app contractor (TBD)</td>
<td>Website log</td>
<td>Monthly</td>
<td>Monthly</td>
<td>N/A</td>
<td>Construction: 0.4 - 0.65 hits per capita within the affected construction area.</td>
<td>TriMet multimodal trip planner gets 950,000 hits per month on average, or 0.63 hits per capita in the TriMet service area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ongoing: 0.4 - 0.65 hits per capita within the affected construction area</td>
<td></td>
</tr>
<tr>
<td>Type of travel app searches (i.e. non-auto searches)</td>
<td>Type of travel app search (i.e. non-auto searches)</td>
<td>Travel app contractor (TBD)</td>
<td></td>
<td></td>
<td>Monthly</td>
<td>Annually</td>
<td></td>
<td>18%-25% of searches are non-auto</td>
<td>% non-auto searches based on existing mode split in region</td>
</tr>
<tr>
<td>Marketing campaign</td>
<td>Registrants on marketing website (assuming people can sign up for web updates) within the affected construction area</td>
<td>% of people aware of regional marketing campaign</td>
<td>Lead marketing campaign agency (TBD)</td>
<td>Construction: Website log Ongoing: Biennial travel survey (not currently administered)</td>
<td>Monthly</td>
<td>Biannually</td>
<td>N/A</td>
<td>Construction: 10% of population within the affected construction area registered on marketing website</td>
<td>Ongoing target: Estimated based off of the Metro Portland Regional Travel Options Travel &amp; Awareness Survey results.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Ongoing: 21%-35% population aware of regional campaign</td>
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USER GUIDE

This section presents a practical “User Guide” to collect base information and follow up data to assess the impact of the TDM programs and strategies in the region. This Guide provides a brief description of the performance measure (both during construction and on an ongoing basis), the baseline condition in order to assess progress, the data associated with each measure, the required resources to collect that data, and the appropriate time frame to collect the data.

<table>
<thead>
<tr>
<th>TDM Strategies: Establish transit pass program and distribute free/reduced passes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TDM Measure(s): # of pass users; # of riders</strong></td>
</tr>
</tbody>
</table>
| **Baseline Condition:** Average # of riders on construction routes (TBD) | **Target:** During construction – 10% increase in ridership (combined) across all routes  
Ongoing – 5% sustained increase in ridership |
| **Construction Measure:** # of free/reduced pass users on routes during construction | **Ongoing Measure:** Ridership on routes after construction |
| **Data Source:** SMART Service Development Department, DDOT, PeopleMover | **Data Source:** SMART Service Development Department, DDOT, PeopleMover |
| **Data Source Contact:** |
| SMART: Jay Gardiner, Gardiner@smartbus.org, (313) 223-2352 (monthly ridership reports – Service Evaluation Statistics Report) |
| DDOT: Wilfred Beal, WilBea@detroitmi.gov, (313) 833-0159 |
| People Mover: Henry Cornelius, chenry@thepeoplemover.com, (313) 224-2160 |
| **Data Source Contact:** |
| SMART: Jay Gardiner, Gardiner@smartbus.org, (313) 223-2352 (monthly ridership reports – Service Evaluation Statistics Report) |
| DDOT: Wilfred Beal, WilBea@detroitmi.gov, (313) 833-0159 |
| People Mover: Henry Cornelius, chenry@thepeoplemover.com, (313) 224-2160 |
| **Frequency:** Monthly | **Frequency:** Annually |
| **Construction Score** | **Ongoing Score** |
| **Date Scored** | **Date Scored** |
TDM Strategies: Establish transit pass program and distribute free/reduced passes

<table>
<thead>
<tr>
<th>TDM Measure(s): # of pass users; # of riders</th>
</tr>
</thead>
</table>

How to Collect:

Ridership and pass information for routes along the construction corridors will need to be collected from SMART, MDOT, and People Mover. Contacts are provided above. Data should be collected monthly during the construction period and annually thereafter.

TDM Strategies: Biking

<table>
<thead>
<tr>
<th>TDM Measure(s): # of bike counts on parallel routes during construction</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Baseline Condition: N/A</th>
<th>Target: TBD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Measure: # of bike counts on parallel routes during construction</td>
<td>Ongoing Measure: N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Source: MDOT staff</th>
<th>Data Source: N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Source Contact: Tony Kratofil, MDOT, <a href="mailto:kratofilt@michigan.gov">kratofilt@michigan.gov</a></td>
<td>Data Source Contact: N/A</td>
</tr>
</tbody>
</table>

Frequency: Monthly

<table>
<thead>
<tr>
<th>Frequency: Annually</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Score</td>
</tr>
<tr>
<td>Ongoing Score</td>
</tr>
<tr>
<td>Date Scored</td>
</tr>
<tr>
<td>Date Scored</td>
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</tbody>
</table>

How to Collect:

Bike counts along parallel routes during construction should be required to be tracked. Contact Tony Kratofil, Metro Region Engineer at MDOT, to identify the specific project manager for the construction project. The project manager will administer the bike counts on designated routes on a monthly basis.

Bicycle data can be quickly and relatively affordably collected via automated count technologies. Several non-motorized count technologies are available. Many can either be mobile devices (moved between construction locations) or permanent installations (for ongoing counts).

For a summary of automated bicycle and pedestrian count technologies and equipment providers please see the National Bicycle and Pedestrian Documentation Project Automatic Count Technology Memo (June 2009) available at bikepeddocumentation.org/index.php/download_file/-/view/22
**TDM Strategies: Business Support**

<table>
<thead>
<tr>
<th>TDM Measure(s): Change in # of employers participating in Commuter Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline Condition:</strong> 2 businesses (Compuware and Quicken)</td>
</tr>
<tr>
<td><strong>Construction Measure:</strong> Change in # of employers participating in Commuter Challenge</td>
</tr>
<tr>
<td><strong>Data Source:</strong> SEMCOG</td>
</tr>
<tr>
<td><strong>Data Source Contact:</strong> Iris Steinberg, SEMCOG, <a href="mailto:steinberg@semcog.org">steinberg@semcog.org</a></td>
</tr>
<tr>
<td><strong>Frequency:</strong> Annually</td>
</tr>
<tr>
<td><strong>Construction Score</strong></td>
</tr>
<tr>
<td><strong>Date Scored</strong></td>
</tr>
</tbody>
</table>

**How to Collect:**
The number of employees participating in the SEMCOG Commuter Challenge should be tracked both during construction and on an ongoing basis. Irish Steinberg from SEMCOG, or a future TDM Coordinator, can track this number annually.
### TDM Strategies: HOV Lanes

<table>
<thead>
<tr>
<th>TDM Measure(s): # of cars in HOV lanes during construction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline Condition:</strong> N/A</td>
</tr>
<tr>
<td><strong>Construction Measure:</strong> # of cars in HOV lanes during construction</td>
</tr>
<tr>
<td><strong>Data Source:</strong> MDOT</td>
</tr>
<tr>
<td><strong>Data Source Contact:</strong> Tony Kratofil, MDOT, <a href="mailto:kratofilt@michigan.gov">kratofilt@michigan.gov</a></td>
</tr>
<tr>
<td><strong>Frequency:</strong> Monthly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construction Score</th>
<th>Ongoing Score</th>
</tr>
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<tr>
<td>Date Scored</td>
<td>Date Scored</td>
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</table>

**How to Collect:**

Although MDOT does not currently have high occupancy vehicle (HOV) lanes, MDOT could install them as part of construction projects. MDOT would need to install sensors in the HOV lanes to track the number of cars traveling in the HOV lane. Data from the sensors would be available on a daily basis. Contact Tony Kratofil, Metro Region Engineer at MDOT, to identify the specific project manager for the construction project. The project manager will administer the HOV sensors on designated routes and track HOV use on a monthly basis during construction.
### TDM Strategies: Increase usage and availability of Park-and-Ride; Park-and-Pools

<table>
<thead>
<tr>
<th>TDM Measure(s): change in utilization of park &amp; rides within affected construction area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline Condition:</strong> MDOT utilization: 46%; SMART utilization: 53%</td>
</tr>
<tr>
<td><strong>Construction Measure:</strong> Change in utilization of park-and-rides within affected construction area</td>
</tr>
<tr>
<td><strong>Data Source:</strong> MDOT and SMART</td>
</tr>
<tr>
<td>SMART: Jay Gardiner, <a href="mailto:Gardiner@smartbus.org">Gardiner@smartbus.org</a>, (313) 223-2352</td>
</tr>
<tr>
<td><strong>Frequency:</strong> Monthly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construction Score</th>
<th>Ongoing Score</th>
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<td><strong>Date Scored</strong></td>
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**How to Collect:**

SMART has the ability to track park-and-ride utilization on a quarterly and annual basis. MDOT also tracks the capacity and utilization of its park & ride lots and displays this information online, as noted above.
<table>
<thead>
<tr>
<th>TDM Strategies: Vanpool Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TDM Measure(s):</strong> change in # of vanpool/carpool riders within the affected construction area</td>
</tr>
<tr>
<td><strong>Baseline Condition:</strong> Annual ridership: 3,754</td>
</tr>
<tr>
<td><strong>Construction Measure:</strong> Change in # of vanpool riders within the affected construction area</td>
</tr>
<tr>
<td><strong>Data Source:</strong> vRide</td>
</tr>
<tr>
<td><strong>Data Source Contact:</strong> Jennifer Miller, vRide, <a href="mailto:jennifer.miller@compuware.com">jennifer.miller@compuware.com</a></td>
</tr>
<tr>
<td><strong>Frequency:</strong> Monthly</td>
</tr>
<tr>
<td><strong>Construction Score</strong></td>
</tr>
<tr>
<td><strong>Date Scored</strong></td>
</tr>
</tbody>
</table>

**How to Collect:**
Vanpool ridership numbers are available upon request. New riders are tracked as they submit paperwork to ride. Each van submits a daily ridership form that is reported to the National Transit Database which is submitted monthly online. A monthly report can be easily produced upon request. This monthly report will also need to be acquired at the beginning of the construction project to document the baseline condition along the corridor.
## TDM Strategies: Congestion Management

<table>
<thead>
<tr>
<th>TDM Measure(s): Travel time</th>
</tr>
</thead>
</table>
| **Baseline Condition:** | **Target:** On all corridors: during construction = moderate congestion (Freeway: 1.3 – 1.8; Arterials: 1.5 – 2.0)  
Post-construction: No/low congestion (Freeway: Less than 1.3; Arterials: < 1.5) |
| I-94: TTI 2.191, congestion high;  
I-75: TTI 2.045, Congestion High;  
I-96: TTI 1.535, Congestion Moderate;  
Woodward: TTI 1.840, Congestion Moderate |  |
| **Construction Measure:** Travel time | **Ongoing Measure:** Travel time |
| **Data Source:** SEMCOG Travel Time Index | **Data Source:** SEMCOG Travel Time Index |
| **Data Source Contact:** Tom Bruff, SEMCOG, bruff@semcog.org, 313-324-3340 | **Data Source Contact:** Tom Bruff, SEMCOG, bruff@semcog.org, 313-324-3340 |
| **Frequency:** Monthly | **Frequency:** Annually |
| **Construction Score** | **Ongoing Score** |
| **Date Scored** | **Date Scored** |

**How to Collect:**
SEMCOG tracks travel time on an annual basis. SEMCOG’s travel time index is defined on this website:

http://www.semcog.org/uploadedFiles/Programs_and_Projects/Transportation/Congestion/CngDefThreshold.pdf

Baseline conditions for freeways are documented here:
http://www.semcog.org/uploadedFiles/Programs_and_Projects/Transportation/Congestion/PerformanceFwy.pdf

Baseline conditions for arterials are documented here:
http://www.semcog.org/uploadedFiles/Programs_and_Projects/Transportation/Congestion/PerformanceArterial.pdf

The Travel Time Index is typically tracked on an annual basis. During construction, the annual count would be used as a baseline and the construction project manager would monitor travel time on a monthly basis.
<table>
<thead>
<tr>
<th>TDM Strategy: Localized Travel App</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TDM Measure(s): # of travel app hits; type of travel app hits</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **Baseline Condition:** | Target: 0.4 - 0.65 hits per capita within the affected construction area  
16-25% of all searches are for non-SOV alternatives |
| Not available (no travel app exists) |  |
| **Construction Measure:** (1) # of travel app hits within the affected construction area;(2) type of search (i.e. non-auto searches) within the affected construction area | **Ongoing Measure:** (1) # of travel app hits within the affected construction area; (2) type of search (i.e. non-auto searches) within the affected construction area |
| **Data Source:** Website log | **Data Source:** Website log |
| **Data Source Contact:** Travel app contractor (TBD) | **Data Source Contact:** Travel app contractor (TBD) |
| **Frequency:** Quarterly | **Frequency:** Annually |

**Construction Scoring**

**Ongoing Scoring**

<p>| | |</p>
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<tbody>
<tr>
<td><strong>Date Scored</strong></td>
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</table>

**How to Collect:**

Once a travel app is developed, the number of travel app hits within a construction zone should be tracked by contacting the travel app contractor (TBD). When developing the travel app, it will be important for SEMCOG to ensure that the web development contractor has the ability to track the number, location, and type of website hits.
### TDM Strategies: Marketing campaign

<table>
<thead>
<tr>
<th>TDM Measure(s): # of registrants on marketing website within the affected construction area; % of people aware of regional campaign</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline Condition:</strong></td>
</tr>
<tr>
<td>N/A – regional marketing campaign does not yet exist</td>
</tr>
<tr>
<td><strong>Target:</strong></td>
</tr>
<tr>
<td>During Construction - 10% of population within the affected construction area registered on marketing website</td>
</tr>
<tr>
<td>Post-construction/ongoing – 21-35% of population are aware of travel alternatives</td>
</tr>
<tr>
<td><strong>Construction Measure:</strong> # of registrants on marketing website within the affected construction area</td>
</tr>
<tr>
<td><strong>Ongoing Measure:</strong> % of people aware of regional marketing campaign</td>
</tr>
<tr>
<td><strong>Data Source:</strong> Website log (TBD)</td>
</tr>
<tr>
<td><strong>Data Source:</strong> Biennial travel and awareness survey (not currently administered)</td>
</tr>
<tr>
<td><strong>Data Source Contact:</strong> Lead marketing campaign agency (TBD)</td>
</tr>
<tr>
<td><strong>Data Source Contact:</strong> Lead marketing campaign agency (TBD)</td>
</tr>
<tr>
<td><strong>Frequency:</strong> As needed</td>
</tr>
<tr>
<td><strong>Frequency:</strong> Biannually</td>
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**Construction Score**

**Ongoing Score**

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**How to Collect:**

For the construction measure, the number of people who sign up to receive updates on the marketing website will be a good measure of people’s awareness of the construction project. On an ongoing basis once the regional marketing campaign is established, a biannual travel and awareness survey should be administered to gauge people’s awareness of the regional campaign. Metro Portland conducts a similar survey. A copy of the survey can be found in Appendix A of this summary report:

Bicycle Transportation Alliance. 2009 – 2012 Annual Reports.

The “affected construction area” is determined as half the distance between the construction route and the prescribed detour route.


Email from Jay Gardiner, SMART, October 18, 2013.


The “affected construction area” is determined as half the distance between the construction route and the prescribed detour route.

To confirm the target, SEMCOG should determine the number of website hits that MiDrive and MiCommute currently receive. Diane Cross at MDOT (CrossD2@michigan.gov) and Robert Morosi at MDOT (MorosiR@michigan.gov) are the contacts for this information.

TriMet. The Open Trip Planner. Metro 2009-2011 Regional Travel Options Grant. August 31, 2011.


The “affected construction area” is determined as half the distance between the construction route and the prescribed detour route.

The “affected construction area” is determined as half the distance between the construction route and the prescribed detour route.
EVALUATION OF TRANSPORTATION
DEMAND MANAGEMENT PROGRAMS
AT RESIDENTIAL DEVELOPMENTS

By

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Department of Civil Engineering
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March 1991
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<td>24</td>
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<tr>
<td>5.4 Enforcement of compliance</td>
<td>26</td>
</tr>
<tr>
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<td>26</td>
</tr>
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</tr>
<tr>
<td>6.1 Decision process leading to the imposition of requirements</td>
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</tr>
<tr>
<td>6.2 Institutional memory of requirements</td>
<td>31</td>
</tr>
<tr>
<td>6.3 Monitoring compliance</td>
<td>31</td>
</tr>
<tr>
<td>6.4 Enforcement of compliance</td>
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ABSTRACT

Over the last decade, local jurisdictions and transportation agencies have increasingly used transportation demand management (TDM) programs to manage traffic impacts of new office/industrial and retail developments. More recently, however, King County and the cities of Kirkland, Redmond, and Seattle, Washington, have introduced TDM programs for residential developments or "origin" sites. The objectives of the evaluation discussed in this paper were (1) to document the implementation of home-end TDM strategies and (2) to evaluate their effectiveness in mitigating the number of vehicle trips generated by residential development.

Since few projects had been built and occupied by the time the evaluation concluded, quantitative evaluation was limited, and the success or failure of residential TDM programs could not be determined. However, it was possible to gain an understanding of the nature and reasons for the implementation problems encountered through qualitative means. These included interviews with jurisdictional staff, developers and managers and a focus group among residents. The analysis pointed out problems related to (1) the decision process leading to the imposition of mitigation requirements, (2) the institutional memory of requirements, (3) monitoring, (4) enforcement of compliance, and 5) the adequacy of mitigation measures. The paper concludes with recommendations to mitigate these implementation problems.
CHAPTER 1.0
INTRODUCTION

Over the last decade, local jurisdictions and transportation agencies have increasingly used transportation demand management (TDM) strategies as a means of managing the traffic impacts of new office/industrial and retail developments. TDM programs are developed for a specific development project to mitigate the transportation impacts associated with it by discouraging single-occupant vehicle (SOV) trips and encouraging travel by high-occupancy vehicle (HOV). They serve the site-specific needs of tenants and are designed to reduce SOV trips and parking demand at a development site. (King County Draft Administrative Guidelines for Application of TSM under SEPA, April 18, 1990)

In the past, these efforts to discourage SOV commutes and encourage HOV modes of transportation have almost exclusively been focused on "destination sites" — office buildings, industrial/office parks, and office/retail developments. Since 1987, however, King County and the cities of Kirkland, Redmond, and Seattle, Washington, (Figure 1) have introduced the concept to residential developments, or "origin" sites, in an attempt to mitigate the transportation impacts of these developments through promotion of HOV use among residents.

Before the onset of this study, no data on residential projects using TDM strategies had been collected, nor had an evaluation been conducted of the TDM programs and the various mitigation measures attempted. An objective assessment of these programs seemed appropriate. Thus, the original objectives of this project were to (1) document the implementation of "home-end" TDM programs and (2) evaluate their effectiveness in managing the transportation impacts of residential developments on freeways and adjacent arterials. These objectives were meant to identify the effect of home-end TDM programs on HOV use by residents and to identify specific effective actions.
Figure 1. Seattle, Washington Vicinity Map
The researchers intended to combine a number of different methodologies, including surveys of project residents, surveys of ridematch and vanpool applicants, interviews with project developers and managers, and comparisons of vehicle counts between TDM program sites and control sites.

However, in the early stages of the project it became clear that the scope envisioned was not appropriate for the available data. Only a limited number of developments with TDM requirements had been built and occupied by the time the study began, despite the fact that jurisdictions started to require TDM measures at residential developments in 1987. An even smaller number had actually implemented any TDM measures. Surveying residents of projects with TDM programs or conducting formal interviews with developers or managers following a prepared outline also proved very difficult.

Thus, this paper does not determine the success or failure of TDM programs on residential developments, although the researchers gathered as much information relating to the original goals of the study as possible, i.e. the documentation of home-end TDM programs and their evaluation. Rather, the scope of the project was extended to gain an understanding of the nature of the problems encountered in implementing these programs and to develop approaches to minimize these problems. Where possible, new approaches to addressing these problems that have been used in other parts of the country were studied, although none of them has been formally evaluated to date. Conversations with both developers and staff of the involved jurisdictions, as well as a review of available literature, showed that a range of factors not directly related to TDM measures nevertheless affects their effectiveness. These include site design and zoning and land use policies. The paper concludes with recommendations to mitigate TDM implementation problems at residential developments and deal with other problems.
CHAPTER 2.0

PROJECTS IN KING COUNTY, KIRKLAND, REDMOND, AND SEATTLE WITH TRAFFIC MITIGATION MEASURES

2.1 Location and status of TDM projects

The researchers established a list of developments with TDM requirements from files maintained by the Municipality of Metropolitan Seattle (Metro), the region's transit operator. As part of the State Environmental Policy Act (SEPA) process, each jurisdiction informs Metro about major projects with a potentially high impact on transportation. Because, with the exception of the city of Seattle, jurisdictions have generally required developers to negotiate any TDM measures with Metro, its files were relatively comprehensive. An attempt to verify Metro's files was unsuccessful because none of the jurisdictions kept readily accessible files on residential projects with TDM requirements.

In all, 57 residential projects with TDM requirements were identified and analyzed for this paper. Of these, 47 were located in unincorporated King County, three in the city of Kirkland, two in the city of Redmond, and five in the city of Seattle. Thus, almost all projects, as was the focus of the study, were in a suburban environment. According to the research conducted at the outset of this study, none of the other jurisdictions in the region had started to require TDM measures from residential developments. Ten of the projects, all located in unincorporated King County, were single family lot developments; therefore, a comparative analysis of TDM programs implemented for single-family projects versus multi-family projects could not be carried out because of the small sample size of single-family projects. For twelve projects, the information obtained was too limited or outdated, and the developers/managers for these projects could not be contacted. Nine of these projects were within the jurisdiction of King County, and three within the city of Seattle. Two projects, both in unincorporated King County, had been withdrawn and would not be built, and 25 were either still in the approval process, not started, or partially built. Only 18 had been built and occupied by May 1990 (Figure 2).
2.2 Types of home-end TDM requirements

Twelve different measures encouraging mode shift have been imposed on residential developments in the Puget Sound region. They can be grouped into four types, including

- the provision of physical structures that encourage mode shift,
- the distribution of transit and rideshare information,
- the collection of information on commute behavior, and
- transit subsidies.

No more than eight measures were required from any single development. Twenty projects had unspecified TDM program requirements, except for sidewalk improvement requirements.

(For a list of requirements on specific projects, see Table 1.)

2.2.1 Structural requirements

Structural requirements relate to the physical aspects of the development. They include a fully connected set of sidewalks on the project and along the street adjacent to the project, bus pads and shelters, and secure bike storage. While sidewalks by themselves do not guarantee a shift in mode choice, convenient and aesthetically pleasing pedestrian access to transit and car- and vanpools can encourage the use of these modes of transportation. They were required in 14 (25 percent) cases, all of them located in King County. For five (9 percent, n=57) of these projects this was the only requirement.

Easy and fast access to transit is a major factor in mode choice; thus the provision of a bus pad and/or shelter on project property can strongly influence the decision to use the bus. In King County four (7 percent) of the developments were required to provide bus pads and/or bus shelters.
Figure 2. Breakdown of Projects, by Knowledge of TDM Requirements and Compliance
Table 1. Residential Projects - TDM Measures, Knowledge of TDM Requirements and Their Implementation

<table>
<thead>
<tr>
<th>Name</th>
<th>Project Units</th>
<th>Amenity Type</th>
<th>Built</th>
<th>Transit/RideShare</th>
<th>Data</th>
<th>Subsidies</th>
<th>Developer</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Park at Forbes Ctr.</td>
<td>496 mf</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Ballinger Commons</td>
<td>485 mf</td>
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<tr>
<td>Redondo Beach Club III</td>
<td>298 mf</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Riverview Apts</td>
<td>266 mf</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Emerald Glen II</td>
<td>261 mf</td>
<td>X X X X X</td>
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<tr>
<td>Remington</td>
<td>260 sf</td>
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<tr>
<td>Emerald Glen</td>
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<tr>
<td>Glen Park I</td>
<td>250 mf</td>
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<tr>
<td>Shadow Brooks</td>
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<tr>
<td>Timberline Ridge</td>
<td>242 sf</td>
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<tr>
<td>Colony at Bear Creek II</td>
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<tr>
<td>Evergreen Heights</td>
<td>200 mf</td>
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<tr>
<td>Newport Crossing Apts</td>
<td>192 mf</td>
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<tr>
<td>Kenmore on the Park</td>
<td>180 mf</td>
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<tr>
<td>Redondo Reach</td>
<td>167 mf</td>
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<tr>
<td>Riverside Apts</td>
<td>150 mf</td>
<td>X</td>
<td></td>
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<tr>
<td>Cascade Terrace</td>
<td>144 mf</td>
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<tr>
<td>Kenmore</td>
<td>140 mf</td>
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</tr>
<tr>
<td>Westview Village</td>
<td>137 mf</td>
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<tr>
<td>Silver Shadow Apts</td>
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<td>White Gate</td>
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<tr>
<td>Juanita Shores</td>
<td>112 mf</td>
<td>X X</td>
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<tr>
<td>East Empire Gardens</td>
<td>103 mf</td>
<td>X</td>
<td></td>
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<tr>
<td>High Point Park</td>
<td>100 sf</td>
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<tr>
<td>Salmon Creek Apts</td>
<td>100 mf</td>
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<tr>
<td>Westchester Estates</td>
<td>100 sf</td>
<td>X</td>
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<tr>
<td>Terrace View Apts</td>
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<tr>
<td>Valley Faire</td>
<td>75 sf</td>
<td>X X X X X</td>
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<tr>
<td>Hendriksen Apts.</td>
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<tr>
<td>Rainier Meadows Apts</td>
<td>62 mf</td>
<td>X X</td>
<td></td>
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<tr>
<td>Campus Highlands</td>
<td>53 sf</td>
<td></td>
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<tr>
<td>Coal Creek</td>
<td>49 mf</td>
<td>X X X X X</td>
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<tr>
<td>Waterfront Apts</td>
<td>44 mf</td>
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<tr>
<td>Johnson Court Apts</td>
<td>42 mf</td>
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<tr>
<td>Queen Anne Apts</td>
<td>17 mf</td>
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<tr>
<td>3515 Wallingford Ave N</td>
<td>8 mf</td>
<td></td>
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</tr>
</tbody>
</table>

LEGEND

Project: Units = Number of units; Type = type of development (sf = single family, mf = multiple family); Built = Indicates that project has been built

Amenities: Wal = sidewalk, Pad = pad, Shel = bus shelter, Bik = bicycle storage

Transit/RideShare (Distribution of Information): Info = information distribution; CIC = commuter information center; TC = transportation coordinator; Pro = promotion

Data: (Collection of Information on Commuter Behavior) Sur = survey residents; Rep = report

Subsidies: Bus = bus pass; Shu = shuttle

Developer: Cont = Contacted by investigators; Kno = developer knows about requirements; Imp = developer has implemented requirements
While the bicycle is still considered by many to be a means of exercise rather than a means of transportation, an increasing number of Americans commute by bike. The provision of secure bike storage at the residential end makes the use of the bike easier and thus can make this mode of transportation more attractive. Six (11 percent) of the projects were required to provide bike storage facilities. Four were located in King County, and one each in Kirkland and Redmond.

2.2.2 Distribution of transit and rideshare information

The distribution of information about transit and ridesharing options is the most frequent requirement imposed on residential developments. In addition, some developments were obligated to install a commuter information center (CIC), to provide a transportation coordinator (TC), and/or to promote transit and ridesharing options on a regular basis.

The distribution of information on transit and ridesharing options was required in 23 (41 percent) cases, 19 in King County, three in Kirkland, and one in Redmond. This requirement was usually fulfilled with a Metro information package to be received by every new resident of a project, although no procedure was specified.

A commuter information center (CIC) was requested in seven (13 percent) cases, six in King County, and one in Kirkland. CICs were to be established in the clubhouses, the central point of multi-family developments, at a prominent location. They provided current information on transit schedules and ridesharing options and reminded residents of the existence of these services.

To assist residents in finding car- and vanpools, to provide personalized transit information, and to give out bus passes, 17 (30 percent) projects were required to provide a transportation coordinator. Sixteen cases were in King County, one in Kirkland. How much time this person was required to spend on transportation issues was not specified.

Periodic promotion of transit and ridesharing options was required in four (7 percent) cases in King County. No time frame or procedure was specified.
2.23 Collection of information on the commute behavior of residents

To improve existing transit and rideshare services, updated information on the commute behavior and needs of residents is essential. Seven (13 percent) projects were asked to survey their residents or tenants upon request, five (9 percent) to write a report on a regular basis. All projects were located in King County.

2.24 Transit subsidy or provision

To facilitate transit use, some developments were required to provide free monthly bus passes to new or first-time residents. One project was required to provide peak-hour shuttle services to the closest park and ride lot.

The provision of free one-month bus passes, or in one case in King County a 50 percent subsidy, was required in 24 (43 percent) cases. All four developments in the city of Seattle were required to give free bus passes to first-time or new residents over a period of three months. Fifteen developments in King County, as well as all projects in Kirkland (three) and Redmond (two), were required to provide free one-month passes.

One project was to provide peak-hour shuttle services to the nearest park and ride lot. Originally, two projects, both large multi-family projects, had this requirement, but it was implemented only at the one in Kirkland. Unincorporated King County did not follow through on the enforcement of implementation for the second one.
CHAPTER 3.0

KNOWLEDGE OF AND COMPLIANCE WITH TDM REQUIREMENTS

3.1 Knowledge of the requirements

The developers or managers of 12 (27 percent) of the 45 projects for which contact could be made acknowledged awareness of at least one TDM requirement. Out of 21 projects where more than one requirement was imposed, developers of eight of them were aware of the requirements. However, two companies owned six of the projects. In all, only six companies in the area paid serious attention to the requirements. The two companies with more than one project with TDM requirements were among the biggest developers in the region and had a political and economic stake in successful relations with the jurisdiction. They were willing to comply with requirements they considered minor to preclude negative public opinion and higher mitigation costs. All four developers contacted who had both a sidewalk requirement and a generic "TDM program" requirement knew only about the sidewalk. Three projects reviewed had the single obligation to provide a free bus pass to first-time residents. Managers or developers of these projects were aware of the requirement. It is possible that in some cases developers claimed no knowledge of TDM requirements to cover their unwillingness to comply with them. In cases where the researchers suspected this, they could not establish whether the requirements were just considered minor and thus ignored until the developer was questioned about their implementation, or whether the TDM concept itself was not considered worthwhile. None of the 20 developers of projects with unspecified TDM program requirements was aware of any requirements.

3.2 Compliance with the requirements

While the existence of TDM requirements on projects could be determined with Metro lists, no sources other than the developers themselves were available to establish compliance for all but two of the projects. Thus, compliance had to be determined by interviews with developers.
compliance for all but two of the projects. Thus, compliance had to be determined by interviews with developers.

Of the 12 projects for which developers acknowledged the requirement(s), only nine (75 percent) had been built and occupied by May 1990. Of these nine, the requirements of eight (89 percent) had been implemented at least in part. As stated above, four of them had only a single requirement, three to provide monthly bus passes, one to provide sidewalks. Four other developments, each with a different set of requirements, belonged to the two previously mentioned major development companies. At the time this study was conducted, two of them were just starting to implement the measures because the developments had been occupied only recently. One developer acknowledged the requirements in an interview and stated that they were minor both in terms of costs and personnel, even though five different measures were required. However, he had not implemented them.
CHAPTER 4.0

PERCEPTIONS OF THE REQUIREMENTS

4.1 Perceptions of Developers and Managers

A list of questions for developers and managers (see Appendix A for interview guides) was prepared and used to guide informal interviews with developers and managers. No attempt was made to obtain statistically reliable data from this population. Thus, the information presented below is qualitative rather than quantitative and cannot be considered representative of all residential projects. It ranges from general data about the projects and their target clientele to more specific information on TDM program requirements.

New multi-family developments in the region for which this information had been gained were geared toward the middle or upper-middle class income range. None of the projects contained low income housing. Background checks on prospective tenants of a sample of these developments, conducted at most new projects, showed average incomes between $36,000 and $43,000 per apartment. The turnover rates ranged between 5 and 10 percent per month, or around 75 percent per year, and were considered normal by the management. With the exception of the few projects within the city of Seattle where the parking ratios were around 1.2 per apartment, the parking ratios on the suburban projects ranged from 1.6 to 2 spaces per apartment.

In general, the representatives of the development community were not very interested in the TDM requirements on their projects. They did not consider them important and, for the most part, seemed either not to be aware of them or to ignore them. In many cases, the developers had no concept of the requirements and their rationale were not particularly cooperative. The only exceptions were two of the major companies in the area, and developments in the city of Seattle, where all contacted developers complied with their requirements. Transportation issues such as access to transit or proximity of park and ride...
lots were not decision criteria in siting projects. Those who were aware of the requirements for their projects tended to be skeptical about the actual success of these programs.

None of the developers considered the requirements to provide information, a commuter information center, a bus pass, or a transportation coordinator a problem. While no developer had kept track of the actual costs for these requirements, both financial and personnel costs were considered minor or negligible in comparison to the overall costs of the project. This was true both for projects where these TDM measures were implemented, with estimated costs in most cases below $1000, as well as for projects whose developers were asked to estimate the potential costs of the above requirements for their projects. (A one-zone pass cost $26, and the distribution of information and passes was easily incorporated into the work of the project manager.) The only exception was the shuttle at the Park at Forbes Creek, where the ridership did not justify the expense. According to the developer, operating costs were about $3,000 per month, and the resale value of the project would have decreased by $400,000 if this expense had continued.

However, much more concern was expressed about the high costs of physical requirements such as sidewalks and bus pads, which can run up to several tens of thousands of dollars. In one case, the requirement for a sidewalk along the project was at first overlooked by the developer but later enforced by the county. The company refrained from going to court only because of plans for a second project in the neighborhood of the first one. None of the developers who acknowledged the existence of requirements had any problems understanding or implementing them.

With one exception, all representatives of developers who actually contacted Metro to negotiate and/or implement its requirements were pleased with the support Metro staff had given them. Metro response was considered timely and adequate.
4.2 Perceptions of residents and tenants

The material presented below was obtained through previously unpublished surveys conducted by Metro of residents of Ballinger Commons (Metro, 1989a) and The Park at Forbes Creek (Metro, 1989b), two projects with TDM requirements, a focus group meeting, and comments from managers and developers. The limited number of cases did not warrant distinguishing the projects by external factors such as the level of transit service available or density around the projects.

Interviews with managers of multi-family developments revealed that the interest of residents in transit and car- and vanpool options was small. If residents asked for transit information at all, which they rarely did, questions about directions and distance to the closest park and ride lot prevailed. To the knowledge of the developers and managers, there were no tenants who did not own a car and were thus dependent on transit. As the manager of one of the projects put it: "People who move here expect to use their cars."

The experience with the shuttle service at The Park at Forbes Creek confirmed this attitude. Here, the developer was required to provide free peak-hour shuttle services to the closest park and ride lot. While The Park had close to 500 units and an occupancy rate of 95 percent, only five residents rode the shuttle on a regular basis. The shuttle service was discontinued after nine months.

According to the manager, only 5 percent of Park residents took advantage of the substitute offer, a free one-month, two-zone bus pass. For five other projects with a bus pass requirement, a similar response rate was reported. While no figures on the actual number of requested bus passes could be obtained, the managers of these projects estimated that between 5 and 10 percent of the residents had asked for the passes. In most cases, the tenant was informed about the offer personally or through an information package upon moving in. The only exception to this was Remington, a single-family project, where about 40 percent of the residents had requested a bus pass (Hendriksen, 1990). In that case, however, the offer was made at the project's well attended first Home Owners Association meeting, after the
transportation management requirements had been introduced. Residents just checked their name on a list. At Ballinger Commons, the one project where this information was available, survey results indicated that the bus passes were used an average of nineteen times during that month.

One other requirement on large multi-family projects was the provision of a commuter information center (CIC). According to the Ballinger Commons survey, despite the fact that 65 percent of the respondents knew about the existence of the CIC, only 11 percent had ever looked at it (n=190). At The Park, 55 percent (n=76) of the respondents had considered it very likely or somewhat likely that they would commute by bus, carpool, or vanpool if a CIC were available. However, despite the fact that The Park provided a CIC and had gone to great effort to inform residents about the shuttle and other transit and ridesharing options, only 23 percent of the respondents actually had used one of these modes of transportation. The manager had even used the closed-circuit TV system of the project for promotion without, according to him, any success.

Participants of the focus group meeting at the single-family development stated that they would be more likely to take notice of transit or rideshare options if the information were provided in a regular newsletter, e.g., the monthly publication from the Home Owners Association. They suggested that the transportation coordinator on the project be responsible for listing project residents who were interested in carpooling or vanpooling in the newsletter, include information from the ridesharing agency in the area, as well as transit information and updates.

Residents were asked about the likelihood that they would change their mode of transportation if someone at the residence would help them plan their commute. At The Park, where the shuttle service was provided, 38 percent of the respondents answered that they were very likely or somewhat likely to change their commute behavior. At Ballinger Commons, 24 percent considered it very or somewhat likely. Interestingly, both projects had
a TC requirement, and at both sites a representative of the management served in that position at the time the survey was conducted.

Several projects were required to provide secure bicycle storage facilities. When asked whether they would change their commute if bicycle facilities (bike paths, storage for bikes, free loaner bikes to ride to a nearby park and ride lot) were provided, 38 percent of the respondents at The Park considered it very likely or somewhat likely. At Ballinger Commons, 7 percent considered it very likely or somewhat likely.

For reasons stated above, very little can be said about the effectiveness of different TDM measures on residential projects. It seems clear, however, that most residents are not interested in using HOV modes of transportation at projects without low-income housing. It is also not apparent to what extent people's stated willingness to change behavior will match their actual behavior over time. However, the survey results from The Park indicate that actual behavior changes may be much smaller than the stated willingness to make those changes.
CHAPTER 5.0

IMPLEMENTATION PROBLEMS WITH EXISTING RESIDENTIAL TDM PROGRAMS

Since the original intent of the research could not be carried out because of the small number of developments with TDM programs, the researchers tried to identify reasons for this failure. In the process of research for this project, a number of problem areas were uncovered related to

- the decision process that leads to TDM program requirements for residential projects,
- institutional memory about the requirements,
- monitoring,
- enforcement of compliance, and
- adequacy of the measures.

The following is a description of these problems.

5.1 Decision process leading to the imposition of requirements

All projects listed in this study were assigned requirements under a case-by-case negotiation process as part of the State Environmental Policy Act (SEPA) review. Interviews with staff showed that as of May 1990 none of the jurisdictions had established administrative guidelines or an ordinance imposing TDM requirements on residential developments, although efforts were under way to establish ordinances in all four jurisdictions. No performance goals had been established by any of the jurisdictions, neither for the overall effect of TDM strategies on residential projects nor for specific projects or classes of projects. King County, Kirkland, and Redmond usually required the developers of projects to contact Metro to negotiate the set of TDM measures appropriate for that project and/or to fulfill the requirements. However, procedures varied among jurisdictions.
Kirkland used a "rule of thumb" to decide on requirements for particular projects and had not established a coherent set of criteria or a consistent process. In Redmond, a project generally had TDM requirements if it contained more than 100 units. If it was close to a bus line, it was required to provide a bus pad and shelter as well as pedestrian access to that shelter. Further requirements were the distribution of information on transit and ridesharing options and a free one-month bus pass over a varying period of time. However, the process was not well established and staff were not operating on a decisive set of criteria.

Unincorporated King County had tried to establish a process for assigning requirements to residential developments. In general, when a project was large enough to be required to conduct a traffic impact study under SEPA, a special review process to include transportation demand management was triggered. The county then tried to ensure that Metro received a copy of the study. In turn, Metro was supposed to put together a set of requirements to recommend to the county. Because of a lack of an established procedure, this process collapsed. From then on, Metro was usually notified as part of the regular SEPA procedure for the project. Metro would work out a set of requirements in negotiation with the developer and send it to King County's Building and Land Development division to be included in further permit review and approval.

In the city of Seattle, residential projects with 20 or more parking spaces had TDM requirements. The Department of Engineering looked at the permit application for each project and could require further information. If deemed necessary, it might ask the Department of Construction and Land Use to request a traffic impact study. After review of all available information, the Department of Engineering would, in close cooperation with Metro, propose requirements such as bus passes or CICs, but the Department of Construction and Land Use (DCLU) was responsible for imposing the requirements. DCLU was not required to follow the Department of Engineering's suggestions. This process was followed for all types of projects within the jurisdiction of the city of Seattle under SEPA, including non-residential land uses.
These processes allowed for a great amount of flexibility and thus enabled the planning staffs in each jurisdiction to set requirements for a project according to the unique situation of a site. This flexibility can be advantageous when new TDM measures are tested; however, it can also create a set of problems, as described below.

During the initial review, insufficiently trained staff may be unable to recognize the significance of a project because of inexperience with TDM programs on that type of project. They may use their discretion and decide that the project does not need mitigation, while it actually has unrecognized or underestimated impacts that justify TDM requirements. While such requirements can still be imposed at a later stage, that is not likely to happen.

If there is no established process, implementation of TDM program measures is open to irregularities and unintended equity problems. As can be seen in Figure 3, there was no relation between the size of the project and the type or number of requirements imposed on that project, despite the fact that Metro, a single agency, established the requirements for the majority of developments in suburban areas. There were no clear thresholds for any given mitigation measure. (Figure 3)

A further problem lay in the need to use SEPA procedures. First of all, only projects considered for SEPA review were considered for TDM requirements. Second, if a project had a large enough impact to justify transportation mitigation measures, they could be implemented in two ways: (1) if the project was considered insignificant under SEPA for all other issues, it had to receive a determination of insignificance that included the mitigation for transportation impacts; or (2) if a project was expected to have a significant impact under SEPA, an Environmental Impact Study would be required and transportation mitigation measures would result from that process. When this paper was written, no process had been established to ensure that mitigation would occur.
An additional problem was posed by the fact that the use of SEPA tended to curtail regional mitigation. While one project by itself may not have a significant traffic impact, it can create problems if it is combined with other projects nearby. SW Campus Drive in Federal Way is a case in point. Campus Drive was a major development area in which several of the projects analyzed in this paper were located. In at least three cases, TDM measures were required for developments with more than one building phase, but only one of the phases had TDM requirements. One single-family development had five divisions totaling over 300 houses, but only one of its divisions, with about 60 houses, had TDM requirements. On at least one project, of about the same size as its neighbors, no requirements were imposed. SEPA theoretically requires consideration of cumulative impacts, but administratively, it is very difficult to impose mitigation measures based on cumulative impacts. This difficulty was apparent in cases in which no procedure had been established, such as in the residential projects analyzed here.
In the Puget Sound region, the decision process using the case-by-case approach has proved to be too flexible. To ensure predictability and continuity, an ordinance must be developed that structures the requirements for residential developments and/or sets clear performance goals for the TDM program on the residential project. However, the development of an ordinance requires a certain amount of commitment by the jurisdictions to TDM requirements on residential projects. They need to decide what they want to achieve with the policy, relate it to their overall transportation goals, and determine how much staff and money they are willing to commit to the effort.

5.2 Institutional memory of the requirements

According to officials, none of the jurisdictions that had residential developments with TDM requirements had a compliance tracking system when this paper was written. Thus, information on requirements for developments could and did get lost. Even for the city of Seattle, which had a process to determine the significance of applications, information proved to be incomplete. A representative of the county conceded that under the present system, information on transportation mitigation requirements could get lost when the application went through the subsequent stages. Thus, Metro could have projects on file that were supposed to implement TDM measures, but the county might not have received notice of any requirements on the same project.

As described above, only a small percentage of the developers contacted claimed awareness of the requirements on their projects. While some lack of knowledge can be explained by the lack of a jurisdictional tracking system and active enforcement, there were other reasons for this phenomenon. At the developer's office, the person who guided a project through the permit application process was not necessarily the person who would be responsible for it when the time came to implement the requirements. This could be true even within the same company. Interviews with developers showed, in at least three cases, that the agent responsible for a project changed during the course of this investigation. Even
though the first respondent had been aware of the requirements imposed on the project or was in the process of negotiating them, the next person did not know about them. In another case, the respondent said that he had just taken over the project, had found reference to the mitigation requirements only by chance, and was starting to negotiate them.

Further complicating the transfer of information is the fact that, commonly, development companies hand a project over to a management company once it is occupied. While the agent in the developer's office may be aware of the requirements, on-site management may not be informed. In at least one case the researchers observed that information on requirements was lost in the transferral process. One developer mentioned that a 1986 change in tax law complicated the process of information transmission. The law made it more profitable for developers to sell their projects shortly after they were finished and occupied and thus increased the percentage of projects that were sold shortly after completion.

Institutional memory is an important factor in ensuring compliance with TDM requirements. The analysis of existing projects and requirements showed that both the staff at the jurisdictions and the developers, managers, and owners of residential projects often did not know about the requirements of the project, or in the case of the developer or manager, claimed not to know about them.

To ensure that the information does not get lost both at the jurisdiction's and the developer's offices, the TDM ordinance should have clearly defined objectives and requirements. It is important to tie the requirements explicitly to the land, independent of ownership or control of the project.

5.3 Monitoring compliance

A monitoring mechanism is needed to ensure compliance with the mitigation measures and to determine whether the developer has made a "good faith" effort to implement the mitigation measures within a reasonable time frame and at an acceptable level
of quality. Furthermore, monitoring is particularly important for a new set of rules and requirements (such as transportation mitigation measures for residential developments) to enable the jurisdictions, Metro, and developers to examine the usefulness of the measures or sets of measures and to modify them accordingly.

When this paper was written, monitoring for compliance with mitigation measures in the Puget Sound region was very limited. This lack of attention could explain in part why so few developers responded that they knew about the measures. None of the jurisdictions had established a process of monitoring compliance, nor was any of them monitoring projects with TDM requirements on an informal basis. However, there were a few exceptions.

In the case of The Park at Forbes Creek, the developer had completed the negotiation process with Metro and had complied with all requirements, including the shuttle. The project had been monitored by Metro. Without Metro's interest in the shuttle and its ridership problems, and without the developer's desire to make the project work, Metro would not normally have monitored it so closely. According to the developer, one staff member of the city of Kirkland, where the project was located, made "a few informal phone calls." None of the other four projects with requirements belonging to that company had been closely monitored.

Apart from that, monitoring occurred only when mitigation measures required physical structures such as sidewalks or bus pads and shelters, or, as in the city of Seattle, CICs. In one case in the city of Seattle, compliance with a CIC requirement was monitored when the Certificate of Occupancy was issued, but there was no follow up.

None of the jurisdictions in the Puget Sound area effectively monitored the projects, except when physical structure such as sidewalks were required. Thus, neither the effectiveness of the existing mitigation measures nor compliance with the TDM requirements could be established.
5.4 Enforcement of compliance

Enforcement of mitigation measures should not be necessary if the developer makes an earnest effort to comply with them and make them work. However, jurisdictions need to establish a legal basis for enforcement so that violations can be pursued.

Since none of the jurisdictions had effectively monitored compliance with TDM requirements on residential developments or established any performance goals, it is not surprising that none of the jurisdictions in the Puget Sound area had established penalties for noncompliance when this analysis was conducted. Again, the only exceptions seemed physical structures such as sidewalks and the shuttle at The Park at Forbes Creek. The shuttle at The Park was the only requirement for which performance goals been established on any of the projects.

However, to set performance goals for the traffic mitigation measures on a residential development, the jurisdiction must first decide what it wants to achieve with its residential TDM programs; that is, it must establish its role in achieving its overall transportation goals. It then must determine how close to achieving these goals it can come, given its financial, personnel, and political situation, and adjust them accordingly. Only if a realistic and feasible balance between the goals of the mitigation measures and the administrative capacity is achieved can transportation mitigation requirements be monitored and enforced effectively and the credibility of the program be ensured.

5.5 Adequacy of TDM requirements

Even if the developer makes a good faith effort to implement the requirements imposed on the project, they will not necessarily result in a significant or recognizable change in commuting habits. The experience with the free shuttle service at The Park at Forbes Creek, where the developer made every effort to make it work, is a case in point. Obviously, it was not the appropriate measure, given the location of The Park and the demographic composition of its residents. Other examples include projects located on Campus Drive South West in Federal Way. Campus Drive South West is a new development
area with about 3,000 new apartments and houses. When the research for this paper was conducted, it did not have walking access to a bus line, only driving access to a park and ride lot three miles away. However, three of the projects with TDM requirements had a bus pass requirement.

Other factors, such as the proximity and convenience of transit service; the destination and length of commute trips; transportation and parking management at the work site; size, design, and lay-out factors at both the residential site and work site; as well as land use and zoning decisions, are important determinants that can potentially overwhelm all incentives resulting from the mitigation measures. These factors are addressed below.
CHAPTER 6.0
DIFFERENT APPROACHES FOR TDM PROGRAMS
AND THEIR IMPLICATIONS

In recent years, a small number of communities in other parts of the country has established traffic mitigation ordinances that include measures for residential developments. While none of them has been formally evaluated yet, their consideration may assist in solving the problems identified for the home-end TDM programs in the Puget Sound region.

6.1 Decision process leading to the imposition of the requirements

The problems arising from a case-by-case approach, as described above, indicate that, despite its flexibility, it is not the appropriate method. The decision between predictability and equity, combined with better administrative feasibility on the one hand and effective requirements tailored to the individual project on the other, should be made clear and carefully considered on a political level. Below, two very different existing approaches are described.

The first approach is the development of an ordinance with minimum size thresholds for increasing sets of requirements for residential projects.

North Brunswick, New Jersey's, traffic management ordinance is a good example of such an ordinance. For developments of 20 or more units, the developer must conduct a commuter survey to determine, among other factors, work place location and work schedule characteristics. For developments with 50 to 200 units, a 15-car vanpool park and pool lot is required. A 200 to 350 unit project must provide 30 park and pool spaces. A development with 350 or more units must construct park and ride facilities at the ratio of one parking space per ten units. (Kish, 1990; KPMG Peat Marwick, 1989)

Montgomery County, Maryland, on the other hand, allows the developer to choose among a set of options. The developer can decide either to finance the expansion of roads or
to reduce commute trips on an already existing project to mitigate the impact of the new development. In the latter case, the county authorizes the developer to devise the program, but the plan has to be approved by the county. (Hekimian, 1990; KPMG Peat Marwick, 1989) This approach allows development of a set of TDM measures tailored to the individual project and the transportation problems and options of its surroundings.

While this investigation was conducted, unincorporated King County and Seattle were in the process of drafting ordinances that included transportation mitigation measures on residential developments. Unincorporated King County, Kirkland, and Redmond were involved in drafting a TDM ordinance for the Eastside Transportation Program (ETP), which is trying to coordinate transportation planning for a larger area in eastern Puget Sound. The ETP includes parts of King County on the eastern shore of Lake Washington, as well as Kirkland, Redmond, Bellevue, Bothell, and Issaquah (see Figure 1 for map). In its residential section, the proposed ordinance required every developer of one or more units to disseminate public transportation information to new tenants or home buyers, in addition to free ride coupons. Furthermore, it required a financial contribution to park and ride lots or HOV facilities. Developments with 10 or more units were required to present a site plan facilitating public transportation needs and access to transit and ridesharing facilities. Each residential development over 50 units was required to conduct a biannual survey of its residents and to comply with all other requirements. By increasing the responsibilities of the developer with increasing project scale, it was a fair and equitable approach, since it applied to virtually every developer and not only to those above a certain size. (ETP, 1990)

Thus, all jurisdictions involved had recognized the need for clearly defined, consistent and predictable TDM requirements and were working towards that end when this paper was written.


6.2 Institutional memory of the requirements

As discussed above, one of the major problems with the existing approach is related to the lack of the jurisdictions' and developers' knowledge about the TDM requirements. If no process ensures that both know about the requirements imposed on the project, it is very easy for the developer (or later, the manager) to lose track of or ignore the requirements. Since measures are usually implemented only after the project has been occupied, when the original developer may already have sold the project or handed it over to a management company, they should be tied to the land. In addition, an effective monitoring process should ensure tracking.

One way to make sure that both the administrative staff of the jurisdiction and the developer are aware of the requirements is to establish an ordinance with a clear set of requirements dependent on the size of the development. Once in place, the requirements will become common knowledge, and developers with more than one project cannot claim ignorance.

Alexandria, Virginia, goes one step further by requiring (partial) compliance with the requirements before giving out a transportation management special use permit. The ordinance specifies that the permit runs with the land and is mandatory and binding not only to the applicant or owner, but to all their successors, heirs, or other occupants of the project. *(KPMG Peat Marwick, 1989)*

6.3 Monitoring compliance

While effective monitoring is an essential part of any program requiring transportation mitigation measures, it must not exceed the staff or financial capacity of the responsible administration. Thus, the requirements should be easy to monitor, or, if possible, be to some extent self-monitoring.

Montgomery County, Maryland, uses a combination of a self-monitoring and developer-paid audit process before county staff conduct their own review. The developer is required to submit a monthly report on the success of the mitigation program. To ensure that
the information provided by these reports is correct, the developer pays a fee, which the county uses to pay an independent auditor. The auditor monitors the project at regular intervals and provides the county with an assessment. Instead of monitoring the implementation of the program on site, which would involve considerable effort, Montgomery County staff simply review both documents. (Hekimian, 1989, 1990)

Alexandria, Virginia, requires the presentation of a transportation demand management strategy before a special use permit is issued. Furthermore, it requires that an annual per unit fee of $60 be paid into a citywide fund. The TC on the project uses this money for transit subsidies. If the money is not spent, it can be reprogrammed if the city approves the new use. Otherwise, the city can use the money to promote transit. Thus, city staff are involved in the monitoring process only if necessary. It is in the developer's interest to run the program to get a full return on his investment. (Grossman, 1990; KPMG Peat Marwick, 1989)

6.4 Enforcement of compliance

Apart from a feasible monitoring process, a functional enforcement process is necessary. As stated earlier, insufficient monitoring of the implementation of transportation mitigation requirements makes enforcement of the provisions of the agreement difficult or impossible. In addition, penalties for noncompliance, such as withdrawing use and occupancy permits, levying fines, or injunctions through court, while existent on paper, may be difficult to impose because of time and expense. However, even if the jurisdiction has trouble enforcing compliance with requirements on existing projects, a functioning monitoring process is useful if it establishes the permit process for future developments. Once the developer knows that future projects may run into trouble, compliance with requirements on existing projects should become normal procedure. The case of the project with the sidewalk requirement, mentioned above, illustrates that effect.
Failure to make a good faith effort to comply with requirements on residential developments can result in fines in Concord and Contra Costa, California; and North Brunswick, New Jersey. (KPMG Peat Marwick, 1989) However, when this paper was written, none of these jurisdictions had fined a developer. In Alexandria, Virginia, failure to comply with requirements may result in revocation of the transportation management special use permit, although this also had not yet happened. (Grossman, 1990)

Montgomery County, Maryland, has a unique method of enforcing requirements on developments. Developers are required to reach their performance goals before they receive a building or occupancy permit. The permit can be withheld until the performance goal has been reached. After occupancy, a performance bond is used to maintain the performance of the program if the developers' own efforts prove inadequate. (Hekimian, 1989,1990)

6.5 Adequacy of the requirements

Transportation mitigation measures are useful only if they are appropriate for the project. To ensure this, experience from similar projects should be considered. Montgomery County, Maryland, involves the developer in drafting requirements and is thus able to tailor the requirements to each project. While the developer is allowed to choose the mitigation measures to reduce traffic impacts, the jurisdiction sets strict traffic reduction goals.

Information on commute behavior and attitudes is essential to make mitigation measures as efficient as possible. Residents should be surveyed at regular intervals. North Brunswick, New Jersey, requires that each new tenant or condominium owner fill out a work place/commuter survey. This is used for carpool and vanpool coordination and to determine where a shuttle service might be feasible. (Kish, 1990)

One option for dealing with the conflict engendered by the necessity to develop a clear, equitable, and functional set of TDM measures for each development would be to require all developers to pay an annual fee based on development size into a transportation fund. This fee could apply not only to "hardware" such as park and ride lots, but also to the
"software," i.e., the actual program. This method would be an extension of the approach Alexandria has taken. Developers could decide either to spend the money through approved transportation demand management strategies of their own or to let a regional transit authority integrate their projects into a bigger program.
CHAPTER 7.0
OTHER FACTORS INFLUENCING
THE EFFECTIVENESS OF TDM PROGRAMS

Apart from the processes of establishing, monitoring, and implementing transportation mitigation requirements on residential developments, several other factors influence the success of these measures. While each factor by itself may not determine the success or failure of a TDM program, they are important components influencing the decision process of commuters and should thus not be ignored. They range from the proximity and convenience of transit service to the length and destination of the commute, transportation demand management at the work site, site design at both the residential project and the work site, and zoning and land use policies.

7.1 Proximity and convenience of transit service

With the exception of the three new developments within the city of Seattle, all projects evaluated in this study were located in suburban areas. Generally, in suburban areas transit service is less frequent, and the closest bus stop or park and ride lot are often not accessible by foot. According to members of the focus group meeting at Remington, good access to a park and ride lot is an important factor in mode choice. Furthermore, the access to the park and ride lot is often the most congested part of the commute and thus takes an inappropriate amount of time. The longer the access distance or travel time to transit, car- or vanpool in relation to the total commute, the less people will be likely to use alternative modes of transportation.

In addition, suburban work sites may not be linked to the public transportation system. Thus, the tenants of residential developments with a good TDM program may not be able to use public transportation to commute even if they are willing to do so simply because their work sites are not transit accessible. A study conducted in 1989 by the Center for Urban
Transportation Research (CUTR) of the University of Florida showed in its national sample that 22 percent of the people with access to public transit at their residence did not have transit access at their work sites. For work sites in the suburbs, which are the destination of many commuters originating in the suburbs, this percentage is probably even higher.

### 7.2 Destination and length of commute trips

In previous decades the majority of professional jobs have been located in urban centers. However, in the 1980s, jobs shifted towards suburban areas. In 1980, 57 percent of all office space in the U.S. was located in urban centers and 43 percent in suburbia. In 1986, the reverse was true; 60 percent of all office jobs were in the suburbs, and 40 percent in the cities. (Pisarski, 1987; Office Network, 1987) Between 1960 and 1980, suburb to suburb commutes in metropolitan areas with a population larger than 250,000 increased from 30 percent to almost 42 percent. (Fulton, 1986) The national survey conducted by CUTR indicated that one effect of the "suburbanization of the work place" is that people tend to live closer to their jobs. (CUTR, 1989)

While precise local figures were not available, a similar trend was clearly recognizable in the Puget Sound region. The surveys conducted at The Park at Forbes Creek and at Ballinger Commons, both multi-family rental projects, showed that the majority of respondents worked in a suburban environment, often fairly near where they lived. The survey conducted at The Park showed that only 15 percent of the respondents worked within the central business district of the city of Seattle. (Metro, 1989b) At Ballinger Commons, 23 percent of all respondents worked in downtown Seattle. (Metro, 1989a) According to one manager of another multi-family rental project, most of her tenants worked nearby as well. The recent study conducted by CUTR found that average national commute distances (with the exception of city to city trips) and times between suburbs are shorter than those for any other commute. (CUTR, 1989)
In the **Puget Sound** area, an increasing number of multi-family rental projects receive building permits in suburban areas. The remark of the manager that most of her tenants worked nearby indicates that people who rent rather than buy are more likely to live closer to their work site — if they can afford it — than people who own or buy houses. A regional telephone survey conducted by Metro in north King County showed that mean commute time by different types of dwellings were not significantly different. However, the cumulative percentages showed that **27.4** percent of the people who lived in multi-family developments in North King County and drove to work alone had car commute times of ten minutes or less, while this was true for only **20.9** percent of the respondents who lived in single family homes and drove to work alone, a 6.5 percent difference. (Gilmore Research Group, 1989) This finding implies that a portion of suburban renters live at a distance from their work site because they can not afford to live nearby.

### 7.3 Transportation demand and parking management at the work site

The success of efforts to manage transportation demand at the residential end is also affected by the existence of TDM programs and parking management strategies at the work-end. If the majority of the work sites of tenants or residents of new residential developments already have substantial programs, implementation of a program at the home-end may have little effect. On the other hand, certain changes at the work site, such as the removal of free parking, can have a positive impact on TDM programs both at the commercial and residential ends. According to several studies published recently, parking management is one of the most, if not the most, important decision factor in mode choice. (see e. g. Cervero, 1988; CUTR, 1989; Kenyon, 1984; Surber et al., 1984)

### 7.4 Site, design and layout factors
#### 7.4.1 Residential site

Recently, an increasing number of transportation scholars have pointed out the importance of factors such as size, layout, and design of a project to the level of transit use.
Only above a certain number of riders and a certain density is public transit feasible. A cul-de-sac arrangement, favored for both multi- and single-family developments, discourages not only through-traffic but also transit access by forcing buses to retrace their routes. While most residential developments have a system of sidewalks, they are often self-contained to discourage trespassing. At the same time, however, that arrangement makes it more difficult for residents to gain access to facilities outside the development and creates prohibitively long walking distances. The emphasis on automobile access has led to a layout that gives preference to car use (especially convenient parking and car access), rather than to a truly pedestrian-friendly environment.

7.4.2 Work site

In addition to factors related to the residential project, factors related to the work site influence the commute decisions of residents. Robert Cewero found that most suburban office projects were insensitive to the needs of pedestrians, cyclists, and transit users. Site layouts segregating buildings and land parcels in many instances create environments hostile to pedestrians. Similar to the layout of residential developments, wide setbacks and separate access roads on commercial developments discourage the entry of transit vehicles on these developments. Cewero concluded: "Where foot travel and transit travel are relegated to a second-class status, not surprisingly, solo-commuting predominates." (Cewero, 1988, p. V)

Thus, a good TDM program on the residential side can be rendered worthless if the appropriate measures are not taken at the work site as well.

7.5 Land use and zoning policies

Cervero found that the low density, single-use, and non-integrated character of many suburban office or commercial centers leads to a dependency on the car. In campus-like office parks, the trademark of many high-tech companies in the Puget Sound area as well as elsewhere in the country, employees need their car to run midday errands, go out for lunch, or travel to the bank. He asserted that on-site or near-site retail services such as shops and
restaurants, as well as banks and day-care facilities, are important to lure suburban workers out of their cars. To support this, mixed-use environments were found to have the highest percentage of car- and vanpool arrangements and transit ridership. (Cervero, 1988) While his study was based on suburban economic centers only and did not include the impacts of traffic mitigation measures on the residential end, it is evident that the success of home-end TDM programs is strongly influenced by the situation at the work-end.

Furthermore, authors such as Cervero, Bhatt and Higgins, and others have pointed out the importance of density requirements for residential developments and the necessity to move toward mixed-use zoning policies that allow higher density residential, commercial, and office development to take place near one another as well as near a transit system. A new design concept for suburbia, the "pedestrian pocket", recognizes this need and places all elements within a quarter-mile walking distance to each other. (Kelbaugh, ed., 1989)
CHAPTER 8.0
RECOMMENDATIONS AND CONCLUSION

8.1 Recommendations

This section provides four approaches to designing TDM ordinances for residential developments that mitigate the implementation problems presented above. Both a study on existing TDM ordinances, including requirements from residential developments in other parts of the country (KPMG Peat Marwick, 1989), as well as information from personal communication with staff from these jurisdictions, are included here. However, the following recommendations do not guarantee the success of TDM measures at the home-end; rather, they are designed to give them a chance of success — if the issues concerning zoning, land use policies and other factors are also considered.

The first step for each jurisdiction considering TDM requirements on residential developments should be to decide what it wants to achieve with that policy. It needs to ensure that the policy is consistent with the overall transportation goals for the jurisdiction and the region, and with the land use and zoning laws. Once it has decided to implement TDM measures on residential developments, it must make the commitment to follow through. In addition, the jurisdiction needs to ensure that the costs of the TDM strategies for the developer are scaled to their potential impact. The local jurisdiction should be able to afford the administrative costs to monitor compliance with the requirements and to enforce them. The next step is to balance all of the above against the political climate in which the jurisdiction operates and to decide on a policy. The research for this report has illustrated the results when jurisdictions have not considered these steps carefully enough. Four different approaches to a TDM ordinance for residential developments appear possible after consideration of these issues.

1. The first approach is to develop an ordinance requiring minimum size thresholds for increasing sets of requirements. The bigger the project is, the larger is the number of
requirements and the higher the costs. The developer is not required to meet any performance goals apart from the implementation of the measures themselves. This approach is appropriate for jurisdictions where transportation problems are heavy enough to warrant action, but not heavy enough to demand more stringent requirements. It is also most appropriate for small projects and is used for commercial developments by many jurisdictions in the country. It ensures predictability and continuity and is fairly easy to monitor. Since the requirements are clearly stated for each size of development, the information on them cannot get lost. However, this approach cannot ensure that the requirements are adequate for that particular project, and enforcement may prove difficult if the requirement is not appropriate.

2. To avoid inadequate TDM measures for a residential development, the jurisdiction may, in a **second approach**, decide to put the choice of the TDM program measures into the hands of the developer. While a basic set of measures should be carried out for each project, the developer must then choose further measures from a list of additional requirements in order to tailor the TDM program as closely to the development as possible. This second approach is particularly appropriate for larger developments. The jurisdiction reviews the TDM program, approves it if it is considered appropriate for the project, and issues a transportation special use permit. The permit is tied to the land; therefore, the information on the requirements cannot get lost. It can be revoked if the jurisdiction finds that the development's TDM requirements are not carried out adequately.

3. The **third approach** is a variation to the second approach. Its implementation is dependent on the severity of transportation problems in the area and the political feasibility of even stronger requirements. The jurisdiction sets performance goals and leaves the choice of TDM measures up to the developer. In this case, the jurisdiction monitors the performance of the TDM program to determine whether the developer reaches its goals. The jurisdiction revokes the transportation special use permit if the developer does not make a good faith effort to reach these goals.

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4. A **fourth approach**, even more stringent than the above, is to require the developer to mitigate the projected traffic impact of the development before it has been built. The developer must do this by devising and implementing a TDM program on an already existing project. The developer does not receive a building permit before the performance goal for the TDM measures has been reached. This approach requires a high degree of commitment from the jurisdiction and is politically feasible only if the transportation system in the jurisdiction or region cannot be eroded any further. To simplify the monitoring process for the jurisdiction, each TDM program's process has to be reported to the jurisdiction on a regular basis. To ensure the **correctness** of these reports, a process that requires the developer to pay for an independent audit mechanism, in addition to the self-monitoring processes, used in Montgomery County, Maryland, is an appropriate solution.

To ensure compliance under all approaches, the jurisdiction may decide to require the developer, manager, or owner to pay an annual fee for each unit into a fund or performance bond. The developer can then use the fund to comply with the requirements, e.g., buy bus passes. Should the jurisdiction determine that compliance is inadequate, it can use the funds to finance TDM programs. If the developer is found to have made a good faith effort, he or she may be allowed to incorporate the remaining funds into the next year's program. The policy may also allow the developers to organize themselves into Transportation Management Associations in coordination with commercial areas in order to pool resources and efforts.

**8.2 Conclusion**

The quantitative evaluation of TDM requirements on residential projects in suburban Puget Sound proved difficult, since only a small number of projects had implemented these measures. However, the analysis of available quantitative and qualitative information pointed out implementation problems related to:
• the decision process leading to the imposition of mitigation requirements,
• institutional memory of requirements,
• monitoring of compliance,
• enforcement of compliance, and
• adequacy of mitigation requirements.

The research presented above shows the dilemma many jurisdictions face. The case-by-case approach to transportation demand management on residential projects used by unincorporated King County, Kirkland, and Redmond leaves both the staff of the jurisdictions, as well as the developer, with too many uncertainties about their respective responsibilities and creates equity problems. It does not send a strong enough signal of commitment on the part of the jurisdictions and allows developers to ignore or overlook their responsibilities. On the other hand, the evaluation of existing projects with implemented TDM measures has proved the importance of tailoring requirements to a particular development, as well as its surroundings.

Transportation demand management at residential projects, like any other policy, needs clearly defined and measurable goals and commitment by the local jurisdiction. It has to be integrated in a wider framework of local and regional transportation planning, to be balanced with the land use and zoning policies of the jurisdiction and the region, and to account for the financial and personnel capacity of the jurisdiction. A stringent and well considered TDM ordinance for residential developments is worthless if it cannot be monitored and enforced, if it is not linked to land use and zoning policies, or if the political climate does not allow for the level of commitment on the part of the jurisdiction necessary to make the envisioned residential TDM policy feasible. Thus, it is necessary to decide between the need for clear thresholds, a well structured ordinance, and the particular requirements of the project, while keeping the tradeoffs among them in mind. The success of development, imposition, monitoring, and enforcement of TDM measures on residential developments is not only dependent on the quality of the implementation of these strategies but also on other
factors such land use and zoning policies. However, jurisdictions have a number of options for implementing TDM ordinances for residential projects to mitigate implementation problems.
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APPENDIX A

INTERVIEW GUIDES
1. INTERVIEW GUIDE FOR DEVELOPERS ON HOME-END DEMAND MANAGEMENT STRATEGIES

1. Information on the project

1.1. Rent range/price per unit.

1.2. Is this project targeted towards a specific clientele? (e.g.)
   - Singles/married couples, with kids?
   - Age group
   - Socio-economic group/income range
   - Other

1.3. Occupancy rate

1.4. Turnover

1.5. Parking ratio
   1.5.1. How many stalls per GSF? At the legal ratio? Is that enough?

   1.5.2. Are there any tenants without cars? How many?

1.6. Nature of sidewalks
   1.6.1. Is there a complete system throughout the entire development? (Do people have to use parking lots or roadways in some parts?)

   1.6.2. Is continuous walking access to transit provided? If the project has a wall or a fence around it, are there breaks to ensure easy access to transit facilities outside?
1.7. Transportation Coordinator

1.7.1. Is there a transportation coordinator on the project? (name, phone #)

1.7.2. How much time does he spend on his task? What is his salary?

1.8. Does the project have a communal area or an on-site office where information can be provided and shared? Is it used?

1.9. Is there a tenant organization on the project?

2. TDM program requirements on the project

2.1. Which of the required measures were you able to implement to date?

2.2. How long did it take you to implement them?

2.3. Did you have any implementation problems? If yes, what were they for each requirement?

2.4. Costs

2.4.1. What are the construction costs for the entire development?

2.4.2. Which portion of these costs were required to fulfill TDM program requirements? (actual or estimated $)

2.5. Are you in the process of implementing any of the remaining required measures at this time? (If so, which ones?)

2.6. Why were you not able to implement them to date? Were there any particular problems?
2.7. **Do** you expect to be able to implement them? When?

2.8. **Are** there any required measures for this project you will not be able to implement? Why is it not possible?

2.9. Is the jurisdiction enforcing the requirements or do you have leeway?

2.10 **Has** that influenced compliance with the requirements?

2.11. Did you know whom to contact at Metm to establish a CIC, provide bus passes, etc.?

2.12. Were there any problems with the contact at Metm or with Metm **procedures**?

3. **Experience with the TDM program on the project**

3.1 How did the **tenants/buyers** of the project react to the **offer(s)**?

3.2. Did you receive any comments from their side? Which?

3.3. **Do** they use the offered shuttle, bus pass, etc.?

3.4. What is your estimate of the percentage, real **#s** of tenants taking advantage of the **offer(s)**? (Are there any **records**?)

3.5. Which **one(s) was/were** most appreciated?

3.6. Which, in your opinion, works best? What led you to that conclusion?
4. Overall experience with TDM program requirements

4.1. Comparison with other TDM program projects

4.1.1. Do you have any other TDM program projects? (Record them)

4.1.2. Did you perceive any differences between the projects in terms of

- Offer acceptance by tenants
- Difficulty of implementation (reasons?)
- Costs of implementation, or
- Multi- versus single family projects?

4.2. Do you have any suggestions for changes in the wording of the requirements? Where are they unclear or not specific enough?

4.3. Threshold for TDM program requirements

4.3.1. In your opinion, where should the threshold for requiring a home-end TDM program be? Why? (Size, cost of development, which portion of the project's costs should be spent on TDM program measures?)

4.3.2. What is, in your opinion, the appropriate development size for requirement of each of the following requirements:

- Transit information
- Carpool information
- Bike shed
- Free bus pass (one-time)
- Project assisted access to carpool facilities and rideshare information
- Shuttle to nearest park and ride lot
- Carpool coordination on the project
- Bus pad

4.4. Did you offer any of the measures on your own in other developments without being subject to them through a TDM program? If yes, what was your rationale?

4.5. Have you advertised with these services for any of your developments? Did you use it as a marketing tool?
4.6. Did you get any reaction from your prospective clientele?

4.7 Is there any indication that some clients favor projects which provide these services?

4.8. Is proximity to transit service a factor in your site selection process?
2. INTERVIEW GUIDE FOR TRANSPORTATION COORDINATORS ON HOME-END TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

1. Information on the project

1.1. Rent range/price per unit.

1.2. Is this project targeted towards a specific clientele? (e.g.):

- Singles/married couples, with kids?
- Age group
- Socio-economic group/income range
- Other

1.3. Occupancy rate

1.4. Turnover

1.5. Parking ratio

1.5.1. How many stalls per GSF? At the legal ratio? Is that enough?

1.5.2. Are there any tenants without cars? How many?

1.6. Does the project have a communal area or an on-site office where information can be provided and shared? Is it used?

1.7. Is there a tenant organization on the project?
2. The work of the transportation coordinator

2.1. How much time do you spend with transportation issues like giving out bus-passes or providing info? (How much does it cost your employer?)

2.2. Do your tenants use the offered bus-passes, the CIC, other sources of transit-info that you provide?

2.3. What is your estimate of the percentage, real #s of tenants taking advantage of the offer(s)? (Ask if records exist.)

2.4. Did you receive any comments from their side? Which?

2.5. Which one(s) was/were most appreciated? What led you to that conclusion?

2.6. Which, in your opinion, work best? What led you to that conclusion?

2.7. Is there one that is not implemented right now that you think might work?

2.8. How many tenants take the bus every morning who are not eligible for the bus-pass any more? (Ask if there is a convenient bus-connection — whether it makes sense at all to ask that question!)

2.9. Are there any carpools originating from this development that you are aware of? Where do they go?

2.10 What do you think could persuade more of your tenants to take the bus, carpool?
2.11. How is your contact with Metro? Is it **cooperative** or do you have any problems?

2.12. Is there anything in your relationship with Metro that you think should change?

2.13. What do you think about the idea to have a contractor run a shuttle, assist carpool matching **etc.** that would serve this project and others in the neighborhood?
3. Home-End Transportation Demand Management Programs
Residential Focus Group Questions

I. General questions

How do you feel about the traffic situation?
- In the region,
- during your commute,
- in your neighborhood?

(What, in your perception, is the biggest problem?)

How do you think it would be solved?)

Do your employers provide incentives to carpool, take the bus, etc.? Do you have free parking at your work place?

What are your experiences with it? Does it work, not work -why not?

(If there are no provisions, would you like to have them introduced?)

II. Own commute behavior

What made you decide to move here?

Do you carpool, ride the bus — sometimes, on a regular basis — now?

What motivated you to start that?

What would be the problems you would run into if you were to carpool, take the bus now?

What would influence your decision to start doing that now?

Did you get a/like the package with information on transportation options when you moved here?

Was the information adequate?

How helpful was the transportation coordinator in that respect? What other info/help would you like him/her to provide?

Some of you have been offered a free bus pass when you moved in. Did you use it? Why not?

Would you find it more useful to get two free ride passes as part of your info package from Metro?

Would you feel differently if you had the chance to catch a shuttle to the next PARK AND RIDE lot right here on the development? Why not?
III. Changes in Policy Affecting Mode Change

Rent for parking lot at the at the residential end:

With the growth of the region housing has become very expensive. One of the reasons for that development is the increase in the price of land. Here on the project, much of the space is taken up by parking lots. At the moment, the parking to apartment ratio in most residential developments is about two to one. If developers were able to reduce that ratio, they would be able to reduce costs. In many European cities, and even in some areas of the city of Seattle, people pay the rent for their parking spot separately from the rent for their apartment. How would you feel about being charged separately for parking? Let's say if you have two cars, you would pay the same amount as you pay now. If you have only one car, you would pay less, and if you use three parking spots because you maybe have an RV, you would pay more. This would be more equitable, because the people with less cars would not subsidize the people with more cars. It would reduce the costs of housing for people with a relatively lower income who tend to have fewer cars. What do you think about this idea?

Do you think this could work? Why not?

Would you feel differently if you had the chance to catch a shuttle to the next park and ride lot right here on the development? Why not?

Fees for parking at the work place:

A few weeks ago the legislature passed a new gas tax. It included a provision that enables municipalities to tax commercial parking lots. On the long run, and this is really a long shot, this could end free parking at your work place. How would you react to that? Under which circumstances would you be in favor of such a measure?
In general, what do you think has to change to make other means of transportation like carpooling, the bus, or rail more attractive? What would you advise policy makers to do?

**IV. Design and zoning changes**

Some planners are thinking about changes in the design of developments like this one to make it friendlier for pedestrians. How would you feel about that idea?

Some are even thinking about changes in the zoning requirements, i.e. a shift to mixed use to make it easier for people to leave their cars on the parking lot. One of the names the media has used for that approach is the "compact village". Examples here in the area would be Ballard, Fremont, Wallingford, and maybe Aurora. Would you like to live in a neighborhood where you can do part of your shopping by foot or to walk or bike to work?

What are the things you would be concerned about before you would move into such an area?
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Chapter 1: Introduction

1.1. Defining TDM

Transportation demand management (TDM) is a term used to describe a wide range of strategies that makes the most efficient use of the transportation system by increasing person-carrying capacity. TDM strategies can include promoting alternative modes like transit and increasing vehicle occupancy through ridesharing programs. In addition, TDM strategies can facilitate shifting trips from peak-hour congested corridors to off-peak periods or eliminating trips altogether through strategies like telework.

The Metropolitan Council of the Twin Cities region has provided a series of these TDM strategies through their regional TDM program over the last several decades. With help of promotion and marketing at the local level through transportation management organizations (TMOs), the regional TDM program has been a successful venture in promoting and implementing many TDM strategies. Today, the Twin Cities enjoys a mature regional TDM program with four healthy TMOs that work together to assist commuters in ways such as joining vanpools and carpools, biking to work, taking part in the annual Commuter Challenge, paying less for carpool parking permits, finding out about discounted transit pass products through Metro Transit, and working with travelers on construction congestion mitigation. A complete inventory of the TDM products and services offered throughout the Twin Cities region is presented in Chapter 2: Inventory.

1.2. Study Purpose

The purpose of the Transportation Demand Management Evaluation and Implementation Study (TDM Study) is to outline a clear process for selecting, funding, and implementing transportation demand management (TDM) strategies and also structuring and evaluating the Twin Cities TDM program. Through involvement with local TDM partners and researching best practices from TDM programs nationwide, the primary focus of the goals and recommendations in the TDM Study are:

- Improving the structure of the TDM program and the ensuring TDM funding is prioritized for activities and projects that will have the greatest impact
- Developing a clear and transparent funding allocation process for TDM Congestion Mitigation Air Quality (CMAQ) funds
- Conducting regular and consistent evaluation of the impact of TDM strategies implemented by all TDM providers in the region
- Focusing Metro Transit’s TDM outreach efforts outside of local transportation management organization (TMO) service areas

These elements were the primary needs identified by the local TDM partners that were engaged during the planning process through a formal Advisory Committee (the members of this Advisory Committee are detailed in Section 1.3). There are supporting policies and strategies for the TDM Study within the 2030 Transportation Policy Plan. These policies are described in Section 1.4.

1.3. Stakeholder Outreach and Plan Composition

The development of TDM Study was achieved through a collaborative process with state, regional, and local organizations that implement TDM. The stakeholders identified for this regional planning process included:
• Metropolitan Transportation Services (MTS), including Van-GO!
• Metro Transit
• 494 Commuter Services
• Anoka County TMO
• St. Paul Smart Trips
• Downtown Minneapolis TMO
• Mn/DOT Metro Division and Office of Transit
• Transportation Advisory Board and subcommittees

These organizations were formally engaged through an Advisory Committee during the entire TDM Study planning process. The Committee helped develop the goals, strategies, and recommendations of the TDM Study through multiple avenues for input.

At the first kickoff Advisory Committee meeting for the plan, members were engaged in a group meeting as well as one-on-one stakeholder interviews to provide knowledge and data about their local organizations and agencies. These interviews also included perspectives and thoughts for the goals and recommendations sections of the plan.

A second Advisory Committee meeting was held in December 2009 to conduct a planning assessment of the strengths, weaknesses, and future opportunities and threats to the TDM program. This information was critical during the evaluation phase of the TDM Study and helped inform the TDM program structure recommendations. The results of this analysis are summarized in Chapter 3.

The Advisory Committee was also involved in the delineation of the goals and strategies established for the TDM Study during third and fourth committee meetings in the winter and spring of 2010. The final eight goals for the TDM Study are listed in Section 1.5 of this chapter. Chapter 4: Recommendations contains a list of detailed strategies to implement each of these eight goals.

1.4. 2030 Transportation Policy Plan Policies and Strategies

The TDM Study is supported by the region’s 2030 Transportation Policy Plan (2030 TPP). Specifically, Chapter 2 of the 2030 TPP advances a transportation system investment policy centered on managing congestion by increasing the person throughput carrying capacity of the system. An important component of this policy and other policies in the 2030 TPP is a strong program of TDM initiatives that help to avoid and lessen congestion.

To further refine the purpose of the TDM Study, the following Policy/Strategies in Chapter 5 of the 2030 TPP were developed for TDM programs. Directly quoted from that chapter, the region’s policies for TDM are:

- Increase the use of alternative transportation modes such as walking, bicycling, public transit, carpooling, vanpooling, and flexible work arrangements, such as telecommuting, to reduce vehicle miles traveled.
- Mitigate congestion during the peak periods, special events, and construction.
- Reduce air pollution and energy consumption related to transportation.
- Make more efficient use of transportation infrastructure and services.
- Reduce the necessity of car ownership when other travel choices exist.
- Promote transportation-efficient land development.
- Provide “reverse commuting” assistance for urban commuters to employment locations not served by transit.
These policies from the 2030 TPP formed the basis for the goals and strategies of the TDM program, which are described in Section 1.5 below.

1.5. Transportation Demand Management Program Goals

TDM Study Goal 1: Traveler Focus. Develop a regional TDM program with a wide variety of strategies that are easily understood and utilized by travelers.

TDM Study Goal 2: Program Structure. Structure the regional TDM program and the provision of funds to local TDM partners that ensures resources are maximized toward activities and projects of greatest benefit.

TDM Study Goal 3: Target Markets. Target the geographic areas of the region where TDM strategies will be most successful and would make more efficient use of existing transportation infrastructure and services. National research indicated that centers of high employment and high employment density are the most successful target markets for TDM activities.

TDM Study Goal 4: Strategy Recommendations. The region will invest in TDM strategies with a proven track record of success. These strategies may include those that exist in the region today as well as piloted new strategies from national best practices.

TDM Study Goal 5: CMAQ TDM Funding Process. Allocate future funding for TDM based on monitored performance and sound estimates of impact.

TDM Study Goal 6: Performance Measurement. Develop consistent measurement methods for evaluation of the CMAQ-funded TDM program.

TDM Study Goal 7: New Funding. Develop additional sources of funding for the TDM program.

TDM Study Goal 8: VMT Reduction Goals. The region will track the vehicle miles reduced (VMTR) due to TDM efforts from all CMAQ funded activities. Using a consistent methodology year-to-year, the VMTR will be compiled annually and compared to performance in past years.
Chapter 2: Inventory

This chapter summarizes the key transportation demand management (TDM) programs implemented in the Twin Cities region. This inventory is not an exhaustive list, but highlights the programs that are funded through the Congestion Mitigation Air Quality (CMAQ) program, which is administered through the Metropolitan Council and Metro Transit.

The second component of this chapter contains several succinct summaries about the characteristics of the Twin Cities TDM programs. These include the roles and relationships of the many organizations involved in TDM and a summary of funding sources. These summaries help organize the region’s TDM program information so that it can be compared to other national best practices and evaluated consistently in the next chapter.

2.1. Metropolitan Council

The Transportation Division of the Metropolitan Council contains two “subdivisions” that perform important roles in the delivery of TDM services. These subdivisions are Metro Transit and Metropolitan Transportation Services (MTS). The TDM-related functions of these two groups are described in more detail below.

2.1.1 Metro Transit

Metro Transit is the direct transit operating subdivision of the Metropolitan Council. The TDM-related services Metro Transit provides include oversight of CMAQ-funded TDM programs as well as implementing regional TDM programs and tools.

On the funding side, Metro Transit administers the application process for all FTA grants including the TDM-related CMAQ grants to local organizations. When the grants are awarded, Metro Transit is also responsible for the oversight and administration of the funded TDM programs. At the conclusion of the CMAQ TDM grant cycle, Metro Transit summarizes the impact of the programs and reports their results to the Metropolitan Council and FTA.

On the TDM implementation side, the programs and tools implemented by Metro Transit include promoting transit and increasing transit pass sales, operating the regional ridesharing program, managing several incentive programs, assisting organizations build telework programs, and administering the regional Guaranteed Ride Home program.

The role of Metro Transit throughout the region depends heavily upon the presence of local transportation management organizations. In areas of the region where TMOs are active, Metro Transit offers assistance and support, particularly by providing incentive programs and tools such as the regional ridesharing database. In the areas of the region where no TMOs operate, Metro Transit is the lead organization promoting, marketing, and implementing TDM services. This area is quite large and Metro Transit must carefully plan their limited outreach and TDM resources for this area (Figure 1).
Figure 1: Metro Transit TDM Employer Service Area

Current efforts

Metro Transit provides several TDM programs and tools for commuters, TMOs, and other TDM groups. The major programs include rideshare planning and matching, a carpool and vanpool parking discount program, guaranteed ride home, transit pass programs, and telework assistance. These programs are described in more detail below:

- **Ridesharing.** The Metropolitan Council is required to administer a ridesharing program according to Minnesota State Statute 473.375, Subdivision 11. As a subdivision of the Metropolitan Council, Metro Transit is the responsible entity for implementing the regional ridesharing program. Much of the rideshare matching is performed through the online Rideshare Planner, which offers different ways of signing up for a variety of ridesharing opportunities. Commuters can create an account that will allow them to access a variety of Rideshare Planner tools. The “Trip Matching” tool will match Rideshare users with other commuters who will travel the same route for one-time trips. The “Carpool Matching” tool will match users who live near each other and are traveling the same direction and during the same time to share the ride to school or work. The “Vanpool Matching” tool will assist in finding people who live near one another to share a ride to school or work. Users of these tools may also track their trips and their savings in miles and CO₂ emissions by using the Commute Calendar, although there are no financial incentives to do so. Metro Transit is currently in the process of updating their ridesharing tools, including their website and database structure for maintaining and monitoring rideshare matches. A new tool is expected in late 2010.
• **Parking Perks for Poolers.** Registered Metro Transit carpools and vanpools are eligible to use free parking or receive a reduced rate for parking along specific streets or in specific parking lots and garages located in the cities of Minneapolis and St. Paul. Some parking facilities require approval from Metro Transit or Metropolitan Transportation Services (vanpool), as there are limited spaces. Once the requests have been approved by the agency, carpool or vanpool drivers receive one parking pass to identify that they have a valid permit and are allowed to park in the specific spaces or parking lots at a free or discounted rate. These designated parking spaces and lots also have signs indicating they are only intended for carpools and vanpools.

• **Guaranteed Ride Home.** Guaranteed Ride Home (GRH) is a form of commuter insurance as commuters are ensured a free emergency ride. This program is eligible for people who commute to work or school by bus, train, carpool, vanpool, bicycle, or by walking a minimum of three days a week. This program is available to people living or working in the Twin Cities metropolitan area and for those who have registered through the Regional Guaranteed Ride Home Registration. Registered participants receive two coupons worth $25 each every six months and registered participants will be eligible to use the coupons for a $25 cab fare, or for an emergency bus or train fare.

• **Bike2Benefits.** This incentive program encourages commuters to try bicycling one time per week for an eight-week period. If a participant completes the eight-week challenge, they are eligible for a grand prize. Trips are tracked in the Metro Transit web site and registration is conducted online.

• **Commuter Challenge.** The Commuter Challenge is an annual event held from April through June each year, sponsored by Metro Transit and the four transportation management organizations. The program challenges individuals to pledge to try one or more alternatives to driving alone during the three month period. Registration in the event automatically enters participants for grand prize drawings. The primary goal is to convert commuters who drive to work in single occupant vehicles into using another transportation alternative.

• **Commuter Choice Awards.** This event is held annually and its purpose is to recognize organizations in the region that do an outstanding job promoting transportation alternatives and implementing TDM programs. Employers nominate several dozen companies each year for a handful of top awards (e.g., Exceptional Company Involvement, Corporate Leadership, Outstanding Promotion).

• **Specialized Transit Pass Products.** Metro Transit provides commuters the opportunity to save money by offering a variety of specialized transit pass products. These products are designed to fit the specific needs of certain groups and benefit a variety of users.
  
  o The Metropass is available to companies with ten or more employees and a minimum of five transit users. This product offers employees unlimited rides and is a permanent pass available to employees as long as the company is in the program.

  o The GoToCollege pass is an unlimited ride pass program available to the students of the 76 colleges and universities of the Twin Cities region. Depending on location and available transit service, the pass cost is between $140 – $170 per semester.
The TransitWorks! pass product is available through stored value cash cards between $10-$40 or a 31 day unlimited monthly pass. Employers can choose to subsidize these passes and offer them to employees at a discounted rate.

- **Regional TDM Database.** In addition to the commuter programs described above, Metro Transit also manages data for many of the region’s TDM programs. They work with the four TMOs to update this database from local marketing and outreach efforts. The RidePro database includes data on programs such as:
  - Guaranteed Ride Home
  - Carpool and vanpool parking space registration and payment of the monthly incentives for participants in this program
  - Employer outreach contacts
  - Vanpool registration, including Van-GO! and private vanpools
  - National Transit Database reporting
  - Bike2Benefits incentive program
  - Vanpool reporting web site

**Funding**

The primary funding source for Metro Transit’s TDM programs is the CMAQ program. The Metropolitan Council has historically applied for and received CMAQ funding from the federal government and, typically, Metro Transit uses about half of the TDM funding for its own program. The remaining half is allocated to local TDM service providers. In 2008, Metro Transit received 58 percent ($1.595 million) of the region’s CMAQ TDM funds. The 20 percent local match required for these CMAQ funds is provided by the State of Minnesota, Metropolitan Council, local governments, and operating funds of Metro Transit.

**Evaluation**

Metro Transit maintains records of registration of carpools and vanpools in their database as well as the participation in their programs, particularly events like the Commuter Challenge. Results for 2008 are summarized below:

- **Regional Database.** 16,900 carpool matches were attempted, and out of these attempts, 13,900 matches were made. Also, 2,200 carpools were added in 2008 and 2,000 were deleted or purged. No data on actual carpool formation or how frequently matches actually carpool is maintained; however, Metro Transit assumes 5 percent of matches in the database actually start sharing a ride.
  - Assuming the 5 percent rate, the estimated vehicle miles of travel savings is 24,846,000 miles. This result is calculated using standard trip distance information for the region as well as assumptions on the frequency of travel in a carpool (assumed 3 times per week).

- **Commuter Challenge.** 15,000 commuters pledged to try transit, bike, walk, or rideshare over the three-month period of the challenge in 2008. When surveyed, nearly 93% of the people who drove alone before their Commuter Challenge pledge now use alternatives to driving alone more frequently.

- **Bike2Benefits.** In 2009, the program had 2,900 members with an estimated 375,500 bike and bike-transit miles logged.
2.1.2 Metropolitan Transportation Services

Metropolitan Transportation Services (MTS) is the second “subdivision” of the Transportation Division that is engaged in TDM programs and services. From a policy standpoint, MTS provides the formal link between the local TDM programs and the Metropolitan Council and Transportation Advisory Board. MTS also oversees the TDM-related components of regional transportation planning and funding through the biennial regional allocation of federal Surface Transportation Program funds.

In addition to its policy and Metropolitan Planning Organization (MPO) functions, MTS operates several transportation services related to TDM. The primary transportation service is the Van-GO! vanpooling program, which is described in more detail below. In addition to vanpooling, MTS also operates two contracted services: Metro Mobility, a paratransit service offered only to ADA certified riders and Dial-A-Ride service, a county-based shared-ride service reserved in advance.

2.1.2.1 Vanpooling

The MTS Van-GO! vanpooling program has been in operation since 2000 as a region-wide transit option for long-distance commutes. The intention of the program is to serve trips that are impossible or unrealistic to serve with regular fixed-route transit service within the region’s regular route service area, as well as areas outside of the transit-taxing district where regular route bus and rail services do not exist. The vans are administered and funded through the Council and day-to-day operations and maintenance are handled through a contract with a third party vendor, currently VPSI, Inc. Van-GO! is a regional service that primarily depends on local TDM providers, such as the transportation management organizations, to promote and market vanpool services. In addition to the Van-GO! vans, there are 20 private vanpools operating in the region that are provided Guaranteed Ride Home and the Driver Rewards program (described below). Including Van-GO! and private vanpools, the program contains over 80 vans and, since inception, has consistently grown the number of vans in operation.

Current efforts

As of November 2009, there were 85 vans in operation in the Twin Cities region. Many of the vans originate outside of the seven county region and terminate at employment centers within the region. Some vans also reverse commute from inside the seven county region to employment locations outside of the Metropolitan Council area. Many of the privately owned vans originate in Wisconsin and are destined to Anderson Window Corporation just inside the eastern boundary of Washington County. The characteristics of the current vanpool program are as follows:

- 59 Metropolitan Council Van-GO! Vans, divided by the following:
  - 27 vans originate from within the seven county region
  - 21 vans originate from areas outside the seven county region (collar counties)
  - 11 vans originate from Wisconsin
- 20 privately owned vans, 17 from Wisconsin (independent from Van-GO!)
- 6 City or Company sponsored vans (independent from Van-GO!)

Drivers and passengers have several incentives to operate a van on behalf of Van-GO! These incentives include:

- Full leased van provided by Van-GO! with a $1 million insurance policy for personal liability
- Full maintenance coverage
- Roadside hazard assistance program
- Access to fuel card program tied to van lease billing cycles
- The driver rides free and can use the vans for some personal trips up to 200 miles per month.
- Reduced passenger fare cost through the 55 percent lease subsidy provided by the Metropolitan Council (roughly $86 per person per month)
- Guaranteed Ride Home
- Driver Rewards, which offers $100 cash incentive to the driver for their first six months of continuous service and $100 per year thereafter. Backup drivers receive $50 after the first six months and $50 per year thereafter.

The minimum requirements to start and operate a Van-GO! van include:

- Registration with MTS in the regional rideshare database
- Driver and passengers must live or work in the seven county region
- Vans must carry at least 5 passengers an average of 3 days per week
- The routes of the vans must not duplicate any regular bus or rail service
- The driver must be over 25 years old, have a clean driving record, good credit rating, and complete VPSI driver safety training.

Van-GO! Funding

The Council subsidizes 55 percent of the individual Van-GO! van lease cost through a mixture of Congestion Mitigation Air Quality (CMAQ) and other federal funds, local taxes, and passenger fares. For the 2008 program year, Table 1 describes the funding sources and their amounts.

**Table 1: 2008 Van-GO! Funding Sources**

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Amount</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Federal sources:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMAQ</td>
<td>$50,240</td>
<td>4.1%</td>
</tr>
<tr>
<td>Job Access Reverse Commute</td>
<td>$70,000</td>
<td>5.6%</td>
</tr>
<tr>
<td>Section 5307</td>
<td>$449,217</td>
<td>36.2%</td>
</tr>
<tr>
<td><strong>Local sources:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metropolitan Council (UPWP)</td>
<td>$68,076</td>
<td>5.5%</td>
</tr>
<tr>
<td>Passenger Fares</td>
<td>$505,372</td>
<td>40.7%</td>
</tr>
<tr>
<td>Motor Vehicle Sales Tax (MnDOT)</td>
<td>$98,277</td>
<td>7.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$1,241,182</td>
<td>100%</td>
</tr>
</tbody>
</table>

Evaluation

Participation in the Van-GO! is carefully tracked by the Metropolitan Council. For the 59 vans subsidized by the Van-GO! program, the annual vehicle miles of reduction is just over 9 million miles. Table 2 below displays the 2008 results of the Van-GO! program as maintained through
the Metro Transit ridesharing database. Note this table does not summarize the participation by privately owned vanpools.

### Table 2: 2008 Results of the Van-GO! program

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of vanpools added</td>
<td>28 vans</td>
</tr>
<tr>
<td>Number of vanpools deleted</td>
<td>0 van</td>
</tr>
<tr>
<td>Total registered vanpools</td>
<td>85 vans</td>
</tr>
<tr>
<td>Total vanpool participants</td>
<td>758 people</td>
</tr>
<tr>
<td>Number of vanpool matches attempted</td>
<td>7,823 attempts</td>
</tr>
<tr>
<td>Reduction in vehicle miles due to registered vanpools</td>
<td>9,038,797 miles</td>
</tr>
<tr>
<td>Operating subsidy</td>
<td>$3.50 per passenger</td>
</tr>
</tbody>
</table>

Since its inception in 2000, the Van-GO! program has consistently added drivers, passengers, and vans to the program. With the exception of the steep increases in gas price in 2008 and its associated drop in vanpooling after prices settled in 2009, the growth in vanpooling has been consistently strong throughout the life of this program (Figure 2).

![Figure 2: Historical Van-GO! vanpool ridership](image)

### 2.2. Transportation Management Organizations

Four unique transportation management organizations (TMO) serve specific activity centers and areas in the Twin Cities region. These organizations are typically governed by a Board of Directors composed of local agencies, business leaders, and community stakeholders. They have traditionally focused on large employers and the commute trips associated with their employees; however, several of the TMOs are looking to apply TDM strategies to new traveler markets and non-work commute trips. The Metropolitan Council has a long history of supporting the work of TMOs through CMAQ funding and planning policy. In addition to implementing their own local TDM programs and strategies, they serve a critical role in promoting and marketing the regional transportation services provided by MTS and Metro Transit.
2.2.1 St. Paul Smart Trips Transportation Management Organization

The St. Paul Smart Trips TMO serves the City of St. Paul, including downtown business district employees as well as the employees and residents of adjacent city neighborhoods. The boundaries of their service area are synonymous with the municipal boundary of the City of St. Paul, yet their programs likely reach many employees who live outside the City in the broader Metropolitan Council region (Figure 3).

Figure 3: St. Paul Smart Trips Service Area

The TMO has recently made a strategic decision to target the residential neighborhoods of St. Paul with new and specialized TDM programs. The 2008 Summit-U residential Individualized Marketing pilot program was created from this strategic decision and specifically targeted the Summit-University neighborhood just west of downtown St. Paul. In 2009, the TMO built upon the success of the Summit-U program by implementing another individualized marketing program in Union Park neighborhood.
Current efforts

The current programs of the TMO are focused primarily on two traveler markets: the employee and the urban residential traveler of St. Paul. The TMO programs consist of:

- **Individual employee commuter services.** These services include customized travel plans and enrollment in commuter challenges. In addition, staff educates employees about pretax benefits, MetroPass, downtown parking for carpoolers, and other transportation incentives.

- **Employer services.** These services include new employee orientations and commuter surveys.

- **Residential individualized marketing at the household level** that includes pre and post surveying, communication pieces, individual trip planning assistance, and various “try-it” incentives.

- **Promotional efforts at employers,** including transportation fairs, relocation assistance, and enrollment into regional promotions like the Commuter Choice Awards program and the Commuter Challenge.

- **A web site serving as a primary portal** to describe available TDM programs and spread awareness about transit, ridesharing, telework, bike/walk, and parking programs.

- **Advocacy efforts** including working with the Central Corridor LRT planning project and coordination with land use development concepts. In this process, the TMO represented the pedestrian and bicycle travelers, looking specifically at how they can access future station sites.

Funding

The TMO is funded primarily by the federal CMAQ program. They use several local funding sources to comprise the 20 percent match required by CMAQ. The 2009 funding amounts, sources, and total funding for the organization is detailed in Table 3.

<table>
<thead>
<tr>
<th>Source</th>
<th>Dollars (2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMAQ</td>
<td>$232,000</td>
</tr>
<tr>
<td>Non-Motorized Transportation Pilot Program</td>
<td>$112,000</td>
</tr>
<tr>
<td>City of St. Paul</td>
<td>$8,000</td>
</tr>
<tr>
<td>Ramsey County</td>
<td>$10,000</td>
</tr>
<tr>
<td>McKnight Foundation</td>
<td>$40,000</td>
</tr>
</tbody>
</table>

Evaluation

The TMO currently monitors the effectiveness of their residential individualized marketing programs and have complete data for the Summit-U program implemented in 2008. Measurement methods included a pre- and post-neighborhood-wide phone survey, participant surveys, bicycle/pedestrian counts, and discussion with partners. Importantly, the TMO also selected a
control group to monitor more carefully if changes in mode share and vehicle trips were due to the individualized marketing program or other confounding externalities. Program highlights for the Summit-U neighborhood include:

- Bicycling and walking trips increased 33 percent in comparison to the control group.
- Using regional transportation averages on trip length, these bicycling and walking trips account for the equivalent of 153 vehicle miles per day during the program period.
- There was no statistically significant change in ridesharing or transit use.
- Drive-alone trips decreased by 21 percent. However, the control group also experienced a decrease in drive-alone trips by 24 percent.
- 8.6 percent, or 612 households, either ordered materials or participated in events.

2.2.2 Downtown Minneapolis Transportation Management Organization

The Downtown Minneapolis TMO (DMTMO) serves the downtown Minneapolis central business district with its workforce of approximately 135,000 employees. The borders of their service area include I-94 to the south and west, the Mississippi River to the north, and I-35W to the east (Figure 3).

The DMTMO has four goals: Commuter Connection, outreach, education, and advocacy. The DMTMO’s programs primarily focus on downtown employees and providing transportation information, products, and travel planning assistance. Their primary marketing strategy is the operation of their combined store and office, the Commuter Connection, which sells transit passes and bicycle accessories, registers interested candidates for ridesharing, sells carpooling parking permits, and provides various other services and information details on all modes of
transportation. Located in a skyway in central downtown, this store is constantly busy with employees and other travelers in the downtown area.

**Current efforts**

The following is an overview of DMTMO’s primary products and services as they relate to each of its goals:

- **Commuter Connection.** Commuter Connection is a one-stop shop for transportation information and services, is located on the skyway in central downtown. Among its information and services are:
  - Selling Metro Transit transit passes and regional bicycle maps,
  - Registering and renewing carpools
  - Individualized trip planning
  - Maintaining wait lists for carpool parking at public and private parking facilities
  - Taking MetroPass pictures
  - Providing skyway maps with walking distances
  - Providing hands on learning for using the bus bike rack
  - Distributing information on behalf of other agencies such as Van-GO!, Guaranteed Ride Home applications, MnPASS, City of Minneapolis downtown bike trails and policies, MnDOT’s bike rules of the road, and discounted carpool parking maps and brochures.

- **Outreach.** Outreach efforts serve primarily two markets: the employers and building managers/owners. The services and programs themselves are designed to reflect the particular needs and characteristics of each market.
  - Employer services include consulting and implementation assistance on pre-tax transportation benefits, discount transit programs, Van-GO!, discounted carpool parking and ridematching services, guaranteed ride home, and special focuses such as eWorkPlace. DMTMO provides an online new employee commuting resource kit specifically designed for the downtown workforce. The DMTMO provides commuting information at employer benefits and health fairs as well as conducting commuter fairs.
  - Building managers/owners services include consulting on programs and services that inform and facilitate use by tenants and tenants’ employees of commuting options, provide data that helps to market the advantage(s) of particular properties and conducts research for those interested in applying for LEED alternative commuting credits. On behalf of the City of Minneapolis the DMTMO assists new developments meet their TDM commitments and reporting obligations. The DMTMO participates in the Building Owners and Managers Association (BOMA) annual vendor fair.
Both outreach markets participate in regional campaigns such as Commuter Challenge and the Commuter Choice Awards. Both markets use the DMTMO services for relocating employers moving into downtown. The DMTMO sponsors commuter fairs at buildings and large employers that includes commuting information, a portable bus bike rack display, and invites several transportation related organizations of interest to the downtown community.

- **Education.** The DMTMO undertakes several education efforts including their website (www.mplstmo.org), emailed newsletters and announcements, brown bag lunches for employees on such topics as bicycle commuting, lunch & learns for employers that focus on single topics such as pre-tax transportation benefits, and Transportation Summits for employers that cover several timely topics.

- **Advocacy** goal is primarily met by providing an opportunity for dialogue between the sixteen member Executive Committee members and public sector representatives on transportation issues.

Periodically, there are unique opportunities for TDM programs and strategies in the downtown area. For example, the DMTMO played a key role in assisting employers and employees prepare for two major bus strikes over the past 15 years, commuting after the collapse of the I-35W bridge, and the expected gridlock during afternoon peak period during the 2008 Republican National Convention (RNC). During these times, the DMTMO conducted major campaigns to assist employers and their employees with commuting choices and trip planning. The marketing included creating informational packets for employers to distribute, mailings/emails, holding special meetings and speaking at other organizations’ meetings.

**Funding**

The DMTMO is funded primarily through federal CMAQ funds. The DMTMO earns the 20 percent local match from contracts they hold with Metro Transit for transit pass sales and carpool registrations at the Commuter Connection store. In addition, they make a small amount of profit on bicycle map sales. They have a reserve account they use for funding shortfalls. For the short term, they are also receiving assistance from the MnDOT eWorkplace.

**Evaluation**

The DMTMO monitors its program components in detail as services are performed. They track pass sales, carpool registrations, and outreach events and attendance. They also track company participation from their service area in regional events like Commuter Challenge. In the past, the DMTMO has met or exceeded the performance goals assigned by the Metropolitan Council, the DMTMO Executive Committee, and others.

In 2008 specifically, the DMTMO has estimated its efforts in transit pass sales, carpool registrations, and Van-GO! promotion has resulted in an annual savings of 28.85 million vehicle miles of travel, 2.27 million vehicle trips, and approximately 6,500 tons of CO₂ emission savings. Table 4 details these estimates by mode.
Table 4: 2008 Participation and Estimated Impacts

<table>
<thead>
<tr>
<th>Mode</th>
<th>Participation (registration, pass sales, etc)</th>
<th>VMT Reduced (estimate)*</th>
<th>Trips Reduced (estimate)</th>
<th>Tons CO₂ Reduced (estimate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpool</td>
<td>1,634</td>
<td>9,913,805</td>
<td>784,320</td>
<td>4,925</td>
</tr>
<tr>
<td>Vanpool</td>
<td>104</td>
<td>630,989</td>
<td>47,280</td>
<td>193</td>
</tr>
<tr>
<td>Transit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MetroPass</td>
<td>1,398</td>
<td>11,813,445</td>
<td>934,608</td>
<td>886</td>
</tr>
<tr>
<td>GoTo College</td>
<td>5,146</td>
<td>6,492,587</td>
<td>502,172</td>
<td>487</td>
</tr>
<tr>
<td>Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8,282</td>
<td>28,850,825</td>
<td>2,268,380</td>
<td>6,492</td>
</tr>
</tbody>
</table>

* Assumes an average 25.28 mile commute distance and 240 days per year

2.2.3 Anoka County Transportation Management Organization

The Anoka County TMO is unique for a TMO given it provides service to all of Anoka County and is within a department of the County, rather than a stand-alone non-profit organization. This is in contrast to the other TMOs that provide service to a smaller sub-area, corridor, or activity center. The Anoka County TMO serves commuters traveling on four major transportation corridors (I-35E, I-35W, TH10, TH65) located in Anoka County. Given its large service area, the TMO serves various traveler markets in different areas of the County, including residents and households as well as nearly 2,000 local employers (Figure 4).

Figure 4: Anoka County TMO Service Area
Anoka County has a large residential of 315,000. The County is a net exporter of workers to other communities and this influences the services and facilities provided for alternative transportation, particularly Park-n-Rides, regional express bus services, the new Northstar Commuter Rail service (began operations in November 2009), and ridesharing. The TMO helps promote and increase utilization of these and other services, as well as increasing utilization of County services like the Anoka County Traveler fixed-route and dial-a-ride bus transit service and other local commuter bus services including Ramsey Star Express and the Forest Lake bus service.

**Current efforts**

The TMO provides education, promotion, and information related to the following transportation choices available in the County:

- Ridematching services
- Transit service, particularly the Northstar Commuter Rail, Ramsey Star Express, Anoka County Traveler, Forest Lake Commuter Bus, and Metro Transit Park-n-ride lots and service
- Traffic mitigation services to businesses and residents along road construction corridors or projects
- Bicycling and walking, including producing an “Anoka County Bike Trail Map & Commuting Guide” distributed to 25,000 residents annually
- Telework

Working with several partners, the TMO promotes these transportation choices through many events, communication tools, and programs, including:

- The Anoka County TMO web site (www.anokacountytmo.com)
- Engaging employers through transportation fairs, newsletters, Lunch & Learn sessions and other networking meetings, enrollment in the Commuter Challenge, and conducting trainings and program development services. In addition, the TMO is developing a network of commercial and residential property managers to work with more in promoting transportation options.
- Working with local government agencies to coordinate promotion of TDM programs and services, particularly in highly congested corridors or construction corridors
- Participating in community events, like the Anoka County Fair, and developing advertising and marketing materials to increase awareness of the TMO as well as regional incentive programs (like the Commuter Challenge)
- Installing outdoor bike racks at no cost to employers. Also, the TMO provides information displays (kiosks) on transportation services available.
- Administering inter-office surveys to identify candidates for transit, carpooling, bicycling, and other transportation options. The TMO also uses employee home zip code mapping to find where employees live and, for those that live in the same zip code, explore the possibility of carpooling or vanpooling together into work.
All of these services are all provided free to Anoka County residents and to people that work for employers in the County.

**Funding**

The TMO receives funding from the federal CMAQ program and the County supports the TMO through providing a 30 percent local match. Currently, there are no other funding sources for the TMO.

**Evaluation**

In 2008, the Anoka County TMO provided road construction project information to more than 50,000 households, reducing construction-related traffic congestion in an area with over 170 businesses and 15,000 residents. Six editions of the “Commuter News” newsletter were distributed to 1,950 employers. Bike racks were provided to 24 employers actively promoting transportation choices.

The TMO promoted the Anoka County Traveler’s transit service, resulting in 257,440 non-SOV trips and the Ramsey Star Express commuter service, resulting in 67,340 non-SOV trips. An estimated 3.3 million vehicle miles were eliminated. The TMO actively worked with the County’s multi-modal planning manager to preserve funding for the Forest Lake commuter bus service and to secure $8 million in funding for expansion of transit service along TH65.

### 2.2.4 494 Commuter Services

The 494 Corridor TMO exists primarily to increase awareness and use of transportation options to major employment centers along the Interstate 494 corridor southwest of the Twin Cities. The TMO service area includes the I-494 corridor through Bloomington, Eden Prairie, Edina, Minnetonka, and Richfield (Figure 5). The traffic concerns along this corridor are significant enough that it threatens future growth and development in these cities; in response, the cities support the work of 494 Commuter Services and their efforts to manage demand.

**Figure 5: 494 Commuter Services Service Area**
494 Commuter Services is very successful in their employer outreach efforts, registering new carpoolers and vanpoolers, and increasing the number of new bus riders and bicyclists in the corridor. They hold hundreds of fairs and events every year and also work with employers one-on-one to increase the transportation benefits they provide to employees. 494 Commuter Services is also piloting a new employer-based individualized marketing approach to TDM and they see a bright future in using emerging communication techniques to speak to the increasingly mobile and sophisticated commuter.

Current efforts

494 Commuter Services provides a wide variety of services mainly focused on building relationships with commuters, registering them for regional services, and promoting the benefits of alternative transportation. Specific efforts include:

- Outreach activities through commuter fairs, bicycle clinics, and seminars on pre-tax transportation benefits.
- Personalized trip planning, brokering transit passes, and helping travelers find carpool matches
- Implementation of employer-based Individualized marketing programs with full evaluation of personalized trip planning assistance and its impact on travel behavior
- Assisting companies with TDM plan development and initiating telework programs
- Promoting and enrolling participants in regional events like the Commuter Challenge
- Installing outdoor bike parking and assisting companies develop preferential parking programs

Through these efforts, the organization focuses on promoting carpooling, vanpooling, bicycling, telework, and transit. Given the dispersed nature of the land uses and relatively low density over their service area, the biggest modal market for 494 Commuter Services is ridesharing followed by transit, then bicycling and telework.

Funding

494 Commuter Services is funded by the federal Congestion Mitigation Air Quality (CMAQ) program. The required 20 percent local match is composed of a mix of funds from the five cities within the organization’s service area.

Evaluation

494 Commuter Services tracks the benefit of their programs in several ways. They track the number of customized ridematches, customized transit itineraries, and customized bike route recommendations performed and the mode shift associated with these activities. They as also summarize this activity into a total number of vehicle miles saved. In their 2008 Annual Report, the following achievements were documented:

- Held 259 commuter fairs and 31 seminars on pre-tax transportation benefits
- Conducted 14 bike to work clinics and installed 9 bike racks for employers
- Promoted Commuter Challenge to 148 employers
Assisted six companies with TDM plans, and another six with telework implementation consulting.

494 Commuter Services estimates these efforts resulted in a savings of 24.9 million vehicle miles of travel in 2008. Further results for 2008 show:

- 2,653 new carpoolers
- 1,215 new bus riders
- 916 new bicycle commuters
- 3,365 individual pledges for the Commuter Challenge
- 4,000+ custom ridematches

### 2.3. Other TDM Services

#### 2.3.1 Hour Car & ZipCar

HourCar is a program of the non-profit organization, Neighborhood Energy Connection, which provides a car-sharing program. This program serves Minneapolis and St. Paul. All of the cars are located in proximity to bus routes and stops, and the cars are equipped to hold bikes. For people to become a member of HourCar, they must pay an initial $50.00 membership fee. Members are able to reserve cars by phone or online. HourCar vehicles cost $6.00-$8.00 an hour and an additional $0.25 per mile.

ZipCar car sharing is available through the Parking and Transportation Services of the University of Minnesota at both the Minneapolis and St Paul campuses. Students, faculty, and staff can join Zipcar for $35/year. Depending on the car model, drivers then pay an hourly rate for actual use of vehicle, typically around $8 per hour. Drivers register and reserve cars online. Currently, there are 10 vehicles available between the two campuses.

#### 2.3.2 NiceRide

NiceRide is a bike-sharing program that will launch in May 2010, and will be available for anyone to join. The bikes will be located in downtown Minneapolis, the University of Minnesota, and the Uptown neighborhood of Minneapolis. It is a convenient program, as users will be able to purchase cards at any of the many kiosks located in these neighborhoods. Once the users have purchased their cards, they are able to use the shared bikes at their leisure. Users simply insert their card at the bike stop, and then they are free to take the bike. The user is also free to return the bike to any rack, permitted that the racks have available spaces to lock up the bike.

### 2.4. Suburban Transit Agencies

There are several suburban transit agencies that provide service in the Metropolitan Council region in areas outside of the Metro Transit service boundary. These agencies and their operations typically provide TDM programs and services such as Guaranteed Ride Home, bike lockers, bike racks on buses, and special pass programs. The suburban transit agencies include:

- Maple Grove Transit
- Minnesota Valley Transit Authority
- Plymouth Metrolink
2.5. MnDOT

2.5.1 eWorkplace

eWorkPlace is a state-sponsored program for Twin Cities metropolitan area employers. This program allows employees to work from home or a remote location. The program encourages employees to connect with work via technology and allows for flexible scheduling. In addition to the benefit of flexible scheduling, the eWorkPlace program provides other tools to benefit employees such as the eWorkPlace Commute Tool, which tracks their many savings from teleworking. eWorkPlace also provides online tools such as a Managers Guide, telework policies, solutions to telework issues and barriers, case studies, and previous reports and white papers to provide education and assistance for employers and employees participating in the eWorkPlace program.

Employees who have enrolled for eWorkPlace may also submit questions and concerns online, in the ‘Ask the Expert’ feature. eWorkPlace also provides on-site training, e-learning, IT advice, and troubleshooting. These features are act as an incentive, as it may be more comforting for employees to take part in an alternative work program.

2.5.2 ArriveMN Web Site

In 2007 the ArriveMN web site (www.arrivemn.com) was developed by MnDOT as a one-stop information portal for all transportation services in the state. One area of particular emphasis was the Twin Cities region. Today, the site contains information on all modes of travel in the region, including bike, boat, bus, light rail, and heavy rail. Overall, this resource is underutilized and could be a communication tool developed and promoted by local organizations in the future.

2.5.3 Managed Lanes Operation and Planning

Two managed lane corridors exist in the region on I-35W and I-394. In coordination with MTS, MnDOT is conducting planning to expand the construction of managed lanes throughout the region. The Metropolitan Highway System Investment Study (MHSIS) will identify the types of managed lane projects that could utilize TDM services moving forward. Currently, the contract language used for the operation of the I-35W managed lanes implies that additional revenues must be spent on the improvement of bus transit services. There may be opportunities to amend this language in the future to support funding for TDM strategies along managed lane corridors.

2.6. Roles and Relationships of TDM Providers

There are several organizations and agencies that compose the TDM program structure of the Twin Cities region. In most cases, programs are administrated by the Metropolitan Council, funded by federal programs, and implemented by several local and regional organizations. Figure 6 details the roles and relationships of these groups and how they work together to provide TDM services.
Figure 6: Roles and relationships of TDM Providers
2.7. Funding Summary

The funding for TDM program implementation through the Metropolitan Council is primarily CMAQ and its required 20 percent local match. Most of the TMOs receive their local match from city or county governments and major employers. St. Paul Smart Trips is unique in that it has one grant-based source of funding through the McKnight Foundation. Also, the Van-GO! program receives revenue from subscriptions and other federal and state sources.

Table 5 below displays the 2008 annual funding for TDM programs with ties to CMAQ and the Metropolitan Council in the region.

Table 5: 2008 Funding Summary

<table>
<thead>
<tr>
<th>Organization</th>
<th>Funding Amount ($2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro Transit</td>
<td>$1,595,000</td>
</tr>
<tr>
<td>Van-GO! Administration</td>
<td>$50,240</td>
</tr>
<tr>
<td>St Paul Smart Trips</td>
<td></td>
</tr>
<tr>
<td>Summit-U program</td>
<td>$134,000</td>
</tr>
<tr>
<td>Other programs</td>
<td>$268,000</td>
</tr>
<tr>
<td>Downtown Minneapolis TMO</td>
<td>$330,000</td>
</tr>
<tr>
<td>Anoka County TMO</td>
<td>$160,000</td>
</tr>
<tr>
<td>494 Commuter Services</td>
<td>$330,000</td>
</tr>
<tr>
<td><strong>Total Funding</strong></td>
<td><strong>$2,867,240</strong></td>
</tr>
</tbody>
</table>
Chapter 3: Evaluation

This chapter consists of three evaluation components. First, several best practices from other regions in the United States are presented to detail how they structure their incentive strategies, how they evaluate their TDM programs, and how these processes are different from what is performed in the Twin Cities region today. Second, the results of a strengths, weaknesses, opportunities, and threats (SWOT) analysis conducted in December 2009 with the Advisory Committee is presented to identify the issues with the TDM program structure today and how future opportunities can help mitigate these issues. Third, a TDM market analysis was conducted to identify areas for future TDM programs in employment population centers not directly served by TMOs today.

Note this chapter provides the background and data needed to inform the recommendations made in the next chapter, Chapter 4: Recommendations. Formal recommendations for the Twin Cities TDM program are not proposed in this chapter.

3.1. National Best Practices and Twin Cities TDM Programs

The best practices summarized in this section offer several comparable TDM programs to the Twin Cities. The best practices are composed of two components: a review of the incentive strategies offered in other regions, and secondly a review of their performance and how these regions track the effectiveness of their overall TDM programs.

At the conclusion of each section, the information is summarized and compared to the Twin Cities TDM program. These summaries help point out the differences between Twin Cities program and other programs, where opportunities for new strategies or structures may lie, and identify areas for improvement that will be refined into recommendations in Chapter 4: Recommendations.

3.1.1 Best Practice Incentive Strategies Review

This section provides an overview of several incentive strategies that are underway in five different cities in the United States. The locations chosen for review include:

- Atlanta region, GA
- San Bernardino region, CA
- Las Vegas region, NV
- State of Virginia
- San Francisco Bay Area, CA

3.1.1.1 Incentive Program Structures

There are primarily three types of incentive strategies provided by other regional TDM programs. These strategies include tax incentives, commuter incentives, and employer incentives. They are incentive strategies that primarily focus on the journey to work, which is also the primary focus of the Twin Cities TDM programs and most TDM programs nationwide.
Tax Incentives

The first group that is simplest to implement is the tax incentives provided through IRS Ruling 132 (f) which allows employees to purchase up to $230 per month of transit, vanpooling expenses and parking expenses with pre-tax dollars, and up to $20 per month for bicycling. The employer also benefits with reductions in corporate taxes, FICA, and FUTA. This program is available nationally to all employees and employers and the two major undertakings are educational, which means educating employers on the use of 132 (f) and identifying voucher and vendor programs.

Although this incentive strategy is generally easy to implement, most employers do not make the effort to offer the pre-tax strategy to employees. One city, the City of San Francisco, has an ordinance that tries to increase implementation and awareness of this benefit by requiring the pretax incentive be implemented at worksite where parking is paid for by the employer.

Commuter Incentives

Commuter incentives are composed of several variations in incentive strategies. One is providing incentives to SOV (single occupant vehicle) drivers to switch to a rideshare mode. The incentive is either paid through cash or gift certificates and is typically available for three months and is validated either through paper work signed by an employer or through web-based systems. A second type of incentive usually includes ridesharing membership in a club that offers periodic discounts or drawings for certificates or cash. A third type is mode specific such as offering a vanpool incentive, or offering an incentive for larger carpools.

Employer Incentives

These incentive programs are rare but include coordinator incentives (cash or gifts based on percent of registrants/population of worksite), or incentives to employers to implement telework or compressed workweek programs by offering access to consultants. Some states even provide cash for the acquisition of equipment, such as the State of Virginia’s Telework!va program.

3.1.1.2 Five Best Practice Incentive Strategies

Clean Air Campaign: Commuter Rewards

*Atlanta, Georgia*

The Clean Air Campaign offers many incentives through their Commuter Rewards program, which is tracked online with their CommuteTrak application, which allows commuters to log their daily commutes. There are three levels of rewards: cash for commuters, commuter prizes, and carpool rewards.

- **Cash for commuters** allows commuters to gain $2 per day, up to $100 over a three-month period.

- **Commuter prizes** allow on-going rideshare participants to earn $25 in randomized drawings. The rewards are paid through a gift credit card.

- **Carpool rewards** allow carpools of three or more to earn $40 gas cards each month for a year and carpools of four or more to earn $60 gas cards for a year.

These strategies are promoted through radio spots, the Clean Air Campaign web site and through local TMAs. Evaluation data shows that on average, commuters rideshare 4.39 days and 3-6
months later rideshare 3.08 days. Since last year, these incentives are available to all residents of the Atlanta region.

Rideshare and Rideshare Plus

San Bernardino Association of Governments and Riverside County Transportation Commission, California

Through the San Bernardino Rideshare program, new rideshare participants are provided with $2 per day in the first three months of ridesharing, with a cap of up to $50 per month. Compared to the Atlanta incentive strategy, the incentive is paid in form of gift certificates. On-going rideshares (Rideshare Plus) that participate in Club Ride get discounts for hundreds of merchants in the region. Both San Bernardino and Riverside counties have the same program and offer reciprocity as long as you live in either county. Validation is paper based; however, a web based system is under development. This incentive strategy started in 1991, and has been copied in many other regions.

Club Ride

Regional Transportation Commission of Southern Nevada

Club Ride Rewards is a TDM program with incentives that encourages commuters to use commute alternatives when traveling to and from work, such as carpooling, vanpooling, taking transit, walking, and bicycling. Commuters are eligible to win $5, $25, and $50 gift cards, in addition to selected merchandise. A unique aspect of this program is that it is employer based and targeted to the service workers in downtown Las Vegas. The employer initiates interest by signing up and then making incentives available to the employees. To verify participation and track trips in order to be eligible for the gift cards, card-activated computer terminals are deployed to the worksites for employee use. Each participating employee has a unique card to swipe through the computer terminal to verify their trip. Alternatively, employees can log their trips online, call, or send a text. This approach enables participants who do not own a personal computer to be fully engaged in the Club Ride program at their worksite.

Another incentive offered by the Regional Transportation Commission to employers is the EZ Rider Transit Pass Program. This pass program allows employers to purchase discounted transit passes pretax (EZ Rider Passes) for employees as an added transportation benefit. These passes can be purchased in bulk at a discounted rate of five to 15 percent. Employers must be a Club Ride partner to get the discounted rate and added tax savings.

The employer based discount structure for EZ Rider passes is as follows:

<table>
<thead>
<tr>
<th>Purchase</th>
<th>Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 200 passes</td>
<td>5% discount</td>
</tr>
<tr>
<td>201 – 500 passes</td>
<td>10% discount</td>
</tr>
<tr>
<td>501 + passes</td>
<td>15% discount</td>
</tr>
</tbody>
</table>

To qualify for these incentives, the employers must purchase a set number of passes over the course of the year. However, how often the passes are delivered and when the employer pays is flexible.

Telework!va
Northern Virginia

Telework!va is a program that provides an incentive of up to $35,000 to employers of 20 or more for costs incurred in the implementation of teleworking in Northern Virginia, and up to $50,000 for employers with 200 or more employees in the I-495 construction corridor. This is a reimbursement-based strategy based on a variable percentage of lease costs and consultant/technical assistance expenses. Eligible expenses may also include laptops, computer peripherals such as printers, broadband access, connectivity infrastructure, VOIP technology, telework center fees, and consultant services. Employers must commit that their employees will telework 6 or more days per month or 1.5 days per week. This program has been available since 2001 and has assisted 101 employers.

Rideshare Rewards

511 Rideshare, San Francisco Bay Area, Northern California

The Rideshare Rewards campaign targets its incentives and messaging on time savings, consumer benefits, and the cost of gasoline. Radio spots are conducted to announce this once a year campaign during key listening periods and times of day when commuters are caught in congestion. The campaign primarily encourages people to try carpooling. Rideshare Rewards pays new carpoolers up to $100 in gas or grocery gift cards.

New carpoolers register at 511.org. Over the subsequent 90-day period, Rideshare Reward participants submit online commute logs, earn $2 per day, and can earn up to $100 total in Rideshare Rewards. Commuters receive assistance finding a carpool match through the 511 RideMatch Service at 511.org.

The Spin the Wheel is an additional motivational tool offered to ongoing carpoolers to keep them interested in submitting a commute diary. Each week of commute information submitted qualifies a web site user for one spin on a prize wheel. The online prize wheel is filled with gas cards, coffee cards, grocery cards and 511 logo products.

The Rideshare Rewards program has been running since 2006 and the program is being merged with a new ridematching system in development.

3.1.1.3 Best Practice Incentive Review Summary

Compared to the incentives offered with the Twin Cities regional TDM programs, the regional incentive strategies described above offer several differences. First, several of the regional programs offer a high level of direct financial incentives (cash or gift certificates) to new and/or ongoing participants. This type of incentive structure requires a large commitment in financial resources, but it also sustains the performance of the overall TDM program. Financial incentives work particularly well within ridesharing programs focused on increasing use of carpooling. In addition, several of these incentives strategies, including the incentives provided with 511 Rideshare Rewards in Northern California and the Rideshare Rewards program in Atlanta are ongoing. This helps with participant retention.

A second highlight is the orientation of some of the incentive strategies directly to employers versus employees. As opposed to the employees themselves, employers are seen as the target audience for the Nevada Club Ride program and the Telework!va program. Both of these programs are fairly robust in the programs and financial incentives they offer employees and have proven successful in their communities.
3.1.2 Best Practices in Program Evaluation

Best practices in program evaluation display the methods and procedures used by other regional
governments to assess the impact of TDM programs. These best practices clearly focus on
employee and participant surveys as the underlying data collection mechanism to derive
performance metrics. However, the practices vary considerably by each region and produce very
different results, responding to the interests and needs of those communities. The best practices in
program evaluation were chosen from a limited number of regions that are consistently
monitoring the impact of TDM programs. These regions were selected based on their program’s
sophistication more than their size or population in comparison to the Twin Cities region. The
five regions selected include:

- Phoenix and Maricopa County region, AZ
- Washington DC metropolitan region
- Atlanta region, GA
- Miami/Ft. Lauderdale region
- San Francisco Bay Area, CA

In general, the goals for program performance of most TDM programs are predetermined by
transportation conformity and air quality policies that are tied to State Implementation Plans
(SIP). The policies of a SIP are reflected in the regional Transportation Implementation Program
(TIP) and funding is delegated accordingly. As an example, in the case of Valley Metro’s goals in
Phoenix, the primary policies are established by the SIP, and then further defined by the
Maricopa Association of Governments and the regional TIP.

There are some instances when additional large development results in further TDM
implementation to adhere to compliance with the SIP. In the Washington, DC metro area, the
building of the Red Skins Stadium and resulting emissions exceeded limits in the SIP. Thus, the
TERMs analysis described later in this section was modified to indicate how TDM strategies and
the MWCOG Commuter Connections program would reduce the impact of transportation-related
emissions increases from building the stadium.

3.1.2.1 Valley Metro, Phoenix, AZ

The purpose of the annual Valley Metro telephone survey is to assess participation in and
reactions to the Trip Reduction, Regional Rideshare, and Clean Air Campaign programs for
Valley Metro. The study is conducted in partnership with Valley Metro, Maricopa Association of
Governments (MAG), and Maricopa County. Up until 2007, Valley Metro based the evaluation of
the TDM program on the results of a telephone survey of residents age 16 and older in Maricopa
County.¹

The survey tracks changes in alternate mode usage among commuters, perceptions of air quality,
and air pollution control. Whenever appropriate, the analysis examines the trends that have
occurred from year to year. Important differences between significant population sub-groups are
also discussed.

On average about 500 – 600 telephone interviews are conducted each survey year. The survey
takes about 12 minutes to complete. The total weighted sample has a margin of error of ±4.2% to

¹ Since 2008, residents age 18 and older have been surveyed. Since the surveyed population for 2008 and 2009 does not directly
match up with census categories, the survey results can not be used to project regional impacts on VMT for those years. For the
purposes of this summary, we have referred to the 2007 data results.
5.8% margin of error. Households are selected by means of random digit dialing. The results of the surveys are expanded to project regional impact.

The following are some of the highlights of the latest survey and show what kind of data a full telephone survey can recover:

- Overall in 2007, the percent of employed people using traditional alternate modes to commute to work did not change in comparison to the past two years (24% vs. 23% and 24%), but remains lower than the 35% recorded in 2004.

- Total alternate mode usage, which includes telecommuting and compressed schedules, increased significantly to the highest level in three years (43% up from 39%). The increase was due, for the most part, to an increase in employed residents who “always” use an alternate mode for their commute (12% up from 9%).

- The percent of employees who drive alone one or more days a week decreased to the lowest level reported since 2000 (85%).

- In 2007, both the percent of carpoolers/vanpoolers (17% to 18%) as well as the frequency of carpooling increased (2.9 days to 3.0 days). Although there was a slight increase in the percentage of people reporting to drive alone five days a week (63% to 66%), the percentage of employees reporting to carpool five days a week more than doubled (14% to 32%).

- The alternate modes that have made the most significant changes since 1993 are riding the bus (up 127%), walking (up 411%), and telecommuting (up 1,007%). The number of employed residents who operate a home-based business since 1993 is up by 219%.

- Using regional average trip distance data, approximately 8.6 million vehicle miles (approximately 18% of the total possible vehicle miles) were avoided daily in 2007 because employees used an alternate mode of transportation, worked at home, or had a compressed work schedule. This is equivalent to 2.3 billion annualized VMT in 2007.

3.1.2.2 Commuter Connections Program, Washington, DC

The Commuter Connections Program of the Metropolitan Washington Council of Government (COG), in concert with program partners, is responsible for implementing five Transportation Emission Reduction Measures (TERMs) in support of the metropolitan Washington region’s efforts to meet the conformity requirements of federal transportation and clean air mandates. The TERMS include:

- Maryland and Virginia Telework
- Guaranteed Ride Home
- Employer Outreach
- Mass Marketing
- InfoExpress Kiosks

In addition, there are six key program measures based on TDM program outcomes. These measures include:

- Vehicle trips reduced
- Vehicle miles of travel (VMT) reduced
- Emissions reduced: Volatile Organic Compounds (VOC), Oxides of Nitrogen (NOx), and Particulate Matter (PM2.5)
• Energy reduction (fuel saving)
• Consumer saving (commuting cost saving)
• Cost effectiveness, in terms of cost per benefit obtained (e.g., cost per trip reduced)

The evaluation process uses several calculation factors derived from surveys of Commuter Connections’ program applicants and/or the public-at-large. These factors include:

• Placement rate: percent of commuters who shift to alternative modes
• Vehicle trip reduction (VTR) factor: Average daily trips reduced for each commuter placed
• Average commute trip distance
• Proportion of ridesharers and transit users that drive alone to the location where they meet their carpool, vanpool, bus, or train.

Much of the data needed to perform this robust evaluation process is achieved through the following methods:

• **Ongoing Monitoring:** This includes the regional Association for Commuter Transportation (ACT) Employer Contact database, Maryland and Virginia Telework participants, Bike to Work Day participant records, Commuter Connections applicant database records, and the Commuter Operations Center activity tracking

• **Existing/Ongoing Surveys:** Commuter Connections applicant Placement Rate survey, Guaranteed Ride Home survey, State of the Commute survey, Employee Commute surveys (voluntarily administered by employers), Telework assisted employer follow-up surveys, Bike-to-Work Day participant survey

• **Analysis Tools:** EPA COMMUTER Model (v 2.0) and the CUTR Worksite Trip Reduction Model

The data retrieved from these data collection methods are applied to a basic methodology listed below to calculate program impacts for each TERM:

1. Estimate commuter population “base” for the TERM (e.g., all commuters, GRH applicants, ride-share matching applicants, kiosk users, Employer Outreach employees, etc.)
2. Calculate placement rate: Percentage of commuters in the population base who made a travel change as a result of the TERM
3. Estimate the number of new alternative mode placements: Multiply placement rate by the population base for the evaluation period
4. Calculate the vehicle trip reduction (VTR) factor for new placements: Average daily vehicle trips reduced per placement
5. Estimate vehicle trips reduced: Multiply number of placements by the VTR factor
6. Estimate vehicle miles traveled (VMT) reduced: Multiply number of vehicle trips reduced by average commute distance
7. Adjust vehicle trips and VMT for access mode: Discount vehicle trips reduced and VMT reduced to account for commuters who drive alone to meet rideshare modes and transit at park-and-rides and other parking facilities.

8. Estimate NOx, VOC and PM2.5 emissions reduced: Multiply adjusted vehicle trips and VMT reduced by emissions factors consistent with the regional planning process.

9. Estimate the energy and commuter cost savings: Multiply VMT reduced by fuel efficiency and vehicle operating cost factors.

10. Estimate cost effectiveness: Divide program or TERM costs by the program impact measures.

Figure 7 displays the results of the TERMs for the 2008 fiscal year.
Figure 7: 2008 TERM Results (*MWCOG 2008 data*).

<table>
<thead>
<tr>
<th>TERM</th>
<th>Participation</th>
<th>Daily Vehicle Trips Reduced</th>
<th>Daily VMT Reduced</th>
<th>Daily Tons NOx Reduced</th>
<th>Daily Tons VOC Reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maryland and Virginia Telework 3)</td>
<td>49,027</td>
<td>11,820</td>
<td>241,208</td>
<td>0.122</td>
<td>0.072</td>
</tr>
<tr>
<td>2008 Goal</td>
<td>49,027</td>
<td>21,866</td>
<td>413,703</td>
<td>0.211</td>
<td>0.126</td>
</tr>
<tr>
<td>Impacts (7/05 – 6/08)</td>
<td>49,027</td>
<td>10,036</td>
<td>172,495</td>
<td>0.089</td>
<td>0.054</td>
</tr>
<tr>
<td>Net Credit or (Deficit)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>36,992</td>
<td>12,593</td>
<td>355,135</td>
<td>0.177</td>
<td>0.097</td>
</tr>
<tr>
<td>2008 Goal</td>
<td>36,992</td>
<td>8,680</td>
<td>227,428</td>
<td>0.106</td>
<td>0.056</td>
</tr>
<tr>
<td>Impacts (7/05 – 6/08)</td>
<td>36,992</td>
<td>(11,828)</td>
<td>(3,913)</td>
<td>(127,707)</td>
<td>(0.071)</td>
</tr>
<tr>
<td>Employer Outreach – all employers participating 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008 Goal</td>
<td>581</td>
<td>64,644</td>
<td>1,065,851</td>
<td>0.549</td>
<td>0.343</td>
</tr>
<tr>
<td>Impacts (7/05 – 6/08)</td>
<td>852</td>
<td>59,163</td>
<td>969,174</td>
<td>0.443</td>
<td>0.266</td>
</tr>
<tr>
<td>Net Credit or (Deficit)</td>
<td>271</td>
<td>(5,481)</td>
<td>(96,677)</td>
<td>(0.106)</td>
<td>(0.077)</td>
</tr>
<tr>
<td>Employer Outreach – new/expanded employer services since July 2005 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008 Goal</td>
<td>96</td>
<td>8,618</td>
<td>140,622</td>
<td>0.072</td>
<td>0.046</td>
</tr>
<tr>
<td>Impacts (7/05 – 6/08)</td>
<td>194</td>
<td>22,510</td>
<td>372,406</td>
<td>0.178</td>
<td>0.102</td>
</tr>
<tr>
<td>Net Credit or (Deficit)</td>
<td>98</td>
<td>13,892</td>
<td>231,784</td>
<td>0.106</td>
<td>0.056</td>
</tr>
<tr>
<td>Employer Outreach for Bicycling 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008 Goal</td>
<td>61</td>
<td>130</td>
<td>567</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Impacts (7/05 – 6/08)</td>
<td>122</td>
<td>188</td>
<td>1,127</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Net Credit or (Deficit)</td>
<td>61</td>
<td>58</td>
<td>560</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Mass Marketing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008 Goal</td>
<td>11,023</td>
<td>7,758</td>
<td>141,231</td>
<td>0.072</td>
<td>0.044</td>
</tr>
<tr>
<td>Impacts (7/05 – 6/08)</td>
<td>5,464</td>
<td>2,577</td>
<td>69,274</td>
<td>0.032</td>
<td>0.017</td>
</tr>
<tr>
<td>Net Credit or (Deficit)</td>
<td>(5,559)</td>
<td>(5,181)</td>
<td>(71,957)</td>
<td>(0.040)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>InfoExpress Kiosks 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008 Goal</td>
<td>8,627</td>
<td>1,778</td>
<td>46,755</td>
<td>0.023</td>
<td>0.013</td>
</tr>
<tr>
<td>Impacts (7/05 – 6/08)</td>
<td>8,627</td>
<td>2,840</td>
<td>52,638</td>
<td>0.027</td>
<td>0.016</td>
</tr>
<tr>
<td>Net Credit or (Deficit)</td>
<td>1,062</td>
<td>5,883</td>
<td></td>
<td>0.004</td>
<td>0.003</td>
</tr>
</tbody>
</table>

1) Participation refers to number of commuters participating, except for the Employer Outreach TERM. For this TERM, participation equals the number of employers participating.

2) Impact represents portion of regional telecommuting attributable to TERM-related activities. Total telecommuting credited for conformity is higher than reported for the TERM.

3) Impacts for Employer Outreach - all employers participating includes impacts for Employer Outreach – new/expanded employer services since July 2005 and for Employer Outreach for Bicycling.

4) InfoExpress Kiosks TERM is part of the Integrated Rideshare TERM.
3.1.2.3 Atlanta Regional TDM Program, Atlanta, GA

Several measurement efforts are undertaken by Georgia Department of Transportation to document the impact of TDM in the Atlanta region. Surveys are conducted in the non-attainment area, including a State of the Commute telephone survey of about 4,000 randomly selected commuters, a random survey of 385 employer representatives, panel analysis of recipients of Commuter Rewards or Cash for Commuters, surveys of vanpool riders, and other programmatic surveys as needed. Not all surveys are conducted every year.

Commuter Placement Rates and Placements

To calculate the commuter placement rates, the percentage of active participants shifting to alternative modes or increasing their mode use during the evaluation period are used. Examples for 2002, which is year when a methodology framework was developed, are provided below:

- New carpool placement rate 11.2%
- New vanpool placement rate 3.4%
- New transit/non-motorized mode placement rate 7.9%
- Retained carpool placement rate 7.5%
- Retained vanpool placement rate 1.4%
- Retained transit/non-motorized mode placement rate 8.4%

The number of active participants, when multiplied by placements rates, provides an estimate of the total commuters placed in alternative modes.

Vehicle Trips and VMT Reduced

Vehicle trip reduction (VTR) measures the number of vehicle trips (VT) no longer made as a result of commuters shifting to alternative modes.

The VTR factors include:

- New carpool VTR factor: 0.34 daily one-way VT reduced per placement
- New vanpool VTR factor: 0.84 daily one-way VT reduced per placement
- New transit/non-motorized VTR factor: 0.54 daily one-way VT reduced per placement
- Retained carpool VTR factor: 0.82 daily one-way VT reduced per placement
- Retained vanpool VTR factor: 1.41 daily one-way VT reduced per placement
- Retained transit/non-motorized VTR factor: 1.08 daily one-way VT reduced per placement

These factors, when multiplied by the number of placements in their respective categories and discounted to reflect the short duration of temporary placements, equal a total daily vehicle trips reduced. Multiplying the number of vehicle trips reduced by the average commute distance for
the respondents who made a commute change results in a total daily vehicle miles traveled (VMT) reduction.

Using this methodology and results of the 2007 State of the Commute commuter survey, the results of the Atlanta program are summarized below:

- 84 percent drive alone, 6 percent carpool, less than one percent vanpool, four percent telework or work alternative work hours, one percent is on a compressed workweek schedule, four percent take transit and less than one percent bike or walk.
- The average one-way travel distance is 19.7 miles, with an average of 35.9 minutes of commuting time.
- The most frequently used commuter alternative among those who use other modes is telework (40%).
- The average size of carpoools is 2.48, and the average vanpool size is 7.75.
- 30 percent of those surveyed had never heard of transportation support service such as Clean Air Campaign or a TMO.
- In 2008, 69 percent of those enrolled in the Cash for Commuters program continue to carpool 3-6 months after the program ended.

3.1.2.4 South Florida Commuter Services (SFCS), Miami/Ft. Lauderdale, FL

SFCS tracks the number of employees that participate in employer TDM programs, as well as the benefits that each employer provides. Participants are contacted 30-60 days after they initially sign-up for SFCS services to determine use of services. Surveys are also sent out twice a year to gather feedback from participants. This data is used to create a trip reduction analysis for the Florida DOT. They also track calls to their information line, website hits, and the number of returned rideshare applications. SFCS evaluates its PR events by tracking the number of guests at events as well as feedback received from guests at these events.

Using these data and other sources, the following are some of the performance measurements used in evaluation:

- Share of commuters aware of brand
- Profiles of TDM elements for each employer
- Number of employers with telework and compressed work week programs
- Number of employees teleworking or working a compressed work week
- Number of calls received
- Mode shift from drive alone
- Mode shift from alternative modes
- Number of vanpool trips and actual vans
- Customer turnover
• Percent of non-SOV going back to SOV

Evaluation in 2004 of the SFCS programs show:

• Placement as measured by rideshare arrangement formed is 14 percent for all users, 19 percent for online users, and 12 percent for non-online users.

• Overall customer satisfaction had a rating of 7.1 to 6.8 (out of 10, with 10 being highest) for years 1999 to 2004.

• 57,660,000 miles of vehicle travel were eliminated in 2004 at the cost of $1.09 per trip and $0.04 for each mile reduced.

• The 2004 annual budget of SCFS was $2,425,000.

• There are over 13,000 people registered in the Guaranteed Ride Home database and only 749 rides were provided in 2004.

• Of the 23,000 registered commuters in the rideshare database, approximately 69 percent use an alternative mode of commuting once per week. This compares to just 19 percent of the general public.

• There are 89 vans in operation, accounting for 774 vanpoolers.

### 3.1.2.5 511 Regional Rideshare Program, San Francisco Bay Area, CA

The following summarizes annual calculations and metrics that are used by the 511 Regional Rideshare Program to track program performance. In the mid-1990s, the California Air Resources Board developed this methodology and quickly all California area Rideshare agencies began implementing it to calculate program impacts. Data for this summary came from participant surveys completed in fall 2008 and spring 2009, as well as the 511 Rideshare Ridematch database.

Each month, 511 Rideshare estimates the number of individuals (referred to as “Clients Placed”) who shifted to carpooling or vanpooling as a result of 511 Rideshare activities. This calculation is based on three 511 Rideshare activities: New or Updated Matchlist Requests, Placement Calls (also called Follow-up Customer Contact Calls), and New Vanpool Formation. Factors derived from surveys are applied to the volume of each of these activities to determine the final “Clients Placed.”

The vehicle trip and VMT reduction impacts are calculated once the Clients Placed participation is known. These impacts are calculated through a series of factors and regional averages. These factors are summarized in Table 6 and include:

• Prior SOV Use Factor. This is a percentage factor used to determine the number of trips eliminated per day specifically from the 511 Rideshare program. Some participants would have already been carpooling or using transportation alternatives before the program; therefore, a range of 55 – 60 percent is used to discount the impact of the program on vehicle trips and VMT. The resulting trips eliminated per day is the final Clients Placed numbers that are then used in the subsequent Days per Year and Miles per Trip calculations.
• Days Per Year. This factor assumes annual participation of 99 days per year for carpool registrants and 240 for vanpool registrants.

• Miles Per Trip. This factor assumes 32.8 mi per trip for carpools and 54 mi per trip for vanpools.

Table 6: 2008 – 2009 Results of 511 Rideshare program

<table>
<thead>
<tr>
<th>Prior SOV Use Factor</th>
<th>Trips Eliminated per Day (trips)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clients Placed: Matchlists</td>
<td>60%</td>
</tr>
<tr>
<td>Clients Placed: Placement Calls</td>
<td>60%</td>
</tr>
<tr>
<td>Clients Placed: Riders in New Vanpools</td>
<td>55%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Days Per Year</th>
<th>Trips Reduced/Year (trips)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clients Placed: Matchlists</td>
<td>99 days</td>
</tr>
<tr>
<td>Clients Placed: Placement Calls</td>
<td>99 days</td>
</tr>
<tr>
<td>Clients Placed: Riders in New Vanpools</td>
<td>240 days</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Miles per Trip</th>
<th>Total VMT Reduction/Year (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clients Placed: Matchlists</td>
<td>32.8 mi</td>
</tr>
<tr>
<td>Clients Placed: Placement Calls</td>
<td>32.8 mi</td>
</tr>
<tr>
<td>Clients Placed: Riders in New Vanpools</td>
<td>54 mi</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

3.1.2.6 Best Practices in Program Evaluation Summary

Review of the five best practices in TDM program evaluation show that other regions in the United States use varying scales of regional surveying to comprehensively assess the impact of their programs. Surveying methods differ, but all approaches are fairly robust and require a thorough understanding of what is desired as output data for performance measurement.

Regions use the survey results in a variety of methods to estimate the impact of their TDM program, typically at least in terms of vehicle trips reduced or vehicle miles reduced. The key component to develop these performance metrics is to clarify a participation rate by new participants or ongoing participants in TDM programs. These participation rates are the foundation for other results, such as VMT savings, which typically use the participation rate and a
regional average commute trip distance that is already calculated for regional transportation demand modeling purposes.

Expanding more on participation rate, some regions clearly try to understand the subtleties of participation. That is, how many are new participants, how many are ongoing participants, and how many are participants that have reverted back to SOV use. These nuances help explain the true impact of the TDM program and help decision makers understand the long-term impact of TDM programs.

Table 7 presents a summary of the best practices in program evaluation. More detailed budget information is available in Section 3.1.3.
Table 7: Best Practices in Program Evaluation Summary

<table>
<thead>
<tr>
<th>TDM Program</th>
<th>Annual VMT reduced (VMTR)</th>
<th>Annual budget ($2008)</th>
<th>Total Annual VMT* (1,000,000)</th>
<th>VMTR as a percentage of Total VMT</th>
<th>Total Population**</th>
<th>Total Employment**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valley Metro (Phoenix)</td>
<td>2,300,000,000***</td>
<td>$6,352,272</td>
<td>21,268.5</td>
<td>10.81%</td>
<td>4,160,999</td>
<td>3,141,221</td>
</tr>
<tr>
<td>MWCOG (Washington, DC)</td>
<td>505,380,000</td>
<td>$5,200,166</td>
<td>26,604.6</td>
<td>1.90%</td>
<td>5,306,742</td>
<td>4,153,329</td>
</tr>
<tr>
<td>Clean Air Campaign (Atlanta)</td>
<td>336,000,000</td>
<td>$4,000,000</td>
<td>30,576.15</td>
<td>1.10%</td>
<td>5,251,899</td>
<td>3,991,402</td>
</tr>
<tr>
<td>South Florida Commuter Services</td>
<td>57,660,000</td>
<td>$2,425,000</td>
<td>30,754.35</td>
<td>0.19%</td>
<td>5,403,075</td>
<td>4,327,631</td>
</tr>
<tr>
<td>511 Rideshare (San Francisco Bay Area)</td>
<td>45,233,763****</td>
<td>$2,830,000</td>
<td>26,589.75</td>
<td>0.17%</td>
<td>4,222,756</td>
<td>3,409,030</td>
</tr>
<tr>
<td>Twin Cities TDM Program (Minn/St Paul)</td>
<td>65,958,658</td>
<td>$4,063,182</td>
<td>17,402.55</td>
<td>0.38%</td>
<td>3,197,225</td>
<td>2,480,984</td>
</tr>
</tbody>
</table>

* Data obtained from the Texas Transportation Institute 2009 Mobility Study. Total Annual VMT is compiled from the daily VMT reported by region in the 2009 Mobility Study.

** 2006 – 2008 American Community Survey data for Metropolitan Statistical Areas representing these regions.

*** Results of region-wide 2008 TDM program survey including telework, which had a strong impact in this survey.

**** 511 Rideshare regional program results only. The VMT reduced number does not reflect local and transit partner programs.

Table 7 shows that there is a significant amount of variation between regions in terms of VMT reduced and the impact of VMTR as a percentage of total VMT. The principal reason for these differences is differing data collection standards and program effectiveness reporting requirements for each region. Also, some regional TDM programs may account for all programs, including telework and bicycle use, while others may only account for ridesharing programs.
3.1.3 Best Practices in TDM Program Funding

National research has shown that while TDM program funding is still heavily reliant upon CMAQ, a diversity of other funding sources are slowly being developed at the state, regional, and local level. Research conducted by the Center for Transportation and the Environment of nine regional programs found nearly 60% of all funding stems from the CMAQ program. Other federal funding accounted for 7 percent, state funding was 16 percent, and local funding 18 percent. The regions studied included Atlanta, Massachusetts (statewide MassRIDES program), Chicago, Houston-Galveston area, Miami-Dade, Phoenix, Riverside, CA, the San Francisco Bay Area, and the Washington DC metropolitan region. It is important to note that the regions listed above are all in nonattainment status for air quality designation while the Twin Cities is a maintenance area. The nonattainment status requires CMAQ be used for alternative transportation modes like transit and TDM. Since the Twin Cities region is in maintenance status, CMAQ funds in this region are more flexible and this may affect the ability of TDM partners to seek out funding resources.

Figure 8 displays the results of this research.

**Figure 8: Average Funding Sources across nine regions (CTE, 2006)**

The five regions researched for best practices in program evaluation were also studied for their funding sources. These funding sources and related annual budgets are detailed in Table 8.

---

2 Center for Transportation and Environment. 2006. “TDM Program Comparison Study: Program comparison research for nine regions across the nation.” Atlanta, GA: Georgia Department of Transportation.
Table 8: Regional TDM program funding

<table>
<thead>
<tr>
<th>TDM Program</th>
<th>Funding Sources</th>
<th>Annual Budgets (2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CMAQ</td>
<td>Local</td>
</tr>
<tr>
<td>Valley Metro (Phoenix)</td>
<td>48% distributed through State and Maricopa County Trip Reduction Program</td>
<td>49% Proposition 400: 1/2 cent sales tax</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MWCOG (Washington, DC)</td>
<td>50% through State and local DOT’s</td>
<td>49% State</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Air Campaign (Atlanta)</td>
<td>80% through CMAQ</td>
<td>20% total local match. Composed of state (11%) and private corporations/ fundraising</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Florida Commuter Services (Miami/Ft. Lauderdale)</td>
<td>No CMAQ funding</td>
<td>40% through regional agency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% State Funds</td>
</tr>
<tr>
<td>511 Rideshare (San Francisco Bay Area)</td>
<td>75% through Congestion Management Agency (MTC)</td>
<td>25% from the Bay Area Air Quality Management District</td>
</tr>
</tbody>
</table>
3.1.3.1 Denver Regional Council of Governments TDM Pool Allocation Process

The Denver Regional Council of Governments (DRCOG) administers a regional CMAQ TDM funding application process with local TDM partners biannually. DRCOG staff administers the application, evaluation, and selection process for these funds. Like the Twin Cities, the DRCOG region has several transportation management organizations and other local organizations that use CMAQ TDM funding to implement local outreach programs and promote regional services.

DRCOG works with local organizations each funding cycle to establish an application process that ultimately awards the CMAQ funds on a competitive basis, but also a very transparent basis. There are a series of Workgroup meetings with local TDM partners to define funding eligibility requirements, review standards for VMT and trip reduction calculations from proposed projects, and ultimately the group reviews applications together and collectively select the winning applications through a point-based scoring system. The application consists of several sections, including:

- Application and project information.
- Funding request, with local match sources detailed including volunteer hours, in-kind services, and donations.
- Detailed work tasks with estimated start and end dates.
- Benefit calculations including single occupant vehicle trips reduced, VMT reduced, and cost effectiveness (total project cost divided by VMT).
- Other considerations, such as innovation and project readiness.

Information and resources are published to the DRCOG web site during the application process and final applications are submitted electronically. For the 2010 – 2012 funding cycle, the evaluation criteria and the maximum points that can be awarded for each criteria are provided in Table 9.

Table 9: 2010 – 2012 Evaluation Criteria for the DRCOG regional TDM program

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Maximum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMT Reduction</td>
<td>18</td>
</tr>
<tr>
<td>Trip Reduction</td>
<td>15</td>
</tr>
<tr>
<td>Cost Effectiveness</td>
<td>25</td>
</tr>
<tr>
<td>Overmatch (any additional local match than the minimum 20% requirement)</td>
<td>8</td>
</tr>
<tr>
<td>Congestion level in project service area</td>
<td>8</td>
</tr>
<tr>
<td>Metro Vision Regional Plan implementation points</td>
<td>6</td>
</tr>
<tr>
<td>Results tracking process</td>
<td>5</td>
</tr>
<tr>
<td>Level of innovation (new ideas or concepts not yet implemented in the region)</td>
<td></td>
</tr>
<tr>
<td>Other considerations (awarded based on TDM Workgroup participant thoughts including regional equity, readiness, timeliness, etc)</td>
<td>10</td>
</tr>
<tr>
<td>Grand Total Maximum Points</td>
<td>100</td>
</tr>
</tbody>
</table>
3.1.4 Best Practices in TDM Program Structures

There are different structures for regional TDM programs nationwide. The structure depends heavily upon local government engagement, regional policy, and the presence of local organizations such as transportation management organizations and special districts. In general, two types of structures exist:

- **Heavy regional involvement.** Examples include the Maricopa County Trip Reduction Program and the Portland, Oregon regional Employee Commute Options program administered by the Oregon Department of Environmental Quality.

- **Strong local implementation.** These examples are similar to the Twin Cities TDM program design, where local transportation management organizations and other groups provide local outreach and marketing of regional services as well as their own programs. A comparable region is the Atlanta, Georgia region.

The design of each of these program structures and examples from other regions is described below.

3.1.4.1 Maricopa County Trip Reduction Program

Maricopa County (Phoenix region) is a long-standing national example of mandatory regional TDM requirements through their Trip Reduction Program (TRP). The TRP has been in existence since the passage of the 1988 Air Quality Bill through the Arizona Legislature, which contained many new rules and regulations oriented to improving the region’s air quality. The TRP represented one of the most significant transportation-related regulations passed through the bill to improve Phoenix area air quality. Also, the Phoenix region does not contain transportation management organizations or other local organizations solely oriented to providing TDM programs. However, there are varieties of business improvement districts in operation that provide transportation-related services, such as shuttles in downtown Phoenix.

The TRP is administered through the Maricopa County Air Quality Department. It requires employers with 50 or more employees to develop travel reduction plans for their worksites. The County provides employers with TDM resources and incentives to help achieve the goals established in the plans, such as promoting alternative modes and providing regional incentive programs. Valley Metro, the region’s transit provider, implements the regional TDM program and accompanying incentives.

The regional goal of the TRP is to reduce single occupant vehicle trips and/or miles traveled to the work site by 10 percent a year for a total of five years, and then 5 percent for three additional years, or until a 60 percent rate of SOV travel is reached.

The TRP monitors the effectiveness of the program through providing surveys to participating employers, who in turn implement the surveys and provide the responses to TRP staff. The most recent regional results show employee participants in the TRP save an estimated 12,299 tons of air pollutants each year through the program.

3.1.4.2 Portland, Oregon Employee Commute Options Program

The Oregon Department of Environmental Quality (DEQ) implements the Employee Commute Options (ECO) Program for the Portland, Oregon region. The primary purpose of the program is to reduce air pollution from single occupant vehicle traffic in the region. It is a component of several transportation-related emission mitigation measures the region is implementing to comply with federal air quality standards.
Under the DEQ ECO program, employers with more than 100 employees must develop a travel reduction plan that demonstrates how they will provide their employees with commute alternatives and incentives designed to reduce the number of cars driven to work. The ECO program expects employers to provide the majority of these incentives and strategies such as transit pass subsidies are common tools. Employers are also required to survey their employees and provide the survey responses to the DEQ. In 2008, 780 participating employers reduced over 3 million commute trips through the ECO program.

The ECO program is successful in part because of strong local support and implementation of TDM programs. The Portland region is known for its strong local transportation management associations, who help support the mission of the ECO program. Also, in 2006 the Oregon Department of Transportation, Metro, TriMet, the City of Vancouver, and other public and private partners launched the Drive Less/Save More Campaign (www.drivelesssavemore.com). The City of Portland has also launched several successful TDM programs, including recent residential individualized marketing programs.

3.1.4.3 Atlanta Clean Air Campaign and Transportation Management Associations

As described in Sections 3.1.1.2 and 3.1.2.3, the regional Clean Air Campaign in Atlanta provides a variety of incentives for transportation alternatives and these incentives are monitored for their effectiveness. The Clean Air Campaign itself is a non-profit organization that is a combination of state, regional, and local government partners as well as major employer partners (like the Home Depot). The Clean Air Campaign acts as a “one stop shop” for information on transportation alternatives and TDM services. Travelers visit www.cleanaircampaign.org for information about all transportation options in the region.

Supporting the regional Clean Air Campaign are local Atlanta TMAs and the regional rideshare agency, RideSmart. These TMAs help employers provide cost-effective commute options for their employees such as transit discounts, carpool and vanpool incentives, and other programs that help Atlanta commuters change from driving alone to another mode. The Atlanta region has eight TMAs:

- Buckhead Area TMA
- Downtown TMA
- Clifton Corridor TMA
- CobbRides (recently rebranded LocalZoom)
- Commute Club: A Program of the Cumberland CID
- Midtown Transportation Solutions
- Perimeter Transportation Coalition
- ASAP+: Atlantic Station Access + mobility Program

These groups are funded through a mix of sources, including federal CMAQ grants as well as assessments from local improvement districts and local government support. A significant part of their efforts are channeled towards local outreach and marketing services to promote the regional programs that the Clean Air Campaign provides.

The Clean Air Campaign is a stand-alone organization that equally promotes all modes of transportation and facilitates travelers getting information and incentives to change travel behavior.
3.2. 2009 Transportation Management Association Survey

In 2009, a Transportation Management Association survey was conducted by UrbanTrans in association with the Association for Commuter Transportation’s TMA Council. Of 176 TMA’s contacted nationally and internationally, 78 responded, of those 68 were US based and the rest were based in Canada, United Kingdom, Netherlands, New Zealand, and Australia. The TMAs were based on self-identification of the respondents.

3.2.1 TMA Funding Sources

A total of 65 percent of the TMAs are incorporated organizations. In the US, most of the TMAS are non profit 501 (c)(3) or 501(c)(4) incorporated organizations. Of those that are not incorporated, 88 percent are a subsidiary or internal department of another incorporated parent organization. The most common parent organization is a Chamber of Commerce or other types of membership associations. Other parent organizations include Business Improvement Districts, a site-specific development, a University, or a local government agency or department.

TMA funding sources are also diverse. The following percentages indicate the percentage of TMAs that receive funding from each source type.

- 58 percent of TMAs receive funding from membership dues
- 32 percent of TMAs receive funding from services
- 31 percent of TMAs receive funding from government grants
- 10 percent of TMAs receive funding from developer funding
- 10 percent of TMAs receive funding from a business investment district
- 21 percent of TMAs receive funding from other sources

When analyzing the above data, it was found 20 percent of respondents receive 90 percent of their revenue from membership dues, while 21 percent receive 10 percent or less of their revenue from membership dues. 42 percent do not receive any income from membership dues.

3.2.2 Top Services Provided by TMAs

The TMAs mainly focus on employees who commute to and from work (76 percent). Geographically the TMAs serve a variety of geographic areas such as central business districts, corridors, citywide areas, an urban or suburban activity center, or a specialized activity center such as an airport, hospital, or university.

The five top services offered by TMAs include:

- Promotional/marketing materials
- Employer travel surveys
- Promotional events
- Trip reduction plan/travel plan development
- Rideshare matching

Other services offered by TMAs include:

- Email newsletters
- Guaranteed Ride Home
- Advocacy
- ETC training
- Cycling assistance
- Transit pass sales
- Employer networking events
- Parking management planning
- Web based travel information
- Land use/site design assistance
- Relocation services
- Tax benefit assistance
- Direct ridesharing incentive
- Individual journey planning
- Telework assistance
- Subsidized transit passes
- Real time alerts
- Vanpool services
- Shuttle provision

Some TMAs charge a fee, especially to non-members, for the provision of some of the services listed above. In addition, TMAs frequently contract the above services from a third party.

### 3.2.3 Measurement and Evaluation Practices of TMAs

To track performance and assess satisfaction with services, most TMAs conduct regular surveys of employees and organizations. TMAs also track emails, gather transportation data, and record attendance at events.

Over 50 percent of the TMAs said that they track performance by:

- E-mails and calls
- Surveys of employers and organizations
- Gathering raw data such as traffic counts or transit boardings
- Surveying travelers at a workplace or site
- Web site visits
- Surveying participants in a special program

The types of data TMAs compile from performance measurement activities include:

- Measuring mode shift at the workplace or TMA geography
- New ridematch database registrations
- Direct utilization rate (e.g., vanpool and carpool miles logged)
- Mode shift of new participants
- Cost per trip reduced
- Cost per vehicle mile reduced
- Cost of emissions reduced
- Member satisfaction with services
- Overall awareness of programs
3.3. Strengths, Weaknesses, Opportunities, and Threats Analysis

On December 7, 2009 the Advisory Committee associated with the Strategic TDM Plan met and discussed the strength, weaknesses, opportunities, and threats (SWOT) associated with their TDM programs. All four TMOs were present as well as representatives from MTS, Metro Transit, and MnDOT.

This summary contains a listing of the SWOT as identified by the Advisory Committee. In addition, a discussion is presented on how some of the future opportunities identified can outweigh the current weaknesses of the TDM program.

3.3.1 Strengths

- TMO focus
  - Localized Expertise
  - Regional Collaboration among TDM Stakeholders
- Metropolitan Council focus
  - Strong MPO to influence/support local efforts
  - Longitudinal Employer Household Dynamics (LEHD) data from Met Council
  - Single Centralized Guaranteed Ride Home (GRH) program for regional use
  - Single Vanpool provider (Van-GO!)
  - Bike2Benefits Program
- Municipal focus
  - Local ordinances increase awareness of TDM

To synthesize, the Twin Cities region has some strong implementation efforts due to the presence of four well established TMOs and the active role the Metropolitan Council takes in providing regional incentive programs, vanpool services, and challenge programs. Historically the region has supported TDM efforts and continues to recognize its importance by continuing to fund and develop new programs.

3.3.2 Weaknesses

- TMO and regional focus
  - Limited TMO credit for results
  - Potential double counting of TDM participants when each TMO is keeping track of programs independently
  - Perception that the TDM Program is focused on Metro Transit and a handful of organizations
  - Data sharing
  - Perception that regional TDM program could take over responsibility of TMOs
- Funding focus
  - TMO Competition for limited dollars
  - Funding pie not big enough
  - Lack of private sector funding
- Municipal focus
  - Cities of St Paul and Minneapolis have relatively cheap and abundant parking
- Measurement specific focus
  - Hard to track outcome of TDM program
  - Overlap of which TMO gets credit
  - How to place dollar value on cross-jurisdictional efforts
- Vanpool specific focus
The weaknesses described by the Advisory Committee mainly focus on partner collaboration, funding, measurement of effectiveness, and awareness of the vanpool program. However, there are ways to overcome each of these weaknesses and none are fatal flaws. Many of these weaknesses can be countered by future opportunities, especially as new funding sources are identified, which should also be viewed as new opportunities for partner collaboration and communication. It should be noted that others also thought the level of collaboration between partner organizations is a current Strength, not a weakness.

The measurement weaknesses noted are also important outcomes of the SWOT. Performance measurement recommendations for future TDM programs that will address this weakness are specifically addressed in the next chapter (Chapter 4).

### Table 10: Summary Strengths and Weaknesses

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 4 Strong TMOs</td>
<td>• Perception of effectiveness of TMOs</td>
</tr>
<tr>
<td>• Regional collaboration</td>
<td>• Coordination between TMOs and regional agencies</td>
</tr>
<tr>
<td>• Regional TDM programs: GRH, Van-GO!, Bike2Benefits</td>
<td>• Limited funding and sole reliance on CMAQ</td>
</tr>
<tr>
<td>• Local TDM Ordinances</td>
<td>• Local parking is cheap/free</td>
</tr>
<tr>
<td></td>
<td>• No measurement standards</td>
</tr>
<tr>
<td></td>
<td>• Vanpool awareness</td>
</tr>
</tbody>
</table>

### 3.3.3 Opportunities

- TMOs and Regional Collaboration
  - Cross marketing between TMOs
  - Seeking common goals with other transportation partners
  - Regular communication between transit partners
  - Strengthen relationships on regional committees
  - Tying TDM and TMOs efforts to performance measures on congested corridors
  - Design categories for types of TDM funding: TMO operations, competitive new pilot grants for TMOs, Metro Transit regional programs
  - Build upon eWorkplace
- Future TDM programs and strategies
  - Promote new and planned transit facilities
  - Promote use of future HOV infrastructure and structure future managed lanes as HOT (High Occupancy Toll) lanes
  - Transit partner coordination and testing of trip planning
  - Increase marketing of regional transit fare
Distinct opportunities the Advisory Committee members saw include many infrastructure related subjects, such as the opportunity to market and promote new managed lanes and transit service as well as the existing vanpooling and GRH programs. In addition to these opportunities in physical improvements, there are several initiatives and cultural shifts like health programs and technological advancements in communication that are critical areas for TDM providers spread their services to wider audiences.

There are also some relational opportunities as TMOs, regional agencies, and other transit partners recognize the need to improve relationships so that together they can obtain new funding and administer and implement new programs.

3.3.4 Threats

- Infrastructure focus
  - Managed lanes charging for HOV (just becoming toll lanes only)
- Funding focus
  - Multi-modal choice may not get fair funding or attention
  - MnDOT budget deficit
  - Questions about long term reliance on CMAQ and funds from federal government agencies
  - Future competition for limited transportation funding
  - Perceived lack of fairness in funding allocation
- Local TDM Ordinances
  - TDM ordinances can be interpreted as an obstacle to development
  - TDM ordinances have no “teeth”
- Population focus
  - High turnover of participants in TDM programs and population in general
  - High unemployment
- Vanpool focus:
  - Perception of service overlap and duplication with regular route express service
  - Funding concerns / sources (outstate Minnesota and Wisconsin vanpools)
  - Lack of support for program changes within MTS

The greatest threat to long-term TDM programs is funding. The Advisory Committee recognized the need to diversify their funding and move away from relying solely on CMAQ. However, the competition for funding will be high and TDM programs must prove their value in terms that decision makers can understand and feel are important. If the TDM programs can prove this value, other funding sources may materialize as decision makers realize the positive impacts that increasing a TDM effort could have.
Table 11: Summary of Opportunities and Threats

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Collaboration</td>
<td>• Long Term Funding</td>
</tr>
<tr>
<td>• New or planned multi-modal infrastructure</td>
<td>• Managed lanes may be toll-only</td>
</tr>
<tr>
<td>• Promoting existing TDM programs better</td>
<td>• Local TDM Ordinances</td>
</tr>
<tr>
<td>• Positive external forces: health industry, social networking</td>
<td>• Participant turnover</td>
</tr>
<tr>
<td></td>
<td>• Vanpool support and funding</td>
</tr>
</tbody>
</table>

3.3.5 How to turn the Weaknesses into Opportunities

The current weaknesses of the TDM program can be addressed by several of the opportunities identified by the Advisory Committee. A big opportunity is the promotion of future infrastructure and services, including HOT lanes and transit infrastructure and services. Because these transportation assets will provide a new service to travelers in the region, they need to be marketed accordingly to increase awareness and maximize their effectiveness. In summary, TDM providers need to take the successful programs they have today and show agencies such as MnDOT how TDM can improve ridership and vehicle occupancy.

Performance measurement is also part of the solution to demonstrating how TDM can increase utilization of new transportation infrastructure. The TMOs and partner regional agencies must have a consistent and standardized approach to measuring the benefits of TDM programs so that the administrators of assets such as managed lanes (MnDOT) can see the regional benefit of TDM programs. In addition, an equitable and transparent measurement process is also critical for TDM partner relationships and funding prioritization between current the TDM partner organizations.

3.4 Market Analysis

A TDM Market Analysis identifies the areas in the Twin Cities region that have population densities conducive to receiving marketing and promotion, but are not within a TMO service area or specific TDM program currently. These areas are truly the new areas for TDM efforts and identifying their travel characteristics can help pinpoint effective program recommendations. Full recommendations from the results of this analysis are presented in Chapter 4: Recommendations.

3.4.1 Employment Centers

Understanding how employment population centers are distributed throughout the Twin Cities region are the primary focus in this TDM Market Analysis. Because there are four healthy TMOs operating in specific service areas today, this analysis focused on the employment centers outside of the current TMO boundaries. Identifying these centers can help target TDM programs and services to new areas with high concentrations of employee travelers.

3.4.1.1 Employment Centers
Based on national research of screening tools from around the country, there are several screening tools that can be used to identify the strongest employment center markets for TDM in the region. In national land use and transportation research, employment density serves as a measurable variable that is really a proxy for many characteristics that influence the use of transportation alternatives, such as parking pricing, provision of transit service, and the level of local congestion. In places with high employment density, it is likely there will also be parking fees, frequent transit service, congestion, and other factors that influence the use of transportation alternatives. There are two downtown areas in the Twin Cities region today that have these characteristics. There are also areas of the region with low employment density where parking is likely to be free and little to no transit service is provided. However, congestion in these areas can still be pervasive and many other TDM strategies and techniques can be applied in these more suburban settings.

Overall, the host of TDM strategies and incentives provided in the Twin Cities region can serve both these types of areas. Specific thresholds of employment density and multimodal infrastructure availability that should be used to target TDM service areas include:

- A minimum of 10 employees per acre outside of downtown employment areas and greater than 25,000 employees overall. National research has shown that a minimum of 10 employees per acre is a baseline threshold density that influences the use of transportation alternatives in suburban office parks (Cervero 1988; Ewing and Cervero 2001). Employees in areas with this employment density were shown to use transportation alternatives such as carpooling, transit, vanpooling, and walking/bicycling more often than in areas with less density. However, the difference is very small, amounting to less than a 2 percent reduction in VMT solely due to the density of office development. Therefore, the provision of TDM in these areas is critical in boosting utilization of transportation alternatives that would not otherwise be appealing to commuters without the provision of incentives or specific strategies.

- A minimum of 50 employees per acre in downtown employment areas with over 50,000 employees. National research has also shown that areas with employment densities of 50 employees per acre and greater use transportation alternatives significantly more often than in areas with less employment density (Frank and Pivo 1994). This level of density is a proxy for many of the variables that would influence a commuter to use transportation alternatives, such as parking pricing, frequency of transit service, and congestion. The downtown areas of Minneapolis and St. Paul are currently the only downtowns in the Twin Cities region and are also within existing TMO service areas. While these areas have many characteristics that motivate people to use transportation alternatives without the influence of TDM, these areas are still very strong markets for TDM services. TDM services can market the wealth of transportation options provided in the area and facilitate individuals taking advantage of these programs more so than they would without TDM. The Parking for Poolers program in downtown parking ramps and the Commuter Connections store are two good examples of how TDM services in downtown settings can motivate travelers to take advantage of transportation alternatives.

Geographical employment data was obtained at the Census tract level from the 2008 Longitudinal Employer-Household Dynamics (LEHD) dataset for the Minneapolis-St.Paul-Bloomington Metropolitan Statistical Area (MSA). These data were refined to display employment centers with greater than 10 jobs per acre, as shown in Figure 9.

Figure 9: Employment centers in the Twin Cities region (2008 LEHD data)
Combined with the current TMO service boundaries, the figure shows that several tracts and clusters of tracts with over 10 employees per acre are not directly covered by TMO services.

In addition to these employment concentrations, many of the people who work in these tracts also live in areas not served directly by a TMO organization. To highlight more detail on the residential locations of the employees in these tracts, a series of successive figures are displayed in Figures 10 through 15 with one map per tract cluster. These figures show that many of the employees who work in the identified tracts in Figure 9 also live in areas that are not within TMO service areas currently. It should be noted, however, that these residents could be receiving TMO services, but in an indirect fashion and most likely not directly from their employer or the TMO itself.
Figure 10: Residential Home-end of Employees in Tract 1 (2008 LEHD data)
Figure 11: Residential Home-end of Employees in Tract 2 (2008 LEHD data)
Figure 12: Residential Home-end of Employees in Tract 3 (2008 LEHD data)
Figure 13: Residential Home-end of Employees in Tract Cluster 1 (2008 LEHD data)
Figure 14: Residential Home-end of Employees in Tract Cluster 2 (2008 LEHD data)
Figure 15: Residential Home-end of Employees in Tract Cluster 3 (2008 LEHD data)
The successive figures show that a large number of residents who commute to the targeted employment tracts and clusters do not reside in a TMO service area on the home end. There is a particularly strong residential population south of Minneapolis along the I-35W corridor, especially for the employment clusters in that area (Figures 8 and 9).

3.4.2 AM and PM Peak Congested Corridors

An additional data source that was available for the Market Analysis was 2008 congestion data from MnDOT. These data show the total hours of congestion during AM and PM weekday periods on roadway segments as compiled from their highway monitoring system. For the purposes of this analysis, these segments were overlain with the targeted employment tract clusters from the previous section. This enables an analysis that highlights areas where AM or PM congestion occur that are close or adjacent to the targeted employment centers that do not receive direct TMO TDM efforts today.

3.4.2.1 AM Congested Corridors and Targeted Marketing Areas

The AM Congested Corridor map is displayed as Figure 16. This map shows the congested corridors along I-394 Corridor to the west of Minneapolis and SR 100 in-between I-494 and I-394 are two areas that may warrant more specific attention for TDM services. However, the congestion that occurs in these corridor segments is likely generated by demand from many other areas than just theses segments along the corridor itself. Nonetheless, a part of this congestion is locally oriented travel and reducing that travel through TDM services would be beneficial.
Figure 16: AM Congested Corridors (2008 MnDOT data)
3.4.2.2 PM Congested Corridors and Targeted Marketing Areas

The PM Congested Corridor map is displayed as Figure 17. Like the AM Congested Corridor map, the PM map shows there is also congestion along I-394 and SR 100 west of downtown Minneapolis where there are currently no TMOs directly serving the corridor. As in the AM, reducing a part of the locally-bound PM congestion in this corridor would be beneficial. There is a particular high concentration of employment at the interchange of SR-100 and I-394.

The PM congested corridors maps also shows there is also a large degree of congestion along the I-35W corridor south of downtown Minneapolis. Presumably this is a large population of commuters leaving the urban area in the evening and commuting to residences south of Minneapolis. Because several of these segments show large levels of congestion and they are in areas of frequent transit service, further TDM service is warranted along this congested corridor. In addition there are several employment clusters (greater than 10 employees per acre) along this corridor just south of the Downtown Minneapolis TMO service area.
Figure 17: PM Congested Corridors (2008 MnDOT data)
Chapter 4: Recommendations

The recommendations in this chapter are directly linked to the Chapter 1 TDM Study Goals that guided the planning process of this study. These recommendations serve as a supporting implementation strategy for these goals. Implementing these recommendations will achieve the policies set forth in this plan, particularly the VMT reduction goal specified in TDM Study Goal 8.

The recommendations are supported, in part, by the research and analysis summarized in Chapter 3: Evaluation. Chapter 3 summarized the best practices of TDM programs throughout the United States. In addition to this research, several efforts of coordination with the Advisory Committee for the TDM Study were conducted between December 2009 and February 2010. These analyses included a meeting to identify the strengths, weaknesses, and future opportunities and threats to the Twin Cities TDM program as well as a meeting to discuss the best practices of other TDM programs and review the draft goals presented in this chapter.

4.1. A Traveler Focused TDM Program

TDM Study Goal 1: Traveler Focus. Develop a regional TDM program with a wide variety of strategies that are easily understood and utilized by travelers.

TDM Study Strategy 1.1: Consolidate provision of regional TDM tools and services.

Metro Transit will provide the majority of regional TDM program services. However, it is acknowledged the success of each of these services is significantly influenced by the outreach and promotion conducted by local TDM partners. These services and its annual Commuter Challenge:

- Bike2Benefits
- Parking Perks for Poolers program
- Guaranteed Ride Home
- Specialized transit pass products
- Commuter Choice Award and Best Workplaces

It is recommended Metro Transit also provide all regional TDM tools. These tools include:

- Online ridematching services to individuals. Increase the ability for local partners to share their data as well as access to the overall ridematching database.
- Leading marketing efforts related to the Van-GO! program (MTS will maintain administration of this program)
- Maintain and enhance the use of the regional TDM database of contacts and participants in the TDM program, from both regional efforts and local TMO efforts.

TDM Study Strategy 1.2: Develop a regional “one stop shop” web-based resource of commuting strategies and incentives for the traveler. Build this site to give equal weight to all modes of travel, including ridesharing, transit, bicycling, and walking.

Today, information about regional TDM tools and services are spread between Metro Transit and MTS. Drawing from best practices like Atlanta’s Clean Air Campaign, it is recommended that a “one stop shop” commuting resource be developed to enable a traveler to obtain information quickly and easily. Today it is not obvious to the traveler where to find information about most TDM strategies as they are spread across many web sites (either Metro Transit’s web site, the Metropolitan Council’s web site, or the TMO web sites). This web site will serve as a portal with
information about all modes of transportation and the TDM products and services available for each and should direct travelers to TMOs’ or other web sites as appropriate.

Because Metro Transit is currently developing a redesigned web site that provides more visibility, information, and resources on all modes and because it administers most of the TDM services and products available regionally today, it is recommended Metro Transit’s web site function as the “one-stop-shop” for regional TDM resources. Metro Transit should work with the TMOs to determine appropriate links to and from this web site.

A primary objective of developing this resource is to grant equal marketing and communications efforts to all modes and the TDM services available for each of them. Also, this web site should contain online enrollment forms and databases so that users can immediately request or apply for TDM products or services. A specific example includes enrolling new vanpool subscriptions online for the Van-GO! program, rather than the paper based system used today. For many of the regional TDM services, “paperless” registration and tracking is already the norm (such as the Bike2Benefits program). An example of a comprehensive online ridematching resource for carpoolers and vanpoolers is available in the San Francisco Bay Area through the Metropolitan Transportation Commission. The web site is available at https://www.ridematch.511.org/SanFrancisco/.

TDM Study Strategy 1.3: Metro Transit, MTS, and local TDM partners will work together to promote each other’s services via web sites and the internet.

Equal promotion of services and initiatives between the web sites of regional services and local TDM partners is strongly encouraged. Linking the regional services into local TMO efforts is an important component of the one stop web site. Conversely, it is also important that local TDM partners establish links and refresh their web sites to promote and link to regional services. The Metro Transit web site would serve as the primary portal for regional services (identified in Strategy 1.1). The TMO and other local web sites would serve as the primary portals for outreach and innovation at the local level. All web sites should include educational resources for travelers.

TDM Study Strategy 1.4: Coordinate updates to the ArriveMN web site (www.arrivemn.com), developed by MnDOT in 2006, with the one-stop web site. The ArriveMN web site can complement the one-stop web site and drive traffic to this region-specific resource.

4.2: Regional TDM Program Structure

TDM Study Goal 2: Program Structure. Structure the regional TDM program and the provision of funds to local TDM partners that ensures resources are maximized toward areas of greatest benefit.

TDM Study Strategy 2.1: Clearly outline the roles and responsibilities of local, regional, and state TDM partners.

All the TDM partners have critical roles to play in the TDM program of the Twin Cities region. Local governments and TMOs have a primary responsibility to perform the outreach and marketing necessary to link travelers with regional incentives and strategies. The regional and state agencies involved in TDM have primary responsibilities for planning, program administration, funding allocation, and evaluation. The proposed roles of TDM partners and agencies are different than the structure of the program as it exists today. Specifically, the proposed changes to the roles and responsibilities of the TDM partners are as follows:
• **Transportation Advisory Board (TAB).** The TAB remains responsible for distributing CMAQ funding to the various TDM programs. The TAB will determine the level of funding available for TDM and make final determinations on which programs are funded, either as ongoing activities or projects selected competitively.

• **Metropolitan Transportation Services (MTS).** MTS remains the regional organization for TDM strategic planning. New roles include providing recommendations to TAB for allocation of CMAQ funding for TDM programs, oversight of CMAQ TDM contracting performed by Metro Transit, and conducting region-wide TDM program evaluation in coordination with MnDOT and local and regional TDM partners. The contracting oversight will include an ongoing evaluation of internal roles and responsibilities to determine the best and most efficient way to deliver TDM funding to partners. Each of these CMAQ contracting and evaluation responsibilities will be applied uniformly across all TMOs and local TDM partners and adjustments will be made as recommended by MTS. MTS will also work to populate and provide a regional database of local TDM policies and regulations related to TDM ordinances and development review requirements.

• **Metro Transit.** Metro Transit remains the primary provider of regional TDM services and incentives as well as the provider of regional tools, such as the ridesharing web site and database. Metro Transit will also continue to provide CMAQ TDM contract management with local TMOs and other CMAQ TDM grant recipients. New roles include marketing the Van-GO! program which will be transferred from MTS in order that marketing of all regional TDM services and incentives are provided through one organization. Modified roles include targeting TDM efforts to residential and employment centers that are outside of TMO service areas.

• **MnDOT.** MnDOT’s primary responsibilities include coordinating with MTS to perform regional evaluation of the TDM program, potentially through the annual Omnibus survey. In addition, MnDOT will coordinate with MTS to incorporate TDM program results into future performance measures, particularly the impact TDM programs have on person throughput. As improvements are made to major corridors, especially those targeted with managed lane improvements, MnDOT will work with local TDM partners to promote high occupancy vehicle use in these areas. During construction periods, MnDOT will also work with local TDM providers on construction mitigation efforts.

• **Local Transportation Management Organizations (TMO).** Local TMOs will continue to implement their own TDM programs and services, pilot new TDM concepts locally, and continue the outreach and promotion of regional TDM services and incentives. New roles include following a streamlined process for monitoring participation in programs and evaluating the long-term impacts of local TDM projects. In addition, TMOs will be participating in a regional CMAQ funding application process (see TDM Study Goal 5).

• **Local government.** Local governments will also continue to develop their own policies that encourage use of transportation alternatives, such as transportation demand management ordinances and development review requirements. The cities and counties of the Metropolitan Council region will continue to support the TDM program through providing local matching funds and resources to CMAQ grant recipients.

The existing and new roles for TDM partners are reflected in a new organizational diagram for Twin Cities Region TDM programs (Figure 18)
TDM Study Strategy 2.2: Designate the responsibility of regional TDM program implementation within the Metropolitan Council to Metro Transit with oversight by Metropolitan Transportation Services (MTS). MTS oversight and grant management will ensure that equal attention is paid to all modes of transportation and not biased towards transit.

The recommendations for this strategy are the responsibility of both Metro Transit and MTS. These two subdivisions of the Metropolitan Council working together will ensure a cohesive regional TDM program is delivered to travelers. Recommendations by subdivision are:

- Metropolitan Transportation Services (MTS)
  - MTS will periodically review the regional one-stop web site and local TDM provider web sites to ensure current information is available for travelers.
  - MTS will be the primary author of the annual report on the TDM program that records the outcome of CMAQ TDM funded programs. Currently this effort is provided by Metro Transit. Transferring this responsibility to MTS will help
establish MTS as the regional organization that oversees the regional TDM providers, including Metro Transit and the local TMOs.

- **Metro Transit**
  - Metro Transit will host regular TDM provider meetings with TMOs and MTS where information can be shared and coordination encouraged between groups. Today these groups are meeting regularly, but this strategy ensures that coordination continues into the future. These meetings will also be opportunities to link to educational offerings, such as the University of Southern Florida’s Center for Urban Transportation Research (CUTR) periodic webinars on new advancements in TDM.
  - Metro Transit will ensure that the regional TDM services they implement are integrated into regional marketing efforts. The concept of the Metro Transit “one stop shop” web site will serve as a source of information on all modes.

**TDM Study Strategy 2.3:** Move the marketing of the Van-GO! program from MTS to Metro Transit. Having the vanpooling program marketed within the transit organization will promote vanpooling more equally with the other regional TDM services that are currently managed by Metro Transit.

Marketing Van-GO! through Metro Transit will likely boost participation in vanpooling as it will be marketed more consistently by all TDM partners and branded with the overall TDM program. In addition, potential vanpooling participants will find information easier when the program is bundled with other TDM services that Metro Transit markets.

4.3. **Targeted Markets**

**TDM Study Goal 3: Target Markets.** Target the geographic areas of the region detailed in Section 3.4.1 where TDM strategies will be most successful and would make more efficient use of existing transportation infrastructure and services. National research indicates that centers of high employment and high employment density are the most successful target markets for TDM activities.

**TDM Study Strategy 3.1:** TMOs will focus outreach and local services in territories where they are established. Metro Transit TDM Employer outreach services will primarily be focused on employment centers with 10 or more employees per acre and greater than 25,000 employees overall that fall outside of TMO service areas. These employment centers are highlighted in Chapter 3: Evaluation, Section 3.4.1.1. MTS will continue to track employment growth in the region and identify these employment areas in coordination with Metro Transit.

**TDM Study Strategy 3.2:** Local and regional TDM efforts should also be focused in corridors where the region has made significant investments in multimodal options, including transit service, managed/HOV lanes, and bicycling/walking facilities. The presence of these options enables TDM efforts to be more successful.

**TDM Study Strategy 3.3:** MTS will screen proposed transportation management organizations for funding eligibility for CMAQ and make recommendations to the TAB.

A standard set of criteria for transportation management organization (TMO) formation will help determine whether TMOs qualify for the CMAQ funding described in TDM Study Strategy 5.1.
If a new TMO forms and desires to share in regional CMAQ funding for TDM, the criteria will be used by MTS to determine potential success.

The recommended criteria for defining successful TMOs are presented in Figure 19. These criteria were developed by UrbanTrans from experience and research in the development of these organizations nationwide. Recognizing that each TMO service area has unique characteristics, these criteria can only serve as general guidelines for future TMO formation.

In Figure 2, the column labeled “high” displays the kind of characteristics that are highly desirable for successful TMO formation and implementation of TDM services. In the Stakeholder Commitment and Financial Sustainability categories of the criteria as many of the high characteristics as possible should exist in the area before a TMO is formed. If there are weaknesses in some of these categories, an action plan should be developed that identifies steps and actions to take to remedy these weaknesses.
### Figure 19: Transportation Management Organization Formation Criteria

<table>
<thead>
<tr>
<th>Formation Criteria</th>
<th>TMO Success Indicators</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
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<tr>
<td><strong>Transportation Challenges:</strong></td>
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</tr>
<tr>
<td>Traffic</td>
<td>Existing and Growing Congestion</td>
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<tr>
<td>Access &amp; Mobility</td>
<td>Major Difficulties</td>
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<tr>
<td>Employers &amp; Employees</td>
<td>Major Recruitment and Retention Problems</td>
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<tr>
<td><strong>Regional Characteristics:</strong></td>
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<tr>
<td>Activity Center</td>
<td>Widely Recognized Activity Center</td>
</tr>
<tr>
<td>Employment</td>
<td>Over 50,000 Employees</td>
</tr>
<tr>
<td>Economic Development</td>
<td>High</td>
</tr>
<tr>
<td><strong>Stakeholder Commitment:</strong></td>
<td></td>
</tr>
<tr>
<td>History</td>
<td>Success with Transportation Issues</td>
</tr>
<tr>
<td>Core Group/Champion</td>
<td>Identifiable, Existing</td>
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<tr>
<td><strong>Financial Sustainability:</strong></td>
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<td>Multiyear Commitment</td>
<td>Guaranteed Long-Term Sources</td>
</tr>
<tr>
<td>Stakeholders</td>
<td>Strong Group, Resources Identified</td>
</tr>
</tbody>
</table>
4.4. TDM Strategy Recommendations

TDM Study Goal 4: Strategy Recommendations. The region will invest in TDM strategies with a proven track record of success. These strategies may include those that exist in the region today as well as piloted new strategies from national best practices.

TDM Study Strategy 4.1: Metro Transit and local TDM partners will continue to expand and refine current TDM strategies.

The current strategies implemented today by regional and local TDM partners include:

- Rideshare services
- Van-GO! services
- Transit services (MetroPass and CollegePass)
- Guaranteed Ride Home
- Commuter Challenge
- Bike2Benefits
- Parking for Poolers
- Local TMO outreach efforts in service areas (fairs, events, etc)
- Anoka County construction mitigation efforts
- Downtown Minneapolis TMO Commute Connection store transit pass sales, carpool/vanpool registrations and other commuter assistance
- St. Paul Smart Trips Individualized Marketing programs
- 494 Commuter Services Individualized Marketing programs

Recommended programs to refine include ideas drawn from national best practices and recent experience piloting new programs. Recommendations include:

- **Flexible employer pass products.** Metro Transit should continue to provide discounted pass products to employers (e.g., MetroPass). They can work to increase the flexibility of current pass contracts with employers to allow for monthly enrollment. Many regional transit agencies, including the Denver region’s FlexPass program, have started using monthly pass programs that let employers choose how many passes they would like to purchase monthly for their employees. In addition, many agencies have also implemented flexible programs where employees can choose if they want a pass month to month and have the option to purchase those passes pre-tax.

- **Enhanced social media tools to promote ridesharing.** With the development of the new ridesharing database tool, Metro Transit should also look for social media tools to increase registration in the database and carpool matches.

- **Individualized marketing.** Continue to improve the use of social marketing in TDM and build on the recent successful experience of residential-based individualized marketing project pilots in the region. Expand to target employers with individualized marketing programs.

- **Telework.** Depending on the success of the eWorkplace program, utilize the tools and resources that were built and implement telework programs at the local level.

- **Carsharing.** Work with local carsharing providers as demand for these services grows and is warranted in other parts of the region. Support carsharing services as they look for new markets by raising awareness and helping with promotion.
• **Construction mitigation.** Working in coordination with agencies such as MnDOT or county highway departments, Metro Transit and local TDM partners should look for opportunities to provide construction mitigation services such as temporary vanpool services, express transit services (shuttle or fixed route), and assisting employers to implement flexible workplace arrangements (telework, flex hours, and compressed work weeks). Both Metro Transit and local TDM providers will typically be supporting a larger construction mitigation program led by MnDOT and/or county highway departments by implementing specialized local TDM projects.

TDM Study Strategy 4.2: The region will pilot new TDM strategies at both the regional and local level. Initial concepts for these strategies include:

**Basic Strategies**

• **Ongoing incentive campaigns.** Develop ongoing incentive campaigns, modeled after the programs implemented in regions such as Atlanta and San Francisco.

• **Employer grants.** Create a grant program for employers to implement specialized TDM strategies such as telework, modeled after the Telework!va program.

• **Pre-tax benefit assistance.** Formally implement a pre-tax training and development program for employers. Metro Transit could also work with third-party administrators of these programs to facilitate implementation.

• **Promote new multimodal infrastructure.** As managed/HOV lanes, new transit services, bikesharing, carsharing, and other multimodal infrastructure is built or provided in the region, local TDM partners should develop campaigns and other activities to increase the use of these facilities. Partnerships with MnDOT, Metro Transit, and other agencies will need to be formed to achieve successful programs.

• **Implement TDM for special events and fare-free transit zones.** Special events, such as Twins baseball games, concerts, and large events in the downtown areas are good opportunities to encourage use of transportation alternatives. Strategies include offering discounted parking for carpools and transit pass discounts and/or fare free zones for pre and post event rides.

• **Trip Reduction Calculator.** Trip reduction calculators are typically online tools that calculate the personal financial savings in gas, parking, and vehicle maintenance costs by using a transportation alternative to driving alone. Users enter information such as trip distance, vehicle fuel efficiency, and frequency of travel and the calculator details how much they could save on a monthly or annual basis if they used a transportation alternative.

**Advanced Strategies**

• **Add TDM messaging to variable message signs and other real-time information sources.** Work with MnDOT and local governments to identify appropriate locations to add TDM-related messaging to freeway variable message signs. For example, other cities have successfully integrated messaging about available Park-n-Ride capacity and express bus travel times along congested corridors with HOV lanes.

• **Implement parking cash-out/parking opt-out.** Parking cash-out is a strategy for commuters that have parking paid for by their employers and are offered the cash equivalent of that parking if they decide to use transportation alternatives. Parking opt-
out is a similar case where parking is not paid for by employers, but still permitted (for example hospitals or government sites) and the employee has the option of opting out of the available parking permit for a significant subsidy from the employer to use alternative transportation. Piloting this strategy at the right locations can have a very significant impact on trip reduction, but high density of transportation alternatives and services are needed to support this strategy.

4.5. CMAQ TDM Funding Process

TDM Study Goal 5: CMAQ TDM Funding Process. Allocate future funding for TDM based on monitored performance and sound estimates of impact.

TDM Study Strategy 5.1: Categories of TDM funding will be developed that ensure critical activities are supported during each funding cycle.

The Twin Cities Metropolitan Area Travel Demand Management Program 2008 Annual Report documented the funding distribution of CMAQ TDM funds by organization. Table 12 contains these organizations and their respective CMAQ TDM funding percentages. It is recommended that CMAQ TDM funding categories in the future be designed based on the needs of regional and local TDM programs based, in part, on this table.

Table 12: 2008 CMAQ TDM funding distribution

<table>
<thead>
<tr>
<th>Organization</th>
<th>Percentage Funding</th>
</tr>
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<tbody>
<tr>
<td>Anoka County TMO</td>
<td>6%</td>
</tr>
<tr>
<td>Downtown Minneapolis TMO</td>
<td>12%</td>
</tr>
<tr>
<td>St. Paul Smart Trips</td>
<td>9%</td>
</tr>
<tr>
<td>494 Commuter Services</td>
<td>11%</td>
</tr>
<tr>
<td>Metro Transit</td>
<td>58%</td>
</tr>
<tr>
<td>Van-GO!</td>
<td>4%</td>
</tr>
</tbody>
</table>

Moving forward into future funding allocation processes for 2011 and beyond, CMAQ TDM funding should be structured through the following categories to clearly delineate regional versus local sources of CMAQ TDM funding:

- Regional services. These services include regional tools and services such as operation of the regional “one stop shop” web site, the ridesharing database, and the marketing of the Van-GO! program. In addition, evaluation and administration efforts conducted by MTS and Metro Transit will be covered under this category of funding.

- Baseline local TMO funding. This category is intended to provide TMOs with a steady source of operating funds for local outreach and promotion of the regional TDM program and related services.

- Competitive projects. Specific project grants will be awarded competitively for local and regional TDM pilot projects depending on funding availability. The emphasis of this category is to pilot new and invocative TDM ideas that may be successful enough to eventually warrant baseline local TMO funding or regional services funding.
The amount of funding available for TDM in all three categories above will vary between funding cycles and the availability of funding in the overall CMAQ program. Funding for each cycle will be determined by the Transportation Advisory Board (TAB) in a sub-process that uses funding set aside during the larger transportation improvement program (TIP) process. MTS will provide funding recommendations to TAB based on evaluated performance and specific identified needs.

**TDM Study Strategy 5.2:** Funding allocation for the competitively awarded projects will be determined through a biennial application process managed by MTS (for TAB) that is open to all public agencies, non-profits, and entities of the state.

The application process for competitively awarded local projects will serve as an open and transparent way to fund CMAQ TDM grants for the whole region. It is also a performance-based process to allocate funding to TDM strategies that will produce the greatest impact in terms of VMT reduction and other factors. Each regional and local TDM partner will apply to the TAB for a CMAQ TDM grant to fund a specific project. Before each funding cycle is posted, all local TDM partners will be invited to a regional TDM workshop where the ranking system for projects is finalized. A preliminary ranking system is shown in Table 13.
Table 13: Suggested CMAQ TDM Scoring Criteria

<table>
<thead>
<tr>
<th>Preliminary Scoring Criteria</th>
<th>Maximum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quantification-based:</strong></td>
<td></td>
</tr>
<tr>
<td>Estimated cost effectiveness ($/mi reduced)</td>
<td>20</td>
</tr>
<tr>
<td>VMT reduced &amp; air quality improvement</td>
<td>10</td>
</tr>
<tr>
<td>Location: 10 employees per acre density or greater and at least 25,000 employees in area</td>
<td>20</td>
</tr>
<tr>
<td>Presence of transportation alternatives (i.e., HOV lanes, frequent transit service, bicycle and pedestrian facilities)</td>
<td>20</td>
</tr>
<tr>
<td>Commitment by local partner(s) to continue funding if program is successful</td>
<td>10</td>
</tr>
<tr>
<td><strong>Subjective-based:</strong></td>
<td></td>
</tr>
<tr>
<td>Evaluation methodology</td>
<td>10</td>
</tr>
<tr>
<td>Level of innovation (new ideas or concepts not yet implemented in the region)</td>
<td>10</td>
</tr>
<tr>
<td><strong>Grand Total Maximum Points</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Once applications are completed, MTS will review the accuracy of the applications and give feedback as necessary to applicants on VMT savings estimates or other details on scoring criteria. All applicants will review the applications for accuracy and score the subjective-based component of the applications. The TAB will convene a series of meetings to make final ranking and funding decisions.

**TDM Study Strategy 5.3:** A new TMO that applies for any source of CMAQ TDM funding will be screened against the criteria established in TDM Study Strategy 3.3.

**TDM Study Strategy 5.4:** TMOs can expand their current service area boundaries to work with employers, governments, or other organizations with an interest in TDM. Funding for these expanded boundary projects will be eligible for the competitive grant funding summarized in Strategy 5.1. For those projects that demonstrate success, TMOs can permanently expand their service area boundary and may receive an increase in baseline funding to support efforts in that new area. For those projects that are not successful, the TMO boundary will not permanently expand into that area and Metro Transit will continue to provide a baseline level of service with regional services funding.

**TDM Study Strategy 5.5:** TAB and MTS will develop a funding cycle for TDM CMAQ funds that recognizes the shorter implementation timeline for TDM activities, relative to larger construction projects.

**TDM Study Strategy 5.6:** MTS and Metro Transit will work to streamline the sub-recipient process of providing funding for local TDM partners.
4.6. Performance Measurement

TDM Study Goal 6: Performance Measurement. Develop consistent measurement methods for evaluation of the CMAQ-funded TDM program.

TDM Study Strategy 6.1: Incorporate a series of questions to evaluate the effectiveness of the TDM program with the region-wide annual statistically significant surveys administered by MTS and MnDOT.

The addition of TDM questions to region-wide annual surveys is a recommended measure because it will provide information about the performance of the overall TDM program and individual efforts being conducted in the region. This method eliminates the potential for double counting between TMOs and regional efforts when they are assessed separately. It also provides a uniform basis to compile the total regional vehicle miles of travel (VMT) saved from the TDM program, which is a component of the VMT goal in Goal 8.

Regional TDM question themes should include:

- Length of participant involvement in regional and/or local TDM programs, such as the annual Commute Challenge, local TMO programs, and participation in ongoing incentive programs like Parking for Poolers.

- Participant’s awareness of the presence of local TDM strategies, many of which could be employer or site based. Examples include:
  - Charging for parking
  - Preferential parking for carpools/vanpools
  - Employer based financial incentives or tax credits to use transit or other transportation options
  - On site amenities such as bike lockers, day care, cafeteria, etc.
  - Alternative work schedules

- For those who are new recruits to transportation alternatives, questions should capture the primary mode to work as a result of involvement in the TDM strategy (e.g., did the person change their travel behavior due to involvement with the strategy).
  - For those who did change their behavior as a result of a TDM strategy, also record the frequency with which they use alternative modes currently and the average length of their trip.

- For those who use transportation alternatives currently, questions regarding how TDM services help them maintain their behavior. This is particularly relevant for TDM efforts like the Commuter Connection store where services like Metro Transit pass sales help commuters conveniently maintain their use of transit. It is critical to understand how these travelers are maintaining their travel behavior through the assistance of ongoing TDM services.
  - For these ongoing participants, also capture the frequency with which they use alternative modes currently and the average length of their trip.

TDM Study Strategy 6.2: Each local organization that implements TDM strategies will record the impacts of their programs in terms of new recruits to TDM and retention of current users. These
participation data will be used by MTS to develop the regional vehicle miles of travel reduction estimate for the entire TDM program.

- **New Recruits:** The local new recruits measure is recommended because it focuses on growing the number of participants in TDM strategies and it is easy to implement for local TMOs and other organizations. The measure should track new participants across different events, allowing organizations to evaluate what events were most successful in terms of recruitment. In addition, the measure should also identify what types of businesses (IT, healthcare, etc.) are growing in their participation with TDM, allowing local and regional organizations to recruit new participants from similar businesses.

- **Retention:** The local retention measure focuses on retaining current alternative mode users in their alternative mode due to TDM efforts. This measure provides important information to agencies about length of time that users remain in alternatives modes with the support of TDM and what types of efforts need to be made to retain them. The measure also enables local organizations to track what programs/activities have the highest participation rate and what activities may need to be modified. The measure is easy to institute and can be applied universally to all local organizations.

With both the new recruits and retention measures, the local organizations should provide this information to MTS. MTS will be the primary entity responsible for taking this information and developing the VMT reduction estimate from the results of participation in local TDM efforts. This will serve to streamline the VMT estimation process in several ways. First, parameters from the MTS-maintained regional travel demand model such as trip distance will be compiled consistently between the different activity areas where TDM strategies are implemented. Second, MTS will also standardize the methods used for estimating the impact of the wide variety of TDM strategies. MTS will need to develop these standard methods and equations for evaluation through collaborative efforts with the TDM partners.

MTS will also work with Metro Transit to compile the results from the regional ridesharing database, Bike2Benefits, Parking for Poolers, and other regional programs. Between both the local and regional results, MTS should ensure there is no double-counting between organizations, particularly in ridesharing.

**TDM Study Strategy 6.3:** Evaluation of local TDM partner programs will be distinct between the CMAQ TDM funding categories described in Strategy 5.1. TMOs will evaluate the impacts of their “baseline” services separately from evaluating the impacts of “competitive grant” funded programs that are intended to pilot new TDM ideas and strategies.

**TDM Study Strategy 6.4:** MTS and Metro Transit will work together to produce an annual report on effectiveness of TDM and its return on investment. All local TDM partner results will be included in annual reporting.

Currently the annual reporting performed by Metro Transit of the regional TDM program may be missing some local partners and TDM strategies. A comprehensive list of the TDM efforts ongoing in the region include:

- Rideshare services
- Van-GO! services
- Transit services (MetroPass and CollegePass)
- Guaranteed Ride Home
- Commuter Challenge
- Bike2Benefits
- Parking for Poolers
- Commuter Choice Awards and Best Workplaces
- Local TMO outreach efforts in service areas (fairs, events, etc)
- Anoka County construction mitigation efforts
- Downtown Minneapolis TMO Commute Connection store transit pass sales, carpool/vanpool registrations and other commuter assistance
- St. Paul Smart Trips Individualized Marketing programs
- 494 Commuter Services Individualized Marketing programs

These efforts should be tracked for their efforts in both recruiting new travelers to transportation alternatives as well as retaining existing users. The effort of collecting and compiling this information will serve as a good resource of information to report to the public on how CMAQ dollars are being spent. It will also serve as a good check against the regional TDM survey described in TDM Study Strategy 6.1.

The annual report should be circulated to decision-makers and others to increase the distribution of the annual report and overall awareness about the regional TDM program. A web site page available through the Metro Transit and/or MTS web sites should dedicated to these annual reports to facilitate information sharing. In addition, TDM program highlights should be included at events such as the Metropolitan Council’s State of the Region report.
4.7. New Sources of Funding for TDM

**TDM Study Goal 7: New Funding.** Develop additional sources of funding for the TDM program.

**TDM Study Strategy 7.1:** With a future documented evaluation of the TDM program, present these results to decision makers at MnDOT, local government, large employers, and others to build support for more funding of TDM activities.

**TDM Study Strategy 7.2:** Local TDM partners should work to increase the diversity of their funding and not rely exclusively on federal programs such as CMAQ. As seen from the diversity of TMA funding mechanisms nationwide summarized in Chapter 3, Section 3.2, most of the TMAs nationwide use a mix of local and national funding. Examples of local funding include employer-based TMO membership fees, fees for specific TMO managed services such as shuttles, transit pass sales, and customized employee trip plans, property assessments through special districts, and user-based fees to pay for specialized TDM services such as downtown employee transit pass subsidies paid by parking fees or revenue from the operation of managed lanes.

**TDM Study Strategy 7.3:** Encourage the development of TDM ordinances that require developer participation, financially and otherwise, in the TDM program. Monitor the effectiveness of these programs and present the results to regional stakeholders.

4.8. Regional and Local VMT Reduction Goals

**TDM Study Goal 8: VMT Reduction Goals.** The region will track the vehicle miles reduced (VMTR) due to TDM efforts from all CMAQ funded activities. Using a consistent methodology year-to-year, the VMTR will be compiled annually and compared to performance in past years.

**TDM Study Strategy 8.1:** MTS and Metro Transit will benchmark the progress of the TDM program annually.

Using the results of the performance measurement activities in Goal 6, MTS and Metro Transit will develop a region-wide estimate of the VMTR due to the TDM program. These regional agencies will ensure that all local efforts are reflected in these estimates as well as the results of region-wide surveying.

With the VMTR results compiled, MTS will compare the results of the regional program to the total VMT driven in the region annually for all trips. This total VMT is available from the biannual Texas Transportation Institute’s (TTI) Mobility Report. Table 7 in Chapter 3 displays the TTI data and results of 5 regional programs nationwide as well as the Twin Cities region. Table 14 below is replicated from Table 7 in Chapter 3 and shows that the current VMT reduced expressed as a percentage of regional total VMT is 0.38 percent. As MTS and Metro Transit benchmark the TDM program in the future, the goal of the program should be to match or exceed 0.38 percent.
Table 14: Results of the 2008 regional TDM program results compared to regional characteristics.

<table>
<thead>
<tr>
<th>TDM Program</th>
<th>TDM Program</th>
<th>Regional Characteristics</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Annual VMT reduced (VMTR)</td>
<td>Annual budget ($2008)</td>
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<tr>
<td>Twin Cities TDM Program</td>
<td>65,958,658</td>
<td>$4,063,182</td>
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</table>

* Data obtained from the Texas Transportation Institute 2009 Mobility Study.


In addition, this goal could be tracked on a per capita basis. Using the American Community Survey 2006 – 2008 data for the Twin Cities MSA, the total population is 3,197,225 and the annual VMT reduced per capita is 20.6 miles.
References


USING MODELS TO PLAN TDM PROGRAMS FOR NEW DEVELOPMENT

Peter Valk, Transportation Management Services
Presentation

• Good News...Bad News
• Case Studies
• Lessons Learned
Good News

• Anecdotal findings were primary data source

• Models bring together findings from 25+ years of evaluation and plan documentation

• Development by agencies offers ‘good housekeeping’ seal of approval
  – COMMUTER Model uses same time and cost coefficients as regional travel demand models
On the Other Hand…

- Do not account for site specific variation
  - Surrounding land uses
  - Site characteristics
  - Nuances of TDM program
- Do not include full range of TDM options
- Results must be used with ‘professional’ judgment
- Concern for relying on model results
Case Studies

• Workcenter
  – Century City (Los Angeles)

• Worksite
  – Seattle Children’s Hospital Master Plan

• Special Application
  – Corporate Relocation Analysis
Century City (Los Angeles)

- 176 acres
- 13MSF non-residential space
- 26 buildings housing 1,200 tenants with 40K employees
- 2,500 residents living in 1,800 units
Existing Conditions

• Good transit
• High % drive alone
• Expensive parking, but employers pay
• 9 large employers and 4 buildings have TDM requirements
• Perceived as congested
• Little coordination among sites
Analysis Process

1. Identify trip reduction target needed to balance forecast trips with existing capacity

2. Develop solid baseline data
   – Property Mgr, Employer, Commuter surveys

3. Identify existing mode share and commute management practices

4. Develop five TDM strategy scenarios using:
   – Transit service improvements
   – Financial incentives
   – Rideshare support services
   – Work schedules and telework
# Results of TDM Model Runs

<table>
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<th>Packages Tested</th>
<th>Strategies Modeled</th>
<th>Sponsor Support (Level 2)</th>
<th>Sponsor Support (Level 4)</th>
<th>CP/VP/Access (3 min ably)</th>
<th>Shuttle to Produc. Waiving from Transit</th>
<th>Transit Pass Subsidy ($25/mo)</th>
<th>Mode Shares</th>
<th>Drive Alone (%) incl. motorcycle</th>
<th>Carpool (%)</th>
<th>Van pool (%)</th>
<th>Transit (%)</th>
<th>Bicycle (%)</th>
<th>Walk (%)</th>
<th>Other (%) incl. TW</th>
<th>Peak Trips Reduced</th>
<th>% Trip Reduction</th>
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<td>Baseline</td>
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<td></td>
<td></td>
<td>83%</td>
<td>2%</td>
<td>1%</td>
<td>4%</td>
<td>1%</td>
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<td></td>
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<td>4%</td>
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<td>1%</td>
<td>876</td>
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<td>76%</td>
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<td>3%</td>
<td>6%</td>
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<td>1%</td>
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<td>1,351</td>
<td>7%</td>
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<td></td>
<td></td>
<td></td>
<td>72%</td>
<td>12%</td>
<td>5%</td>
<td>6%</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
<td>2,006</td>
<td>11%</td>
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<td>D - Mod TMA, shuttle and $25 subsidy</td>
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<td></td>
<td></td>
<td></td>
<td>74%</td>
<td>11%</td>
<td>3%</td>
<td>9%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>1,883</td>
<td>10%</td>
</tr>
</tbody>
</table>

* Shuttle modeled as 5 minute walk time savings for regional transit users
Use of Results

• Iterations based on client feedback
  – Less costly financial incentives; further enhance transit
• Develop costs
  – Apply ‘modeled’ mode share to costs
    • # of carpoolers ÷ 2.4/persons per CP * $100 per CP sign
• Start with low cost, low effectiveness and add
• Identify how to best implement
  – Employer, TMA, City
• Set targets for participation, mode share and phasing
Seattle Children’s Master Plan

2008
- 250 beds
- 2,000 employees

2028
- 500 - 600 beds
- 2,600 employees
- + 1.3 MSF
- up to 3,000 parking spaces

Area is congested at peak
Concern for increased traffic
Existing Commute Program

- $50 /mo charge for parking
- $50/ mo bonuses for not driving
- On-site carshare vehicles
- Daycare facilities
- On-site exercise facilities
- Compressed work week
- Flex time/Telecommuting
- On-site vehicle fleet
- Guaranteed-Ride-Home
- 100% annual transit pass
- Invest in local transit service

- Subsidized bicycle tune-ups
- Showers and lockers
- Secure bike parking
- 100% vanpool fare
- Incentives to VP drivers
- Priority CP/VP parking
- Internal rideshare matching
- Six shuttle routes to other facilities and transit connections
Children's Mode Shift 2002-2007

Graph showing the percentage of commute trips for SOV (solid orange), Non-SOV (light blue), and Est. CTR-affected employees (dark red) from 2002 to 2007. The y-axis represents the percentage of commute trips, while the x-axis represents the years from 2002 to 2007. The graph indicates an increase in the percentage of employees commuting by SOV and a decrease in the percentage of employees commuting by Non-SOV, with a notable increase in the estimated CTR-affected employees.
Challenge: Prove Effects of TDM

• Identify Enhancements
  – Commute services, facilities, benefits
  – Transit

• Needed more than ‘judgment’ findings to support program with City & community
  – ITE-type ‘seal of approval’ verification

• Multi-step “modeling” process
“Modeling Process”

• **Step 1: Develop Employee Transportation Strategy Packages**
  – Develop Trip Reduction from Shuttle, Parking and Alternative
  – Reduce Total Daily Trip Forecasts by Estimates Developed in Step 1
  – Model TDM Packages Using EPA COMMUTER Model
  – Develop Scenario Descriptions and Develop Costs

• **Step 2: Develop Patient Travel Program Options**

• **Step 3: Develop Neighborhood Travel Program Option**

• **Step 4: Balance Employee, Patient & Neighborhood Programs**
Strategy Packages

• Enhanced Commuter Services & Incentives (COMMUTER Model)
  – Triple ‘bonus
  – Moderate shuttle increase
  – Increase bicycling/walking emphasis
  – Extend transit pass benefits to all campus

• Transit (No model)
  – Extend transit pass benefits to all campus
  – Increase shuttle route LOS
  – Add Park & Ride service
  – Provide transit connections

• Parking Pricing/Management
  – Triple parking cost
  – Moderate transit enhancements (no model)
Results

• Increase parking to $65/mo
• Operate shuttle-to-transit service
  – 19% reduction in net new PM peak-hour trips
• Innovative bicycle programs
  – Increase bicycle commute from 6% (‘07) to 10% (‘28)
• Increase financial rewards for not driving alone
  – 17% reduction in new PM peak-hour trips in 2028
Use of Results

• Demonstrate effectiveness
  – Internal
    • Build credibility
    • Identify costs
    • Re-run to balance cost and effectiveness
  – External
    • City staff
    • Neighbors
Lessons Learned

• Model results must be used in conjunction with professional judgment
  – A tool to start with and not to end
  – Do the figures look “reasonable”?  
    • Past performance, local setting, external conditions (gas, less congestion)?

• Models have not been calibrated to ‘forecast’ existing conditions
  – Can models represent existing mode share?

• How can models be improved?
  – Compare to trip generation and mode share data of sites with and without TDM programs
Quantifying the Business Benefits of TDM

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<td>Business Benefits Calculator Input Employer Information Screen.</td>
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Quantifying the Business Benefits of TDM

Abstract
Transportation demand management (TDM) is more than carpooling. It is a set of strategies that fosters increased efficiency of the transportation system by influencing travel behavior by mode, time, frequency, trip length, cost or route. Many TDM strategies encourage the use of alternatives to driving alone to help lessen congestion and air pollution. The effectiveness of these efforts depends on employer cooperation and policies supporting these strategies. Employees’ use of transit depends on the compatibility of the employer work hour policies and attendance policies such as flextime with transit schedules. The ability of employees to take advantage of advanced traveler information systems to alter arrival and departure times to avoid congested periods depends on those same employer policies. Employer work-life friendly programs such as compressed workweek programs and telework reduce traffic and parking demands. Employer parking policies determine the availability and price of parking that influence mode choice by employees. The provision of bike and locker facilities by employers can make the difference between someone choosing to drive or use a non-motorized method.

Public transportation professionals have long believed that TDM provides a variety of benefits to employers. Telework programs can improve productivity, enhance recruitment and retention of employees, and reduce absenteeism. Compressed work week programs enable the employer to expand coverage to enhance customer service. Employers allowing employees to pay for transit passes and parking as a pre-tax benefit save payroll taxes.

The TDM industry must largely depend on empirical evidence of these TDM strategies implemented by employers. Most of the tool sets available to assess the impacts of TDM programs have focused on the transportation and air quality benefits. These public benefits may have little relevance for most employers unless they were subject to a trip reduction mandate. Ironically, TDM programs target employers to carry out their missions. Therefore, the quantitative evidence of benefits that accrue directly to businesses from a wide range of programs could offer a strong motivation for employers to begin, continue, and/or expand travel alternatives support activities.

The goal of this project was to identify the key business benefits of TDM and provide techniques for quantifying those benefits. This information should enhance the transportation professions understanding of TDM’s value to business. This increase in awareness, in turn, should allow agencies to improve levels of employer participation in TDM and other transportation programs and thus provide reductions in congestion and air pollution for Florida and other states. From this point, a subsequent step for future research is the enhancement of existing tools (such as a custom-designed software application) to assist employers in assessing the costs and potential business benefits of implementing TDM programs.
Conclusions and Recommendations
The review of the efforts to quantify business benefits by employers and agencies points to several clear conclusions and recommendations: (1) Increase public sector research and technical assistance efforts to evaluate employer TDM programs for the impacts on business, not only transportation and emission impacts (2) Expand the tracking of employer-provided commute benefits to include parking by the Bureau of Labor Statistics and (3) integrate, update, and aggressively distribute the tools.
Chapter 1 – Introduction

Many strategies to encourage the use of alternatives to driving alone to help lessen congestion and air pollution depend on employer cooperation and policies supporting these strategies. For example, employees’ use of transit depends on the compatibility of the employer work hour policies with transit schedules and system reliability. The ability of employees to make use of 511 and other advanced traveler information systems to alter arrival and departure times to avoid congested periods depends on employer attendance policies such as flextime programs. Employer-provided work-life friendly programs such as compressed workweek programs and telework reduce vehicle trips as well as provide employers with a means for increasing productivity and reducing costs. Employer parking policies determine the availability and price of parking that influence mode choice by employees. The provision of bike and locker facilities by employers can make the difference between someone choosing to drive or use a non-motorized method.

Despite these direct connections between employer policies and efforts of the transportation demand management (TDM) community to reduce congestion, little is known of the consequences of congestion on business, specifically the magnitude of these costs and significance to profitability.\(^1\) A NCHRP study developed a typology of congestion impacts on business was developed to begin to understand these consequences.

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\(^1\) Congestion Impacts on Business and Strategies to Mitigate Them. NCHRP Research Results Digest Number 202.
Table 1. Typology of Congestion Impacts on Business.

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Client Travel to Obtain Goods and Services</th>
<th>Commuting</th>
<th>Delivering Goods and Services</th>
<th>Receiving Goods and Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Traveler Impacts</td>
<td>Not applicable</td>
<td>Increased travel time</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased vehicle operating costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change in travel hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change in trip frequency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect Traveler Impacts</td>
<td>Increased stress and aggravation</td>
<td>Increased stress and aggravation</td>
<td>Increased stress and aggravation</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td>Decreased quality of life</td>
<td>Decreased quality of life</td>
<td>Increased pressure to work harder</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change in destination</td>
<td>Change in residence</td>
<td>Decreased quality of life</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change in Destination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-Order Business Consequences</td>
<td>Lost sales</td>
<td>Recruitment and retention problems</td>
<td>Increased staff and vehicles</td>
<td>Higher prices for goods and service</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tardiness or stress concerns</td>
<td>Increased inventory</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative work schedule complications</td>
<td>New branch locations</td>
<td></td>
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<td></td>
<td></td>
<td>Trip reduction requirements</td>
<td></td>
<td></td>
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<td>Second-Order Business Consequences</td>
<td>Change in prices or profits on sales to final consumers</td>
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</tr>
<tr>
<td></td>
<td>Change in land use</td>
<td>Decline in business growth</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change in land use</td>
<td>Relocation of business</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Decline in local spending</td>
<td>Decline in local spending</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loss in business economies of scale</td>
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</tbody>
</table>

The NCHRP study concluded that congestion costs are a relatively small portion of the total cost of doing business for many organizations. At the same time, the study points out that businesses do not explicitly account for the costs of congestion. However, it noted that companies do adapt business practices to minimize the consequences of congestion (e.g., flexible scheduling of deliveries, hiring of additional drivers of delivery vehicles). Simply stated, most companies do not internalize these costs. They do not measure and track the costs of congestion so alternatives such as transportation demand management (TDM) can be evaluated as directly influencing business profitability.

NCHRP study did note that employees adapt to traffic congestion by moving and/or adjusting work schedules. Such adapted behavior comes at a considerable cost to the
employee and the company. The NCHRP report found that the direct costs of congestion and the indirect costs of congestion avoidance by employees such as residential relocation impose a substantial cost on business. The study suggests that strategies beyond providing additional capacity at critical bottlenecks should be considered to reduce the cost of urban congestion to business. Specifically, they noted the need for monitoring and communicating information about the system’s performance. Businesses are adept at adjusting their operations to minimize the costs of congestion, especially when the patterns are understood and relatively predictable.

The staggering cost of congestion is not lost on the business community. According to the U.S. Chamber of Commerce, “The cost of road congestion to the U.S. economy was about $78 billion in 1999, more than triple the $22 billion cost in 1982.”

While employers often agree that traffic congestion is a real problem, but they may not recognize the full range of potential consequences of congestion on their workforce. This view may mean they may fail to see the need for implementing TDM strategies to address those problems. For example, a study concerning marketing high occupancy vehicle (HOV) lanes along the I-95 corridor in South Florida found a disconnect between the traffic congestion problem as perceived by businesses and the affect on their organization. About 85 percent of surveyed employers strongly agreed that traffic congestion was a serious problem; but only 20 percent strongly agreed that traffic congestion could make their employees late for work.2

Approaches to force employers to assume more responsibility for congestion and its consequences via regulations have evolved. In most markets, regulatory mandates on large employers in severe or extreme ozone nonattainment areas have given way to market-based solutions or emphasis on sound business practices for addressing their needs. In addition to the general move toward deregulation, the issue of the cost to employers for carrying out these mandates helped push deregulation. The omission of benefits is akin to evaluating a company’s performance on its expenses but not considering its revenues or profitability.

Though not extensive, TDM research has focused on the costs of TDM to business while largely ignoring the savings that accrue from those investments. An often-cited study by Ernst and Young, Regulation XV Cost Survey, attempted to quantify the employer's costs for complying with the Regulation XV trip reduction ordinance (now referred to by as Rule 2202). The consultants prepared the study for the South Coast Air Quality Management District (SCAQMD) to estimate the annual compliance costs incurred by employers and the change in employee commute trips associated with those costs.

Ernst and Young sent the survey to each of the 5,763 regulated private and public sector sites in the SCAQMD's four county area and achieved a 19 percent response rate. Employers were directed to split their costs into four areas: training of the Employee Transportation Coordinator, plan preparation and approval, plan implementation and

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maintenance, and other costs. In addition to cost information, the survey requested data about the employer type, location, and the number of employees at the site from 6 a.m. to 10 a.m. The following results were estimated after the survey data was extrapolated to the regulated population:

**Table 2. Regulation XV Cost Survey.**

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Result</th>
</tr>
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<tbody>
<tr>
<td>Regulation XV annual costs</td>
<td>$162 million</td>
</tr>
<tr>
<td>Annual Reduction of vehicles</td>
<td>53,910 vehicles</td>
</tr>
<tr>
<td>Daily trips eliminated each year trips</td>
<td>13.75 million</td>
</tr>
<tr>
<td>Employees per reduced vehicle</td>
<td>29 employees per reduced vehicle</td>
</tr>
<tr>
<td>Average annual expenditure per employee</td>
<td>$105 per year</td>
</tr>
</tbody>
</table>

One major finding was the weak correlation between the amount spent and the commute trip reduction received. In other words, high expenditures were not necessarily result in the largest changes in average vehicle ridership.

However, the study also ignored the benefits accruing to those businesses associated with reduction in employee trips. Benefits such as decreased demand for parking; improved employee morale and productivity may offset some or all of the costs and show the cost-effectiveness of the program.

A follow-up examination of the results casts doubt on the accuracy of the self-reported data. Due to a wide variety of responses, the SCAQMD directed Ernst & Young to re-survey some employers to determine why there was a wide variance in annual per employee costs among employers. They interviewed a sample of 20 employers who responded to Ernst & Young's first survey to clarify their responses. The sample included 10 of the 50 employers reporting the highest costs and 5 each from the middle and lower levels. Ernst & Young found that 90 percent of the companies who reported the highest costs had overstated their costs. Over the entire sample, the total revised costs were about 50 percent *less* than the original estimates. This small sample may not represent the surveyed population. However, the full survey may provide a conservative estimate of the compliance costs.

SCAQMD also found that employers were including costs associated for providing the program to employees other than those regulated (i.e., employees who arrive outside the regulated morning peak period of 6 AM to 10 AM). The focus of this survey was on estimating the cost of complying with the regulation, not the total investments made by businesses. For example, an employer may have pragmatically decided to offer a particular benefit to all employees (e.g., 2nd and 3rd shift workers) rather than limit it to those who arrive within the morning peak period.
The investment in TDM is anything but trivial from a business perspective. For example, the State of Washington’s Commute Trip Reduction program estimates that employers invest $12 for every $1 spent by public agencies. However, SCAQMD survey, as many others, did not inquire about the benefits received by the employers for this investment (e.g., reduction in parking spaces). This glaring omission can mislead employers – as well as policymakers - as to the value of TDM program to the employer as well as the commuter and the community.

While the focus has been on the cost to business, there are also intangible business and societal benefits touted by government for the purpose of encouraging employer voluntary participation in commuter choice programs.

The transportation literature was largely void of rigorous studies that document the link between the TDM strategies and tangible business benefits such as reducing the need to build parking. Attempting to quantify the value of seemingly harder-to-measure benefits, such as improved employee morale and job satisfaction and reduced employee stress and attribute such benefits to TDM is also extremely challenging. While human resource (HR) managers have trouble measuring the value of work/life initiatives, some believe that the most significant work/life initiatives are the less tangible ones, such as flexibility and provision of day care facilities. The next section identifies methods for measuring the costs or savings for key business benefits.

These solutions aim at increasing the desirability among employers for TDM strategies to solve business problems such as employee turnover and parking. Understanding the role of the employer in influencing employee travel behavior is the first step toward addressing how to demonstrate the benefits of TDM to business.

Understanding How TDM Benefits Business

How people choose to travel is intricately linked with and influenced by the policies of their employer. For example, parking policies determine how much an employee may have to pay for parking or where they may park. Work hour policies affect the employee’s ability to adjust their schedule to catch a bus or carpool with a commuter who works for a nearby employer. Overtime requirements influence whether or not the employee is on a reasonably predictable schedule to make a monthly commitment to join a vanpool. The process of evaluating job performance and the degree of information technology support may determine the prospects for employee participation in telework programs at that company. Clearly, employer policies directly influence employee commute behavior on many levels.

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A review of the literature found the following benefits cited when discussing the business benefits of TDM.

- **Reduce Overhead Costs.** Increased competition and need to build shareholder value place more pressure on businesses to lower their cost of doing business as well as increase revenues and/or margins. Strategies such as telecommuting and parking management can make a difference. Telecommuting can reduce office space requirements. Parking management can eliminate the need to build additional parking.

- **Enhance Employee Recruitment and Retention.** A shrinking labor force has increased competition for qualified applicants. Similarly, the cost of replacing an employee in productivity and direct costs can be very expensive.

- **Expand Employee Benefits at Low/No Cost.** Employers can take advantage of changes in the federal tax treatment of commute-to-work fringe benefits to benefit employees and reduce costs. Employers can now provide employees with a tax-free benefit and/or offer to subtract the cost of transit, vanpool, or parking as a pre-tax payroll deduction option.

- **Enhance Corporate Image.** Employers with environmental image problems and/or difficulties with their neighbors often seek to mitigate the problems using a combination of trip reduction strategies.

- **Solve Localized Transportation Problems.** Employers are well-aware of the value of banding together to address common problems. More employers are joining transportation management associations (TMAs) to address access and mobility problems in their immediate area.

- **Expand service hours.** Work hour schedules such as flextime, staggered work hour programs, compressed work week programs enable organizations to provide additional coverage with the same total number of employers.

- **Lower absenteeism and tardiness.** Employees may earlier time commitments to their carpool partner or to meet the bus. Telework may allow work to be accomplished when travel to the office isn’t possible.

- **Increase employment opportunities for the disabled and others unable to meet traditional work hours.** Telework provides an alternative to having to physical transport.

- **Reduce employee stress.** Employee health is significantly related to the distance and duration of the trip. People who are exposed to high levels of traffic congestion arrive at work with higher blood pressure than people who are not exposed. The more sensitive long distance commuters are to the effects of commuting on family life, the greater the inclination to try alternatives to solo driving.

- **Enhance employee productivity.** One of the oft-cited benefits of telework is productivity increase.

The factors that relate to the profitability of a business must be understood in order to relate TDM strategies in business terms. The following section identifies these factors.
Factors Contributing to Business Profitability

There are eight factors that affect the profitability of a business (See Figure 1). TDM strategies can affect one or more of these factors to increase the profitability. There are four main factors that directly change in profit (productivity, cost, margins, and revenue) and an additional four contributing factors (resource quantity, resource price, price, and quantity sold). These main and contributing factors are interrelated. Each main factor is affected by two contributing factors. Each contributing factor affects two different main factors. Understanding how the factors influence profitability will shed light on how various TDM strategies can benefit a business.

Change in Productivity – This factor is positively correlated with profit; i.e., profitability increases as productivity increases, all other factors being equal. Changes in productivity are influenced by changes in the quantity of resources used, such as the number of hours worked by employees, and the volume of products or services sold. Productivity increases, for example, as the sales volume increases for a given resource such as total hours worked. If sales per employee increase from 100 units per employee to 110 units per employee then profitability also increases.

Change in Costs – Perhaps the factor most focused on from a TDM perspective is the change in the costs. Decreasing the costs will increase the profitability holding all other factors constant. Strategies to decrease office space needs, for example, by introducing a telework program, are aimed at reducing overhead costs associated with the space. The quantity of resources used and the price of those resources affect the change in costs. For example, a reduction in square footage and/or reduction of the cost per square foot will reduce the cost of office space. A reduction in costs with the same margins, revenues and productivity factors will result in higher profits.

Figure 1. Interrelations of Prices, Products, and Resources to Profit.  

Change in Productivity (e.g., widgets/hour)  
Change in Cost (e.g., $ expenses)  
Change in Margins (e.g., 10%)  
Change in Revenue (e.g., $ gross revenue)  
Change in Resource Quantity (e.g, hours)  
Change in Resource Price (e.g., $/widget)  
Change in Price (e.g., $/widget)  
Change in Quantity Sold (e.g., # widgets)

4 Adapted from James L Riggs and Thomas M. West. Engineering Economics. Third Addition. 1986 p634
Change in Margin - The margin or the contribution to profit related to price is affected by the change in the unit price (e.g., price per product or service) and the resource price (e.g., cost to produce the product or service). TDM strategies can affect changes in margin most likely through changes to the cost to produce the product or service. For example, high absenteeism may require the company to hire additional labor to fill the production task. Reductions in the absenteeism rate may reduce the cost of labor and thus enhance the margins.

Change in Revenues – The remaining factor, change in revenues, is a function of the product’s price and the change in the amount of product sold. Though there has been little research to directly attribute TDM strategies to increases in sales, the fact that TDM helps some employers achieve the image of “green” company may contribute to increasing sales based on the consumer support for environmentally friendly companies. Many ISO 14000 companies are requiring suppliers to also becoming ISO 14000 certified may, in fact, require companies to take some environmentally friendly actions or affect sales.

In response to an inquiry about the role of TDM in their environmental management system, Verie Sandborg with Baxter International Inc., “Some of us at corporate are trying to make transportation impacts more visible. In our 2000 reporting, we gave an estimate of carbon dioxide emissions for employee commuting to be 100,000 metric tons per year, or approximately two percent of our total global warming impact. Some effort is also being made to require fleet cars to be fuel-efficient.”

Some organizations already include their TDM program in their EMS as part of a larger commitment. Beers, an Atlanta based company, began the ISO 14000 certification process in February 1997. Beers specializes in construction services for a wide range of markets. The company included each of its eight offices in the certification. As part of the certification, Beers employees set up 11 main environmental aspects in areas such as transportation, air emissions, endangered species and wetlands and energy conservation. They report that Beers saved over 43,581 vehicle miles through carpooling and public transportation. (20% of Beer employees use public transport)

Case Study: Beers Construction

Beers claimed to have achieved the following in the 18 months before ISO 14000 certification:

- Saved over $230,000 in waste removal cost by reducing, reusing, and recycling in the first half of 1999.
- An estimated 50,000 cubic yards of waste diverted from landfills.
- Saved over 43,581 vehicle miles through carpooling and public transportation. (20% of Beer employees use public transport)

Many TDM strategies are directed at reducing expenses for the employer. However, another method of presenting the impacts would be to relate what would have to happen
to one of the other factors to achieve a similar change in profitability. For example, TDM could relate the reduction of costs to increases in revenue that would have been required for have a similar contribution to profitability.

Many of these expenses affected by TDM would appear on a business’ income statement within the “Selling General and Administrative Expenses (SG&A)” line item. SG&A expenses consist of the combined payroll costs (e.g., salaries and commissions executives and employees) and related overhead costs (e.g., advertising, rent, office supplies, legal, accounting and travel expenses). SG&A expenses are completely separate from the other than the costs of readying the product for sale (i.e., Cost of Goods Sold). SG&A expenses as a percent of revenue are generally recognized as a leading indicator of administrative productivity and can provide an accurate picture of how well a company is managing the costs required for its sales revenue.

Limiting SG&A expenses to a certain percentage of revenue can be a significant challenge for almost any business. Controlling expenses is usually accomplished through tactics such as cost-cutting initiatives and employee lay-offs. The need for controlling costs can be due to a variety of reasons. For example, if a competitor lowers its price and the business must respond in kind then the business must seek to reduce the costs of production if it is to maintain a certain gross profit percentage. Companies may overlook the opportunity to control costs out of concern that the reduction of SG&A might reduce sales. However, the issue is one of efficiency rather than sales revenue.

One of the financial ratios used to monitor the business’ performance is the SG&A to Sales ratio. A steady or decreasing percentage of the SG&A to Sales ratio indicates that the company is controlling its overhead expenses. This ratio is the percentage of selling, general and administrative costs to sales and is determined by dividing the Selling, General & Administrative Expenses by Sales revenue.

<table>
<thead>
<tr>
<th>Table 3. Distribution of Annual Revenue and SG&amp;A Costs During the Period 1979 – 1998 (millions of dollars).</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Sales revenue</td>
</tr>
<tr>
<td>Selling, general and administrative costs</td>
</tr>
<tr>
<td>SG &amp; A as a percentage of revenue</td>
</tr>
</tbody>
</table>


As partially reflected in the large standard deviation in the above table, SG&A across companies and industries makes it difficult to generalize what is the appropriate SG&A
rate across industries and how to position the impacts of TDM. For example, SG&A expenses account for 16.3 percent for Best Buy\(^5\) and 24.1 percent of expenses for MCI.\(^6\)

One way to position the savings to SG&A is in terms of additional revenue necessary to maintain the same SG&A to sales ratio. For example, Costco's average selling, general and administrative expenses, or SG&A, per store grew 11.3% in fiscal 2000, 3.8% in 2001 and 4.3% in 2002, surpassing the rate of sales growth in each of those years. SG&A climbed to 9.4% of sales in fiscal ‘02 from 8.6% in 2000. Sales increases to necessary to offset increases in SG&A can be very significant. One report cites analysts’ views that “Costco needs to grow monthly same store sales by 70%-80% to offset further increases in SG&A.”\(^7\) Clearly, rising SG&A rates require companies to increase revenues to maintain their ratios. Falling SG&A rates would allow a company’s revenues to fall by an equivalent share (assuming COG also declined proportionately) and still maintain the same rate of profit.

There are several reasons why businesses may benefit from examining TDM strategies that affect SG&A expenses. First, businesses can track the SG&A ratio over time to assess its impact on revenues and profits to improve planning. They also may monitor SG&A as a measure of how the company is managing its knowledge-based employees. Finally, monitoring SG&A rations can help some businesses understand the marketing and sales expenditures that may be a significant portion of its costs. One study reported that the sales and marketing expenses accounted for more than 55 percent of SG&A expenses.\(^8\)

The key for controlling SG&A expenses is for each company to carefully review those expenses and maintain an ongoing review to further improve the bottom line. Increased control over SG&A should lead to increase efficiency, productivity, and profits.\(^9\) Positioning TDM strategies such as the introduction of pretax payments and/or co-payments by business for qualified transportation fringe benefits (as well as several other TDM strategies) offers an opportunity for a company to reduce its SG&A.

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\(^5\) Best Buy's Q4 sales rise, but net slips. TWICE; New York; Apr 7, 2003; Jeff Malester;

\(^6\) The new MCI. Business Communications Review; Hinsdale; May 2003; Eric Krapf;

\(^7\) Bigger and better. Barron's; Chicopee; May 12, 2003; Mark Veverka;

\(^8\) http://www.benchmarkingreports.com/businessoperations/op74_administrative_productivity.asp#Benchmark%20Class

\(^9\) Understanding Selling, General And Administrative Expenses http://www.smartbiz.com/sbs/arts/sba33.htm
Benefits of TDM – Business’ Perspective

No comprehensive evaluation of business benefits of TDM was found during the course of the literature review. There are at least three plausible reasons why there is a void in the direct linkage of business benefits and TDM. First, evaluations on TDM focus on the motivations of the funders, typically public environmental or transportation agencies most interested in reducing vehicle trips, vehicle miles of travel, and/or emissions. Second, employers base commute related decisions on regulatory requirements and employee requests without the quantitative rigor of other business decisions. For example, TCRP B-4 Cost-Effectiveness of TDM study found that employers base decisions as to which are the most appropriate TDM strategies on employee requests and business objectives. Rarely were baseline measures on transportation impacts or business objectives identified at the outset. Or they may choose not to report the program’s impacts to protect their business advantage. Finally, the cause-and-effect relationship of specific TDM strategies is difficult to discern due to the numerous factors that could influence program impacts such as changes in gasoline prices and the economy.

The lack of data does not suggest that employers don’t value the contributions TDM makes to overall business goals. It is abundantly clear that employers do adopt TDM strategies and may exceed minimum requirements when they recognize the value of the programs to meeting business objectives. The following case studies summarize the programs and benefits as seen by from leading businesses.

Case Study: Walt Disney Company

A noteworthy example of a comprehensive TDM program aligned with business needs can be found at The Walt Disney Company in Southern California.10 The Walt Disney Company in Southern California is located in the South Coast Air Basin, which is regulated by the South Coast Air Quality Management District (SCAQMD) and subject to SCAQMD Rule 2202 to reduce emissions by various options including TDM. Several years ago, this SCAQMD changed the rule to allow companies to opt out of TDM programs by choosing another method of compliance, (e.g., scrapping old vehicles or paying on a per employee basis to an Air Quality Investment fund used to underwrite programs and services that demonstrate reductions in vehicle emissions.)

The Walt Disney Company chose to continue its 'good faith' effort to meet a 1.5 AVR instead of the other options. According to Linda Ballew, Manager Corporate Commuter Transportation, there were several business reasons why this was done:

- Scrapping old vehicles or paying a dollar amount per employee to the District does not help employees get to work;

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10 Personal communication with Linda Ballew, Manager Corporate Commuter Transportation, Walt Disney Company
• By subsidizing transit for employees Disney is underwriting and supporting the expansion and development of public transit in the region.
• Disney has commitments to the communities in which it operates (cities of Burbank and Anaheim) to meet requirements under site-specific plans. Failure to meet these commitments could impact future development in this region.
• Disney has historically supported conservation of resources, air, water, land, and that tradition would have been inconsistent with the other compliance options provided by the District.
• Disney invests heavily in clean fuel technologies within the Disneyland and WDW Resorts, and for Cast shuttles. It would have been inconsistent with this long time emphasis for it to abandon its rideshare program.
• Parking at some locations is in critical supply and the reduction of vehicles is a business necessity.
• Disney encourages employee involvement in the environment at an individual level, both personally and professionally. To abandon support for ridesharing would jeopardize this position.
• In light of the 1994 Northridge quake, subsequent El Nino activity in the area, and the current concern for safety and security, having a fully realized rideshare system means that Disney can react quickly and effectively in transporting employees in the event of an emergency (this was proved in the 1994 earthquake).
• Program benefits are extended to all employees at all sites (regardless of regulatory status) and all shifts, 24/7, --about 38,000 employees, so Disney is doing much more than is required by the district.
• Moving from a "good faith" effort to a target based compliance option did not seem a good business decision for this company.

Currently, Disney offers the following comprehensive program in Southern California:

• Subsidies for public transit (equals 50% to a maximum of $60)
• Points for daily participation in vanpool, carpool, transit, bicycle, walk, telecommute and compressed work week (equals $1 a day)
• Bonus points for enrollment, referral and special challenge days and weeks
• Emergency ride home
• Vanpool program (company subsidized) -- Between 60-70 vans on average
• Customer service locations in two counties at four major locations
• Web site for recording and redeeming points
• Full marketing and promotion of services and incentives
• Management reports by division/dept. on activity
• Swipe card reporting for those without access to a computer
• Bicycle program and incentives
• Inter-site shuttles for L. A. County employees between buildings
• On-site purchase of subsidized (discount) train tickets
• Pretax transit and vanpool benefits (rollout to be completed by third qtr 2002)
• A 4/40 - 9/80 (compressed workweek) policy at the Disneyland Resort
• Fairs and informational events
• Opportunity drawings and gifts
• Other services include: commute assistance, ridematching, focus groups, newsletter, etc.

Elements of the program are available to Disney employees working in 10 states on the east coast:
• Pretax transit and parking benefits through WageWorks.

According to Ballew, Walt Disney Company realizes a range of quantitative and qualitative benefits:

• Reduction in size of parking structure (saved $2M) due to level of rideshare participation
• Saved significant costs ($200,000+) over hiring outside consultants to provide commuting data in development planning
• Reduced parking demand for Cast Members at Resort to offset potential shortfalls of parking on busy summer days (unquantifiable)
• Competitiveness in hiring (never been quantified)
• Meeting requirements of Environmental Impact Reports, which require traffic mitigation (not quantified)
• Keeping in compliance with the SCAQMD Rule 2202 (non-compliance can cost up to $50,000 a day)
• Keeping in compliance with Burbank Site Specific Plan (non-compliance could impact development)
• Keeping in compliance with the Disneyland Resort Specific Plan with the City of Anaheim (non-compliance would impact the development of a planned third gate)
• Providing a needed benefit to employees (unquantifiable)
• Helping to underwrite the development and expansion of transit services and routes in Southern California (unquantifiable)
• Coordinated with transit agencies and TMA/TMO's the development and planning of future transportation services (unquantifiable).
• Provides a backup plan for emergency situations (prevented the loss of millions in productivity after the 94 quake.
• Promotes the image of the Disney Company as an environmentally aware company (unquantifiable)

Currently, about one-third of employees participate regularly in Disney’s programs.

Part of the challenge in quantifying the business benefits of TDM is the lack of data from employers. This isn’t entirely surprising as Disney, for example, will not make cost information available outside the company. In the case of Disney, however, the costs are considered minimal, at a per head basis and are considered to be a very inexpensive benefit.
Finally, Disney has an investment well into the billions in Southern California; if traffic and air quality become significantly worse, it will impact the travel and resort business well into the millions. She states, “It is a small investment to provide a comprehensive rideshare program to help offset this problem. Hopefully, other companies will take our model and move to take this problem seriously also.”

As the literature and interviews with award-winning programs illustrate, the failure to quantify the benefits in business terms is not a deal breaker, even for those investing hard cash. There is an intrinsic value placed by many of these companies on the programs. These programs also tend to evolve as the employers seek to balance the program features with changing needs.

**Case Study: Nike**

Nike is an example of a business learning to adapt the TDM program to reduce their costs while increasing the benefits to the company. In 1992, Nike was offering employees $1 voucher per day, called “Nike Bucks”, to be used in the company cafeteria, gift shop, daycare center or fitness center. Employees using transit received a comparable discount on the cost of a monthly pass. As the number of Nike employees grew and moved to other locations, the voucher program became difficult to administer as well as costing in excess of $200,000. Nike replaced the voucher program with “Traveling Responsibly via Alternative Commuting,” or TRAC. TRAC offers monthly prize drawings, with prizes valued from $60 to $200. The program has yielded a lower drive-alone rate (79%) than with the Nike buck program (84%) and is costing $43,000 per year.

According to Linda Bainbridge, Nike’s transportation specialist, the Nike Buck program costs got out of hand as more people started to commute by alternative mode. She said she tracks participation in SOV trip reduction according to the number of persons who electronically sign up for monthly and quarterly prize drawings, in addition to the weekly ridership numbers collected for Nike’s shuttle from the work site to a light rail station ½ mile away.

The cost burden of the prize drawings approach is easier and cheaper than the Nike Bucks because it is a fixed cost so it does not matter how many participate. She believes that the prizes attract people to use alternative transportation; but she also said that many carpoolers do not register for the prizes and that while over 300 carpoolers per week sign up, the trip reduction survey, in which she surveys approximately 500 employees, indicates a participation rate of 24%.

While Nike is currently under a trip reduction mandate, their program started many years before the mandate. Nike has a corporate philosophy of “doing the right thing” on behalf of employees as well as for society. Since the program has management support, Bainbridge does not attempt to quantify benefits from the program. It comes down to management concern about business sustainability over the long haul. So the self-interest
is there in a desire to conduct business in a way that is perceived to sustain the company for the long term. 11

**Case Study: Bayer Corporation**

Similarly to Nike, Inc., the Bayer Corporation work site in Berkeley is mandated to conduct trip reduction activities but they do more than they have to because it makes business sense. Deborah Bellush, Site Development/Community Relations Manager, said that prior to the mandate, they already had a shuttle in place and had implemented carpool parking. According to Bellush, without the mandate, they probably would not be going to the lengths they now are. With the mandate, it is as though they think they might as well make it a good effective program if they have to have one anyway. Bellush reported that Bayer spends on the order of $300,000 per year on alternative transportation assistance with a participation rate of 400 employees out of 1,200. The program has been in place for 10 years.

She said there are benefits but they are very hard to quantify. Benefits from the program include a reduction in parking needs. The City requires employers to park on their own property. Since the commute is “horrendous”, participants are happy to have a program that improves their quality of life. Bayer pays 75% of the cost of a shuttle to a BART station that the rest of the community can also use, so there is a community relations benefit to Bayer. Bellush said that if everything else were the same between Bayer and another company, the $45/mo per employee subsidy for vanpooling would give them an edge by making Bayer an employer of choice.

While Bayer does not quantify many of the benefits, the cumulative value of the program means that the investment significantly exceeds development agreement thresholds. In an overview of the Bayer Trip Reduction Program for the year 2001, Bayer reported that the trip reduction program cost more than $288,000, as compared to the estimated cost of $35,000/year, as specified in their development agreement. Bayer also contributed $78,716 to the Berkeley Gateway TMA for the West Berkeley shuttle, which is $28,716 more than mandated under the 1999 Amendment to the development agreement.12

**Case Study: Georgia Pacific**

Failure to examine the costs and benefits of the extensive programs isn’t unusual. According to Robin Taylor with Georgia-Pacific (G-P), the company does not conduct surveys to relate the cost of their investment in commuter assistance to benefits derived. These costs are not trivial but the costs are compared with alternatives such as parking.

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11 Linda Bainbridge. Transportation Specialist, Nike, Inc. Portland, Oregon (From TDM Review
12 Personal communication. Deborah Bellush. Site Development/Community Relations Mgr., Bayer Corporation, Berkeley, CA
Case Study: Georgia Pacific

In just one year, transit ridership among downtown Georgia-Pacific employees increased 10% and the number of carpools increased by 57%.

The teleworking pilot program measured improved productivity and job satisfaction and a reduction in absenteeism.

The Cumberland distribution center avoids a $100,000 parking expansion through carpooling, vanpooling and transit usage.

Georgia-Pacific was motivated to participate in The Clean Air Campaign to achieve three goals: further its environmental efforts, offer an attractive benefit for its employees, and, at one metro area location, reduce parking demand by 130 spaces to avoid a $100,000 surface lot expansion cost. Since 1997, Georgia-Pacific has invested more than $2.5 million in environmental projects across the country allowing the company to meet all three goals.

In the downtown corporate office, 55-percent of the company’s 3,000 employees participate in its Clean Air Campaign program. At the company's Distribution Division Headquarters in the Cumberland area of Cobb County, more than 16-percent participate and this location has successfully avoided the parking crisis that it faced in 1997.

The challenge in evaluating the impact of any TDM program can be found in the diversity of programs and incentives offered by the company. Georgia-Pacific offers employees: carpool and vanpool ridematching; subsidized vanpools; a subsidized transit pass program; alternative work schedules; teleworking; biking and walking programs. Ongoing education efforts include the use of brochures, periodic Lunch n’ Learns, email and the company Intranet. The Cumberland location was able to supplement its company transit subsidy with an additional discount offered by the area transportation management association.

Costs cited by Taylor include approximately $100 per participating employee per month for commuter assistance, which includes $70 per month for vanpool subsidy plus cash prizes and other perks.

G-P also has learned to adapt the program like Nike. The vans used to be fully subsidized at $100 per month per employee, costing G-P $8,000 per month per van. Now they have 11 operating vans, and G-P required participants co-pay $30 per month. So now vans cost $1,000 per month per van for the 11 vans. G-P is paying $132,000 per year in vanpool subsidies, which is offsets the need for additional parking spaces.

Unlike the previous examples, G-P is not required by a local trip reduction regulation or other mandate to provide these benefits. Taylor cites that the benefits accruing to G-P are what they get from the employee in return, which is improved productivity, improved morale, improved employee retention, and good public relations. The company recognizes costs a lot to get and retain good people, but this has not been quantified.

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Monthly drawings for prizes encourage continued participation. Other incentives include free car washes or oil changes for carpoolers; and complimentary access to the company health club showers for bike riders. During smog season, the company also institutes operations and maintenance changes by asking landscape contractors to postpone services on Smog Alert Days until after 6:00 PM.

Participation in the program is voluntary but the incentives and communications have resulted in a high percentage of participation. In just one year, transit ridership among downtown Georgia-Pacific employees increased 10% and the number of carpools increased by 57%. The teleworking pilot program also measured improved productivity and job satisfaction and a reduction in absenteeism. The Cumberland distribution center continues to avoid a costly parking expansion.

**Approaches to Assessing the Impacts of Business Benefits**

Similarities exist between measuring the business benefits of TDM and assessing the impacts of work/life interventions to address the changing needs of the workforce. According to Lobel and Faught, there are four main approaches to measuring the value added of work/life support programs.\(^{13}\)

- **The human-cost approach** highlights the reduced labor costs associated with specific interventions.
- **The human-investment approach** emphasizes the long-term payoffs associated with meeting employee work/life needs.
- **The stakeholder approach** identifies benefits that accrue to important organizational stakeholders, such as shareholders, employees, and customers, as a result of specific work/life interventions.
- **The strategy approach** demonstrates how work/life supports reinforce broad business strategies, such as globalization or providing superior customer service.

These methods also correspond to four criteria regarding the selection of approaches for measuring value. The questions include:

1. What is the specific work/life intervention?
2. How much does the intervention cost?
3. Who benefits from the intervention?
4. How is the effectiveness of the intervention measured?

The human-cost approach is the easiest way to measure the value that work/life investments and demonstrating the reduction of labor costs. Tracking absenteeism and turnover rates and costs before the intervention is offered and comparing those rates to

rates measured after the intervention is provided can do this. Another way is to compare rates between users and nonusers of the intervention. Turnover rates can provide the information needed to calculate the savings as a result of reduced employee termination costs, employee hiring costs and training costs.

In the human-investment approach, workers are assets in which the firm wants to invest. Work/life initiatives, including various TDM-related strategies like compressed work week programs, are investments in human capital rather than as a means of reducing labor costs. The long-term payoff tends to be retention of high-performing employees.

In the stakeholder approach, the emphasis is proving the value of the work/life initiative with positive impact on some stakeholder group of concern, such as employees, shareholders, customers, suppliers and the government. It is recommended to identify a wide range of possible stakeholders, then select the most relevant to consider. For example, a study by Chauvin and Guthrie showed that public companies that appeared on the list of best companies for working mothers, published by the magazine, Working Mother, had a small but statistically significant increase in their stock prices.

Whether the employers implicitly or explicitly quantify the benefits of TDM to their business, the need remains for tools to help quantify the business as well as the community benefits of TDM.

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14 Professor Kathleen Christensen, City University of New York
Chapter 2 – Existing Tools for Calculating Costs and Benefits

This chapter provides an overview of the current tools commonly used to assist employers in predicting the changes in travel behavior due to TDM and/or estimates the benefits accruing to businesses. Four models are briefly reviewed: EPA’s COMMUTER Model, EPA’s Business Benefits Calculator, FHWA’s Commuter Choice Decision Support System, and FDOT-funded CUTR_AVR.

EPA’s COMMUTER Model

The Environment Protection Agency’s (EPA) COMMUTER Model is designed to analyze the impacts of TDM programs in regard to mode share, vehicle miles, vehicle trips and emissions. This model can be used to estimate the number of vehicle trips reduced to help estimate the savings by reducing the need to construct parking garage. It can also be used to measure changes in alternative work hour programs as well as changes in mode splits due to changes in parking and/or commute subsidies.

The COMMUTER Model uses two procedures for calculating travel response to TDM strategies:

1. Logit pivot-point model: A multimodal pivot-point model using coefficients and computational procedures from accepted logit-based mode choice models;

2. Look-up tables: The impacts of some strategies are estimated using relational factors from empirical research. The impacts are arrayed in lookup tables where increments of change are associated with particular types of programs, reflecting different application assumptions, levels of intensity, and setting.

The COMMUTER Model is essentially used as part of a three-step procedure, which can be followed for the area and employer worksite levels:

1. The user establishes a baseline by supplying essential information on current conditions (e.g., current mode split).
2. An analysis scenario is selected from among available program options.
3. Changes in peak and non-peak vehicle trips and vehicle miles of travel are calculated and used to estimate the change in emissions using the logit component and look-up tables.

The baseline is established by entering data inputs for local demographic, mode splits, and alternative work schedule. The fact that COMMUTER is a pivot-point model means that the higher the levels of use of a particular mode, for example, then greater the impact. For example, an employer providing $1 per day subsidy for transit benefits provided to employees will have a lower shift to transit for an employer with a transit share of 2% versus another employer with a transit share of 10%, holding all other factors constant.
There are a wide variety of TDM program options that can be analyzed by the COMMUTER model. The four primary program areas include: site access; financial incentives and parking costs; employer support programs; and alternative work schedule programs. Table 2 shows the options under each of these areas, how they are measured and what additional information is required.

### Table 4. COMMUTER Model Inputs.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Sub-category</th>
<th>Inputs</th>
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</thead>
<tbody>
<tr>
<td>Demographic</td>
<td>Metropolitan Area Size</td>
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<td></td>
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<td>Medium (750,000 to 2 million)</td>
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<tr>
<td></td>
<td></td>
<td>Large (Over 2 million)</td>
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<td></td>
<td>Bicycle</td>
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<td></td>
<td>Walk</td>
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<td>Other</td>
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<td>Average trip length</td>
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<td></td>
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<td>Average vanpool occupancy</td>
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<td>Peak Period Travel</td>
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<td>Transit Characteristics</td>
<td>% of work trips in peak period</td>
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<td>In Vehicle Travel Time</td>
<td>Transit Time</td>
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<td></td>
<td>Out of Vehicle Travel Time</td>
<td>Walk time</td>
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<td>Existing employer support</td>
<td>Carpool</td>
<td>Levels 1-4</td>
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<td>Vanpool</td>
<td>Levels 1-4</td>
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<td></td>
<td>Transit</td>
<td>Levels 1-4</td>
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<tr>
<td></td>
<td>Bicycle</td>
<td>Levels 1-4</td>
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</table>
Table 5. TDM Program Options.

<table>
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<tr>
<th>Program Areas</th>
<th>Specific Programs</th>
<th>Measured by…</th>
<th>Factors</th>
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<tbody>
<tr>
<td>SITE ACCESS</td>
<td>Remote parking for SOVs</td>
<td>Change in Walk Access Time (minutes)</td>
<td>Workforce Participation</td>
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<td>Preferential parking for carpoolers</td>
<td>Change in Walk Access Time (minutes)</td>
<td>Workforce Participation</td>
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<tr>
<td></td>
<td>Preferential parking for vanpoolers</td>
<td>Change in Walk Access Time (minutes)</td>
<td>Workforce Participation</td>
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<tr>
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<td>Closer transit stop</td>
<td>Change in Walk Access Time (minutes)</td>
<td>Workforce Participation</td>
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<tr>
<td></td>
<td>Shuttle from transit stop</td>
<td>Change in Walk Access Time (minutes)</td>
<td>Workforce Participation</td>
</tr>
<tr>
<td></td>
<td>Closer bicycle parking facilities</td>
<td>Change in Walk Access Time (minutes)</td>
<td>Workforce Participation</td>
</tr>
<tr>
<td></td>
<td>Improved pedestrian access</td>
<td>Change in Walk Access Time (minutes)</td>
<td>Workforce Participation</td>
</tr>
<tr>
<td></td>
<td>More frequent transit service</td>
<td>Change in avg. headway (minutes)</td>
<td>Workforce Served Increased Transit VMT</td>
</tr>
<tr>
<td></td>
<td>Faster transit service</td>
<td>Change in route travel time (minutes)</td>
<td>Workforce Served Increased Transit VMT</td>
</tr>
<tr>
<td>Program Areas</td>
<td>Specific Programs</td>
<td>Measured by…</td>
<td>Factors</td>
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<td>FINANCIAL INCENTIVES AND PARKING COSTS</td>
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<td>Parking discount for vanpools</td>
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<td>Parking Cash out</td>
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<td>Transit Fare reduction</td>
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<td>VP subsidy</td>
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<td>Transit Pass subsidy</td>
<td>Transit discount ($)</td>
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<td>Financial Incentive for bicycling</td>
<td>($)</td>
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<td>Financial incentive for walking</td>
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<td>EMPLOYER SUPPORT PROGRAMS</td>
<td>Carpool Program</td>
<td>Change in Program Level (0-4)</td>
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<td>Vanpool Program</td>
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<td>Flextime</td>
<td>Change in Eligibility or Participation (%)</td>
<td>Present rates of Telecommuting and alternative work schedule employees</td>
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</tbody>
</table>

NOTE: For area applications (i.e., multiple employers), *workforce participation* represents the number of commuters who work for employers that offer the particular TDM program.

The COMMUTER Model is used to forecast the impacts of a variety of TDM program scenarios on VMT, vehicle trips, and emission reductions. However, there are challenges and trade-offs that employers may have to make in using it.\(^{16}\)

Since COMMUTER is based on pivot model, it needs a starting mode share to show any change. This poses a problem for employers with little or no use of a particular mode, such as vanpooling. In order to get the model to recognize vanpooling and a mode share greater than 0 must be established as the starting point. In effect, the model will not show the impacts of new modes or options as well as changes to existing mode shares.

While the COMMUTER model is spreadsheet-based, establishing the baselines or estimating the changes due to certain strategies may be difficult for employers to estimate or even obtain help from the agencies to provide. For example, the section on transit improvements requires data on various changes to transit service (e.g., frequency, speed, etc.) that an employer may not be able to easily estimate. Employers may need to work with transit agency staff to estimate a set of inputs for the model.

The mode share input section also fails to include a “work at home” category. However, it appears on the results page. This can create a misleading picture and creates a situation in which mode share percentages have to be manipulated to remove those that work at home.

The level of effort supported by the employer will affect the impact of the programs and strategies. The COMMUTER model developed five scenarios (Level 0 = no program to Level 4 = subsidies and full-time employee transportation coordinators) to represent levels of support for the transit, carpool, vanpool and bicycle modes. The aforementioned look-up tables use values corresponding to these levels to adjust the final

\(^{16}\) Hagelin, Christopher A. “Opportunities and Limitations of the EPA’s Commuter Model” (unpublished) Center for Urban Transportation Research, University of South Florida.
results. The following table provides the general description of each level but some professional judgment may be used to determine the appropriate level. Financial incentives and disincentives (e.g., transit passes, parking charges) are captured separately and used by the logit model portion of the model.

**Table 6. Employer Program Support Levels.**

<table>
<thead>
<tr>
<th>Program</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpool Support Programs</td>
<td>Offers carpool information activities (tied in with area-wide matching) and a quarter-time employee transportation coordinator (ETC)</td>
<td>Offers an in-house carpool matching service and/or personalized carpool candidate get-togethers (including information activities) and a quarter-time ETC</td>
<td>Provides in-house carpool matching and information services, a policy of flexible work schedules* to accommodate carpools, and a half-time ETC</td>
<td>Provides in-house carpool matching and information services, a policy of flexible work schedules, and a full-time ETC</td>
</tr>
<tr>
<td>Vanpool Support Programs</td>
<td>Provides vanpool information activities (tied in with area-wide vanpool matching and/or third-part vanpool programs), plus a quarter-time ETC</td>
<td>Provides in-house vanpool matching services and/or personalized vanpool candidate get-togethers, and non-monetary vanpool development, plus a quarter-time ETC and a policy of flexible work schedules.</td>
<td>Provides in-house vanpool matching services; vanpool development and operating assistance, including financial assistance, such as vanpool purchase loan guarantees, consolidated purchase of insurance, and a startup subsidy (note that such assistance is different from offering financial incentives to use vanpools); and additional services such as van washing, plus a half-time ETC</td>
<td>Provides in-house vanpool matching services; vanpool development and operating assistance, including major financial assistance, such as employer purchase of vans with favorable leaseback (or alternative continuing subsidy, such as free maintenance, free insurance) in addition to startup subsidy; several additional incentives such as van washing, guaranteed ride home, and a full-time ETC and/or personalized vanpool candidate get-togethers.</td>
</tr>
<tr>
<td>Transit Support Programs</td>
<td>Provides a transit information center plus a quarter-time ETC</td>
<td>Provides a transit information center and a policy of work hours flexibility to accommodate transit schedules/delays, plus a quarter-time ETC</td>
<td>Provides a transit information center and a policy of work hours flexibility, on-site transit pass sales, plus a half-time transportation ETC</td>
<td>Provides a transit information center and a policy of work hours flexibility, on-site transit pass sales, guaranteed ride home, and a full-time ETC</td>
</tr>
</tbody>
</table>

26
<table>
<thead>
<tr>
<th>Program</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicycle Support Programs</td>
<td>Provides on-site bicycle parking (racks or lockers).</td>
<td>Provides bicycle parking (racks or lockers) and shower facilities</td>
<td>Provides secure bicycle parking (storage lockers or indoor storage) and shower facilities, in conjunction with local infrastructure conducive to bicycling. This includes the presence of (a) off-street bike paths, (b) on-street bike lanes, and/or (c) local streets with light traffic by which cyclists can access the workplace</td>
<td>Provides parking, shower, and infrastructure conditions as for Level 3, and also sponsoring workplace promotional activities. These activities should include promoting bicycle commuting, identifying the availability and location of parking and shower facilities, and providing local bicycle route maps, along with other activities to encourage bicycle commuting</td>
</tr>
</tbody>
</table>

The appendix contains screen captures showing the process of using the COMMUTER Model and the output obtained.

**Business Benefits Calculator**

EPA’s Business Benefits Calculator (BBC) is an online tool available on the EPA’s Commuter Choice website (www.commuterchoice.gov). The purpose of the tool is to assess the benefits and costs of TDM programs to the employer, employees and community. It is also a means for determining if the employer qualifies for the National Standard of Excellence (i.e., Commuter Choice Leadership Initiative), a program intended to brand employers in the country as among the best workplaces in the country for commuters.

Similar to other tools, BBC obtains information about the worksite such as state and location within their urban area (e.g., downtown, suburbs) and the organizational structure (See Figures 3 and 4). Since the qualified transportation fringe benefit option (Section 132(f) of the Internal Revenue Code) can reduce the taxes paid by employers, information about their corporate income tax classification is obtained.
Figure 2. Business Benefits Calculator Welcome Screen.

Figure 3. Business Benefits Calculator Input Employer Information Screen.
Similarly, employees may also received reductions in payroll taxes for participating in either pre-tax and/or transit/vanpool subsidy program. Information is collected about the average employee salary and the share of employees who make less than $84,900. The $84,900 per year was the limit where the federal government stops collecting FICA from employees and the matching by employers. In May 2003, the limit was raised to $87,000, retroactive to January.

One of the limiting factors of this tool is need to use average salaries. The distribution of salaries may yield different benefits for employers with the same number of employees and same total payroll (e.g., Company A with a few highly paid employees with numerous low-paid employees versus Company B with a lower standard deviation).

Parking costs are a major factor in mode choice decisions by employees. The BBC seeks to identify the amount, form of payment (e.g., pre-tax or not), and the level of employer subsidy. Changes to the cost of parking, for example, are used in the COMMUTER Model to calculate changes in mode choice. BBC developers estimated changes in travel – and parking – behavior for the BBC using the COMMUTER Model. The BBC look-up tables were based on the evaluation of ten strategies for three types of locations (CBD, urban, and suburban). In addition, two financial incentive strategies (transit/vanpool benefits and parking cash out) were analyzed in $10 increments up to $100 per month. For inclusion into the BBC, the impacts were reported for total vehicle trip reductions, as well as transit/vanpool increase (used to calculate total taking advantage of transit/vanpool benefits) and bicycle/pedestrian increase.17

![Business Benefits Calculator Input Employer Information Screen.](image)

17 Personal communication. Michael Grant, ICF Consulting
Employers must select at least one primary benefit options and at least three supporting benefit options in order to meet the National Standard of Excellence in commuter benefits and qualify for the Commuter Choice Leadership Initiative (CCLI). Employers must also offer access to a Guaranteed Ride Home program and meet a 14% target for the share of employees that do not drive alone to work to qualify as a CCLI employer. The next entry screen (Figures 5 and 6) is designed to allow the employer to pick strategies to implement as well as inform them of the requirements of CCLI.

The required benefits to meet National Standard of Excellence are:

- Guaranteed ride home
- Employer-paid Transit/Vanpool Benefits where the employer provides at least $30 per month in benefits or the full value of commuting costs
- Parking Cash Out where the employer provides the option of cash instead of parking. CCLI requires the employer to offer at least $30 per month and at least 75% of the actual saved costs of parking to classify this option as a primary benefit.
- Telecommuting as a primary benefit requires the employer to meet or exceed a 6% average participation rate as expressed as the percent of employees telecommuting on an average day (e.g., 10% of employees who telecommute an average of 2 days per week would not meet the standard)
- Employer-defined Benefit Program is a designed to allow employers to suggest that other strategies allow them to achieve the standards. Employers must achieve demonstrable benefits the Federal Commuter Choice Team must agree if this option is to qualify as the primary benefit.
Figure 5. Business Benefits Calculator – Select Benefits Screen.

Figure 6. Business Benefits Calculator – Select Benefits Screen (cont.).
Many of the other traditional TDM programs (e.g., ridematching, preferential parking for carpools) are treated as supporting benefit options for the purposes of CCLI but do contribute to changes in travel behavior. In addition, programs that don’t meet the minimum investment criteria such as employer-paid transit/vanpool benefits where there are less than $30 per month in benefits are treated as supporting programs. If the strategy is selected as a primary benefit, it may not be selected as a supporting program.

The other supporting programs include:

- Ridesharing or carpool matching
- Shuttles from transit stations
- Preferred parking for carpools / vanpools
- Secure bicycle parking, showers and/or lockers
- Financial incentives for bicyclists or walkers

Employers are then asked to estimate participation of employees with the introduction of the new program(s). A range of participation is estimated based on the employer’s own inputs based on values in the COMMUTER Model that are hard-coded into the BBC. These ranges are shown in grayed-out boxes. The employer has the ability to override these values.

Figure 7. Business Benefits Calculator – Participation Estimation Screen.
Based on these inputs, the Business Benefits Calculator estimates how travel behavior would change upon implementing the commuter benefit programs selected by the employer.

However, one of the COMMUTER Model’s and the calculator’s limitations is the assumption that the employer started with no commuter programs. In other words, it treats all of the programs as brand new. Many employers have one or more of these programs in place. If the assumption is made that COMMUTER Model accurately predicts changes in behavior, then the calculations may inflate the benefits. However, the use of ranges of impacts was a reasonable trade-off between simplicity and accuracy (at least accurate in comparison to the same program analyzed in the COMMUTER Model itself).

In recognition of this limitation, the BBC advises organizations that already have a commuter benefit program to use the low end of the range to represent the change in use for a particular mode or strategy. According to the documentation, the estimated range was developed by examining program scenarios for employers in different types of metropolitan areas.

After entering in the above information, the employer can view the results in the form of an easy-to-read summary. The summary provides an overview of the total annual costs and benefits, the direct costs and savings to the employer and employees, facility savings, recruitment and productivity benefits, and community impacts such as the change in emissions.

![Figure 8. Business Benefits Calculator – Results Summary Screen.](image-url)

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### Figure 9. Business Benefits Calculator Input Employer Information Screen.

#### Direct Costs and Savings

<table>
<thead>
<tr>
<th>EMPLOYER COSTS AND BENEFITS</th>
<th>EMPLOYEE BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incentive Costs</td>
<td>Value of Incentives to Employees</td>
</tr>
<tr>
<td>Cost of transit/vanpool benefits ($/year)</td>
<td>$0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Administrative Costs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Program administration time (hours per month)</td>
<td>0</td>
</tr>
<tr>
<td>Annual program administration cost</td>
<td>$2,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment Costs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>One-time cost of home-offices (start-up)</td>
<td>$8,000</td>
</tr>
<tr>
<td>Annualized cost of home-offices</td>
<td>$2,000</td>
</tr>
</tbody>
</table>

| Direct Savings                | none |

#### Potential Facility Savings

<table>
<thead>
<tr>
<th>Parking Cost Savings</th>
<th>Building Space Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected number of parking spaces reduced</td>
<td>9</td>
</tr>
<tr>
<td>Potential Parking Cost Savings ($/Year)</td>
<td>$0</td>
</tr>
<tr>
<td>Reduced Office Space (square feet)</td>
<td>$450</td>
</tr>
<tr>
<td>Potential Building Cost Savings ($/Year)</td>
<td>$6,600</td>
</tr>
</tbody>
</table>

### Figure 10. Business Benefits Calculator Input Employer Information Screen.

#### Recruitment and Productivity Benefits

<table>
<thead>
<tr>
<th>Recruitment Benefits</th>
<th>Increased Worker Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage reduction in employee turnover rate</td>
<td>3%</td>
</tr>
<tr>
<td>Recruitment/Training Cost Savings ($/Year)</td>
<td>$6,000</td>
</tr>
<tr>
<td>Percent change in productivity per employee telecommuting</td>
<td>10%</td>
</tr>
<tr>
<td>Increased Productivity ($/Year)</td>
<td>$0</td>
</tr>
</tbody>
</table>

#### Community Benefits

<table>
<thead>
<tr>
<th>Reduced Traffic</th>
<th>Reduced Urban Air Pollutant Emissions (lbs./year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced commute vehicle trips</td>
<td>4,700</td>
</tr>
<tr>
<td>Reduced commute vehicle mileage</td>
<td>55,000</td>
</tr>
<tr>
<td>Reduced Energy Consumption</td>
<td>2,780</td>
</tr>
<tr>
<td>Reduced barrels of motor fuel consumed</td>
<td>64</td>
</tr>
<tr>
<td>Reduced barrels of crude oil used</td>
<td>11</td>
</tr>
<tr>
<td>Reduced CO (carbon monoxide)</td>
<td>2,400</td>
</tr>
<tr>
<td>Reduced NOx (volatile organic compounds)</td>
<td>250</td>
</tr>
<tr>
<td>Reduced SOx (volatile nitrogen compounds)</td>
<td>250</td>
</tr>
<tr>
<td>Reduced PM-10 (particulate matter)</td>
<td>5</td>
</tr>
<tr>
<td>Reduced SOx (sulfur oxides)</td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reduced Greenhouse Gas Emissions (lbs./year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced CO2 (carbon dioxide)</td>
</tr>
<tr>
<td>Reduced CH4 (methane)</td>
</tr>
<tr>
<td>Reduced N2O (nitrous oxide)</td>
</tr>
</tbody>
</table>

For Details or to Change Assumptions
The aforementioned savings depends on some fundamental assumptions regarding everything from administrative time spent managing the various programs to current gas prices to the dollar value of employee retention. The following summarizes some of the assumptions as documented in the BBC. The next chapter will provide some guidance in refining some of these values (e.g., the cost of turnover) that may significantly increase the benefits calculated by the BBC.

**Administrative Time Estimates**

BBC notes that the time to administer a program can vary considerably depending on employer size and the way programs are administered. For example, the range of time to administer a commuter benefits program (i.e., enroll employees and distribute passes or vouchers) ranged from only hour per month to a full-time position at 40 hours per week. The calculator default is set at 8 hours per month to administer a program with transit/vanpool benefits. Time could be greater or less depending on the number of employees, number of office locations, and whether administration is outsourced. The calculator default value for administering other TDM programs is set at 4 hours per month though geographic and organizational factors will also affect this value.

**Employee Gas and Auto Maintenance Cost Savings**

Multiplying the average cost of driving per mile by the expected number of miles reduced by employees results in the reduction in driving expenses among employees. Estimated gasoline costs and other vehicle operating-related costs (oil, maintenance, tires, and per-mile vehicle depreciation) are used to calculate the per-mile driving costs. Vehicle ownership costs, such as vehicle financing, insurance, license, registration, taxes, and annual depreciation are not included in this figure.

**Parking Cost Savings**

The expected reduction in employees driving to work daily multiplied by the average cost per space is used to calculate the parking savings. BBC adds “Since [employer-paid] parking expenses are deducted from corporate income [as a business expense] when calculating corporate income taxes, when an employer reduces parking, it saves the cost of the parking minus the corporate income tax savings associated with the parking space.”

**Office Space Cost Savings**

Office space cost savings are solely attributable to telecommuting by the BBC. Compressed work week programs, for example, are not figured into the savings. The reduction in office space is calculated by multiplying the number of employees who telecommute full-time by the average space used per employee. This figure is then multiplied by the estimated cost per square foot, which the user can change, to estimate

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18 “Strategies for Increasing the Effectiveness of Commuter Benefits Programs” Transit Cooperative Research Program Report 87, Washington DC 2003 p.94-95
total cost savings. Apparently, the BBC does not make any adjustment for deductibility of rental expenses in the calculation of the benefit. The calculator also assumes home-based telework. It does not account for leasing space at telecenters.

**Recruitment/Retention Benefits**

Recruitment and training costs per employee are estimated at one-third of the average reported salary. The next chapter will provide a means of estimating the average cost of turnover. Generally, the costs of turnover approximate the annual cost of the departing employee. The calculator assumes a reduction in turnover from 1 to 3 percent depending on programs selected though the direct relationship between given strategies is not well-established.

**Increased worker productivity**

The BBC assumes productivity increases around 10 to 20 percent based on studies of telecommuting. Some employers may be skeptical of the productivity benefits of telecommuting since there are also some potential losses in productivity due to reduced personal interaction with co-workers.

Based on these findings, the calculator uses a default value of 10 percent productivity improvement for full-time telecommuters. The calculator assumes no productivity improvement with other commuter benefits since empirical data on these effects are not available.

**Reduced Vehicle Miles of Travel**

The number of vehicle miles reduced is calculated by multiplying the estimated number of vehicle trips reduced by the average vehicle trip length.

**Reduced Fuel Consumption**

Fuel consumption is calculated by dividing the number of vehicle miles traveled by the average miles per gallon of the U.S. fleet, 20.4 miles per gallon.

**Reduced Urban Air Pollutant Emissions and Reduced Greenhouse Gas Emissions**

Air pollutant emissions are estimated by multiplying the number of vehicle miles reduced by emission factors (in grams per mile) that represent national fleet averages. Actual emission reductions would vary based on location due to temperature, fuel standards, and the mix of the vehicle fleet, among other factors.

Carbon dioxide emissions are calculated by multiplying fuel consumption by factors to estimate carbon dioxide. Other greenhouse gas emissions are estimated by multiplying the number of vehicle miles reduced by emission factors that represent national fleet averages.
Commuter Choice Decision Support System

One of the newest tools is the Commuter Choice Decision Support System (CCDSS) [http://www.ops.fhwa.dot.gov/PrimerDSS/index.htm](http://www.ops.fhwa.dot.gov/PrimerDSS/index.htm) by the Federal Highway Administration. As stated in the companion document, this tool is targeted to “Employers that are trying to determine if a commuter program would be worthwhile for their site can use the CCDSS to determine potential benefits of a specific program. An employer who has already decided to start a program but is not sure what options to implement can use the CCDSS. By entering information about the worksite into the CCDSS, employers can obtain recommendations on specific strategies that may work best for their situation.”19

The CCDSS recommends commute options “most appropriate” for the employer’s needs, provides tips on how to get started and offers examples of effective strategies. This program advisor uses a simple checklist approach to gather information on employer motivations for implementing a TDM program, worksite characteristics and level of management support to recommend the top 5 options for the employer to implement from the following list:

1. Advanced route planning
2. Alternative work schedules
3. Bicycling and walking programs
4. Carpooling incentives
5. Financial incentives
6. Flexible work hours for employees
7. Live near your work programs
8. On-site employee services
9. Parking management
10. Real-time commuter services
11. Teleworking options for employees
12. Transit options and incentives
13. Vanpooling incentives
14. Worksite location and design

No impacts (e.g., benefits accrued to business or vehicle trips reduced) are calculated by CCDSS. It is intended to quickly point the employer to the strategies that would appear to make the most sense for the employer based on the issues identified by the employer and their self-reported situation.

The perceived employer benefits or issues listed in CCDSS are:

1. Improve ability to recruit appropriate employees
2. Increase employee retention / lower employee turnover

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3. Increase employee productivity and reduce tardiness
4. Improve employee morale
5. Ease transition or move to relocated worksite
6. Reduce the need for facility expansion or relocation
7. Reduce the demand for parking
8. Enhance corporate image / be seen as a community leader
9. Reduce operating costs such as parking
10. Reduce tax burden
11. Want to update or enhance emergency preparedness plan
12. Need to comply with environmental or development requirements
13. Improve industry competitiveness

CCDSS recognizes that the unique characteristics of the worksite and organization will affect how employees commute to work. Information is collected with respect to worksite location, level of transit service and congestion frequency. CCDSS probes for information about the access to options such as whether the location is in pedestrian and friendly area. Recognizing the fact that some strategies won’t work without adequate facilities such as clothes lockers, showers, and/or bike storage facilities at the worksite for employees who choose to walk or bike to work. CCDSS also inquires whether there are nearby services where employees can eat, shop, bank, and conduct other personal business during lunch without having to use a personal car.

Based on the experience of the CCDSS developers, the CCDSS implies that the strategies selected should take into account several variables. These variables include the type of employer, the number of employees at the site, distribution of employees around the worksite, the relative mode split (not actual numbers but “most or few”, etc.) and parking situation. Employer policies are also considered such as the work hours at this site for the majority of employees, degree employees require their own vehicle for business, and whether or not the worksite includes jobs that would be feasible to conduct at home or other remote locations.

Finally, the CCDSS inquires as to the relative importance of commuting issues to the organization's management. It queries the employer as to management’s willingness to consider options to encourage employees to participate in a TDM program. For example, employers are asked if management consider purchasing equipment for new services (such as purchasing equipment for employees to work from home, paying for shuttle services, etc.) Provide financial incentives to employees (such as subsidizing the cost of transit passes or vanpool fares, reimbursing costs for employees to set up a home office, etc.)

The CCDSS is an easy to use web tool to quickly identified the strategies deemed most appropriate. As previously stated, it neither calculates the benefits or outcomes from these strategies nor estimates the costs of implementing these strategies.
CUTR_AVR – Worksite Trip Reduction Model

Using the results of research conducted previously for the Florida Department of Transportation, CUTR develop a model to predict change in average vehicle ridership (AVR) and its inverse, vehicle trip reduction (VTR) rate.\textsuperscript{20} Unlike the COMMUTER model, CUTR_AVR was built and validated based actual plans. It used more than 8,000 before and after employer trip reduction plans from Los Angeles, Tucson and Phoenix areas to build the model.\textsuperscript{21}

The model uses mode split information but only requires five incentives even though many others were examined. Picking the right input variables is critical to model development. A good subset of variables can substantially improve the performance of the model. The challenge is finding ways to select a good subset of variables to predict the change in average vehicle ridership while keeping the number input variables to a manageable level. The neural network software used to build the model uses a genetic algorithm that selects the variables. This algorithm is looking for sets of inputs (e.g., site characteristics and incentives) that act in a synergistic manner as good predictors of the output (i.e., change in AVR) rather than predicting the impact of every potential variable. The algorithm begins with population of random variable sets of limited size. As the algorithm progresses, the size of these variable sets will tend to increase if the problem requires larger data sets.

The idea of discarding potential substantial number of variables is sometimes hard to accept. It may seem unrealistic that only five TDM incentives can impact employee choice of how to commute. However, there are plausible reasons for their exclusion by the algorithm.

Some incentives that might seem effective, or even absolutely necessary for an effective TDM program, may not appear as input variables in the model. Some incentives such as marketing materials and Employee Transportation Coordinators (ETCs) were common to most companies in the data used to build the model. Thus their power to explain change in AVR was lost if nearly every plan had such an incentive. However, the fact that these types of incentive were not used in the model does not mean that the tactics aren’t necessary. It is essential that marketing materials and ETCs be put in place to support ongoing TDM programs, to improve awareness and understanding of any of the other incentives. So few companies may have offered other incentives such as facility improvements that it was impossible to accurately determine their impact.

Unlike the COMMUTER Model, CUTR_AVR treats the existence of an employer-provided financial subsidy as a dummy variable – it was either offered or not. One of the

\textsuperscript{20} CUTR_AVR model and users manual are available for download at www.cutr.usf.edu/tdm/download.htm
\textsuperscript{21} Winters, Philip L, Francis Cleland, Mark Burrs, Rafael Perez, and Michael Pietrzyk. “Neural Network Application for Predicting the Impact of Trip Reduction Strategies”. Center for Urban Transportation Research. University of South Florida. Tampa, FL February 1998.
reasons for the treatment of this financial incentive was the lack of information about the incentive contained in the various data sets. In addition, the extent of financial incentives offered by companies was likely constrained by the federal tax code (i.e., employers were less likely to offer more than the nontaxable amount allowed by the Internal Revenue Services. Tax-free transit subsidies were limited to $15 to $21 per month for all plans and any vanpool subsidy was subject to tax prior to 1993. It is assumed that when the variable indicating a financial subsidy is offered that it is at least $15 to $21 per month per employee using the incentive. Subsidies offered for multiply modes (e.g., transit, vanpool, etc.) could be expected to make a larger impact than the same subsidy for a single mode.

The model was used to develop the following table based on employer-provided incentives for a “typical” employer. The mode split for Scenario 1 closely replicates the mode split for Miami-Dade County in 2000.

**Table 7. Vehicle Trip Reduction - Scenario: Company with 200 employees and existing vehicle trip rate of 82.7 vehicles per 100 employees**

(74% drive alone, 14.5% carpools, 5% transit, 1.5% bike, 2% walk and 3% telecommute/compressed work week. 17% commute over 40 minutes)

<table>
<thead>
<tr>
<th>Employer-Provided Incentive</th>
<th>Vehicle Trip Rate Prediction</th>
<th>Change in Vehicle Trip Rate</th>
<th>Total Vehicle Trips Reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher parking cost for people who drive alone</td>
<td>Guaranteed Ride Home</td>
<td>Ridematching</td>
<td>Alternative Mode Subsidies</td>
</tr>
<tr>
<td>1 1 1 1 1</td>
<td>78.7</td>
<td>4.0</td>
<td>8.1</td>
</tr>
<tr>
<td>1 0 1 1 1</td>
<td>79.1</td>
<td>3.7</td>
<td>7.3</td>
</tr>
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<td>1 1 1 0 1</td>
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<td>6.4</td>
</tr>
<tr>
<td>1 1 0 0 1</td>
<td>79.5</td>
<td>3.2</td>
<td>6.4</td>
</tr>
<tr>
<td>1 1 1 0 0</td>
<td>79.6</td>
<td>3.2</td>
<td>6.3</td>
</tr>
<tr>
<td>1 0 0 1 0</td>
<td>79.7</td>
<td>3.1</td>
<td>6.2</td>
</tr>
<tr>
<td>1 1 0 0 0</td>
<td>79.8</td>
<td>3.0</td>
<td>6.1</td>
</tr>
<tr>
<td>0 1 1 1 1</td>
<td>80.7</td>
<td>2.0</td>
<td>4.0</td>
</tr>
<tr>
<td>0 1 1 1 1</td>
<td>81.0</td>
<td>1.7</td>
<td>3.4</td>
</tr>
<tr>
<td>0 1 1 0 1</td>
<td>81.2</td>
<td>1.5</td>
<td>3.1</td>
</tr>
<tr>
<td>0 1 1 0 0</td>
<td>81.2</td>
<td>1.5</td>
<td>3.1</td>
</tr>
</tbody>
</table>
| Employer-Provided Incentive  
(1= Yes, 0=No) |
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher parking cost for people who drive alone</td>
</tr>
<tr>
<td>------------------------------</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

Each of the above tools from the COMMUTER Model through CUR_AVR bring strengths and weaknesses as tools for estimating the impacts of TDM programs. The following chapter will provide guidance on how to estimate the costs of various strategies not adequately addressed in the aforementioned models or tools.
Chapter 3 Methodologies for Quantifying Select Business Benefits

The first chapter described the major factors that can benefit businesses (i.e., affect the profitability of the business). It also identified the business benefits often attributed to one or more TDM strategies. The Chapter Two described several tools to measure the transportation and air quality benefits of employer TDM programs (e.g., EPA’s Commuter Model). This chapter describes how to calculate select business benefits frequently cited but largely unmeasured as being associated with TDM.

While there are a variety of methods and tools for estimating impacts of TDM on vehicle trips and emissions, there is no standardized approach for measuring business benefits, in an acceptably rigorous manner. The methods used by business to estimate the costs of turnover, for example, are far less known to the public transit and TDM research communities. This chapter will provide information on how to measure the costs of turnover, absenteeism, and parking. A general introduction to a particular cost as well as available information as the current extent of use or cost will be provided. By providing detailed methods for calculating the cost or savings, the human-cost approach can be used which examines the rates and costs before the intervention is offered and comparing those rates to rates measured after the intervention is provided.

It also includes a method of calculating the savings accruing to employees and businesses for participating in the qualified transportation fringe benefit program. The detailed methods are accompanied with look-up tables to allow for quick estimates of the costs to business under a variety of scenarios.

Business Benefit: Reduction in Costs of Turnover

An organization’s success depends increasingly on its ability to attract and retain employees. The need for good employees is one constant shared by all types of organizations. Businesses invest substantial resources in recruiting employees, training to improve performance and creating opportunities for continuing growth. The loss of employees or turnover can increase direct and indirect costs to the business and, therefore, consume resources. TDM strategies such as compressed workweeks, transit subsidies and teleworking are examples of TDM strategies that can decrease turnover and attract a large pool of candidates.

Changing jobs happens quite frequently. In August 2002, the Bureau of Labor Statistics examined the number of jobs that people born in the years 1957 to 1964 held from age 18 to age 36. These younger baby boomers held an average of 9.6 jobs from ages 18 to 36. BLS defined a job as an uninterrupted period of work with a particular employer. Men
held an average of 9.9 jobs and women held 9.3 jobs. Both men and women held more jobs on average in their late teens and early twenties than they held in their mid thirties.  

Regardless of the amount of turnover that occurs, the need to attract qualified labor is not a trivial matter and will be an increasingly difficult challenge for more businesses in the near future as the labor pool and mix continues to change. Between 2000 and 2010, total employment is projected to increase by 15 percent, slightly less than the 17 percent growth during the previous decade. For the period covering 2000-2010, BLS projects a 1.1 percent growth rate in the labor force, the same rate as in 1990-2000. However, there will be changes in the mix. For example, the 55 and older cohort will grow 3.9 percent while the 25-54 will only grow at 0.5 and the 16 to 24 will grow at 1.4. The rate of growth of women in the labor force is expected to slow, but it will still increase at a faster rate than that of men.  

With competition for qualified employees expected to increase and the mix, strategies to attract the best candidates and to reduce employee turnover will come under more scrutiny by businesses.

One indicator that businesses see the need to be more competitive is the growing diversity of the benefit package from retirement and health benefits to subsidized commuting and flexible work place programs.


<table>
<thead>
<tr>
<th>Benefit</th>
<th>1999</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retirement benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Defined benefit</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>Defined contribution</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>Health Care Benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical care</td>
<td>53</td>
<td>52</td>
</tr>
<tr>
<td>Dental care</td>
<td>32</td>
<td>29</td>
</tr>
<tr>
<td>Vision care</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>Survivor Benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life insurance</td>
<td>56</td>
<td>54</td>
</tr>
<tr>
<td>Accidental death and dismemberment</td>
<td>43</td>
<td>41</td>
</tr>
<tr>
<td>Survivor income benefits</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Disability Benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paid sick leave</td>
<td>53</td>
<td>NA</td>
</tr>
<tr>
<td>Short-term disability</td>
<td>36</td>
<td>34</td>
</tr>
<tr>
<td>Long-term disability</td>
<td>25</td>
<td>26</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Benefit</th>
<th>1999</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paid Time Off</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paid vacations</td>
<td>79</td>
<td>80</td>
</tr>
<tr>
<td>Paid holidays</td>
<td>75</td>
<td>77</td>
</tr>
<tr>
<td>Employer Assistance for Child Care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Employer-provided funds</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>On-site child care</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Off-site child care</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Adoption assistance</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Long-term Care Insurance</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Flexible Work Place</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Non-Wage Cash Payments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonproduction bonus</td>
<td>42</td>
<td>48</td>
</tr>
<tr>
<td>Supplemental unemployment benefits</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Severance pay</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>Subsidized Commuting</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Section 125 Cafeteria Benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>NA</td>
</tr>
<tr>
<td>Flexible benefit plans</td>
<td>7</td>
<td>NA</td>
</tr>
<tr>
<td>Reimbursement plans</td>
<td>15</td>
<td>NA</td>
</tr>
<tr>
<td>Premium conversion plans</td>
<td>6</td>
<td>NA</td>
</tr>
<tr>
<td>Education Assistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work-related</td>
<td>NA</td>
<td>38</td>
</tr>
<tr>
<td>Non-work related</td>
<td>NA</td>
<td>9</td>
</tr>
<tr>
<td>Travel Accident Insurance</td>
<td>NA</td>
<td>15</td>
</tr>
<tr>
<td>Health Promotion Benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wellness programs</td>
<td>NA</td>
<td>18</td>
</tr>
<tr>
<td>Fitness centers</td>
<td>NA</td>
<td>9</td>
</tr>
</tbody>
</table>

The Bureau of Labor Statistics is tracking the growth of some TDM-related benefits such as working from home. BLS tracks “flexible work place” as a formal program that allows employees who would otherwise work at the establishment to work either some or their entire work schedule at home. The following table captures the proliferation of portable technologies (laptops, cell phones, wireless connections, etc.) that is allowing more professional and technical members of the workforce to literally work anywhere at any time.
Table 9. Flexible Work Place Trends for Medium and Large Private Employers.

<table>
<thead>
<tr>
<th></th>
<th>All Employees</th>
<th>Professional, technical and related</th>
<th>Clerical and sales employees</th>
<th>Blue-collar and service employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1997</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td>1999</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2000</td>
<td>5</td>
<td>12</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

An organization’s success depends increasingly on its ability to attract and retain employees. Businesses invest substantial resources in recruiting employees, training to improve performance and creating opportunities for continuing growth. The loss of employees or “turnover” can increase direct and indirect costs and, therefore, the need for additional resources.

The purpose of this section is to identify the positive and negative consequences of employee turnover on the individual, work group, and organization. With an understanding of the consequences, TDM agencies will be better equipped to identify linkages between business problems and TDM strategies.

In introduction to the terminology is in order. Employee turnover is the rate of employee movement into and out of the organization over a given period. There are two types of movements: additions and separations. There also are two types of separations: voluntary (employee-initiated) and other (firing, death, retirement). Voluntary separations can be further classified as avoidable or unavoidable separations. Unavoidable separations are those that the company has no control such as the job transfer of a spouse. Avoidable separations are those that the company could have prevented in some manner. Raising the pay of an employee who has another job offer or providing a transportation allowance for

Case Study: Marriott Worldwide Reservations Center

According to David Barwick, Human Resources Manager for Marriott Worldwide Reservations Center, 40 percent of potential recruits could not be hired due to personal transportation challenges. Efforts to improve transportation included coordinating transit schedules with MWRC’s primary day shift, adding a Cobb County (Georgia) Transit bus to an existing route to accommodate late-shift workers, and extending service from 10 p.m. to 11 p.m. MWRC also enrolled in Cumberland Transportation Network’s TransAdvantage program for discounted bus and rail passes. Ridematching helped put over 270 workers in carpools. MWRC also offers Guaranteed Ride Home, preferential work schedules, and vacation time as incentives to use alternative transportation. As a result, MWRC’s turnover decreased 87 percent, saving the company $200,000 in 1998. The transportation program allowed them to expand from 90 employees to over 300 employees in two years.
employees who work in a high cost area are examples of prevention techniques to address avoidable separations.

Regardless of the reason, the loss of an employee can have positive and negative consequences on the individual and organization. Potential moderating circumstances can affect the nature and extent of the consequence including the cost of turnover. For example, some jobs, especially those with a high degree of customer-contact or those at the policy-setting level, can have a significant productivity and cost impacts throughout the organization. Other jobs such as those in the fast food service industry with predictable levels of turnover or limited customer contact can be replaced with less impact.

There are numerous possible consequences facing the individual who leaves the job, each with potential moderating factors. On the positive side of leaving the job, the individual may benefit economically and/or advance a career. They also may change jobs to move closer to their current residence or seek other employment when a company relocates from one part of town to another. For the departing employee, there may be negative consequences, too. When changing a job, the individual may lose seniority and benefits such as free parking or flexible work hours. The key moderating variable for these outcomes is the difference between the jobs.

Employees who remain behind after another employee departs can also benefit. For example, the opening may create a new opportunity for advancement or improved morale. Table 10 lists some of the positive and negative consequences associated with turnover for “leavers” and “stayers”.
Table 10. Consequences of Turnover for Individuals.  

<table>
<thead>
<tr>
<th>Level of analysis</th>
<th>Possible Consequences</th>
<th>Potential moderating variables</th>
</tr>
</thead>
</table>
| Leavers           | Positive              | Negative                       | 1. Tenure  
|                   | Increased earnings (2,4) | Loss of seniority (1) | 2. Labor market  
|                   | Career advancement (2,4) | Loss of nonvested benefits (1) | 3. Family status  
|                   | Improved individual-job match (6) | Unreimbursed moving costs (2,6) | 4. Job skills/abilities  
|                   | Increased challenge (6) | Disruption of family (3,6) | 5. Social involvement in work  
|                   | Self-development (6) | Transition stress (3,6) | 6. Characteristics of old versus new job  
|                   | Nonwork benefits (e.g., geographic location) (6) | Loss of friendships (5) |  |
|                   | Increased family ties (3,6) | Decreased family ties (3,6) |  |
|                   | New social relationships (5) |                              |  |
|                   | Enhanced commitment to new job and organization (6) |                              |  |
|                   | Opportunities for promotion (8,9) | Increased workload (3,5,6,9) | 1. Beliefs about why others leave  
|                   | More positive job attitudes (1,4,7,9) | Decreased performance (3,5,6,9) | 2. Social relationship to leavers  
|                   | Increased performance (3,5) | Stress and uncertainty (6,9) | 3. Task interdependence  
|                   | Stimulation at work (2,9) | Less positive job attitudes (1,4) | 4. Status of leaver  
|                   | Initiation of search that results in better job (1,6,7) | Loss of friendships (2) | 5. Performance of leaver  
|                   |                          |                              | 6. Job market conditions  
|                   |                          |                              | 7. Career orientation of stayer  
|                   |                          |                              | 8. Level in organization of leaver  
|                   |                          |                              | 9. Organization promotion policies |

*The numbers following each consequence refer to potential moderating variables thought to be most closely associated with that consequence.

Ultimately, the consequences of turnover are borne by the organization. Increased effectiveness of the individual and work group translates into increased productivity and profits. At the same time, the social costs of turnover disrupt the organization's cohesiveness. Possible positive consequences arising from employee turnover on the

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organization could include increased effectiveness, new skills and abilities, and decreased conflict among employers. At the same time, disruption of the work flow to cover for departing employee and inefficiencies related to the new hire can negatively impact the organization.

If current labor market conditions make it a "buyers" market - the demand for jobs exceeds the supply then the duration and severity of the impact may not be severe. The same can be said for organizations with a strong program of advancement and a broad internal pool from which to draw replacement employees. Issues such as the difficulty of replacing the employee and characteristics of the replacement are moderating variables.

Given that there are potential benefits of turnover, why should companies worry about finding replacement workers? There are five major problems associated with new employees can be quite costly to the organization:

- Lost or dissatisfied customers
- Mistakes made and the time and expenses to correct them
- Fraud
- Shortages
- Higher overhead costs

For example, it isn't unusual to find new employees made 80 percent of the errors. High turnover, therefore, means more errors and more resources allocated to fixing the errors.

The cost of turnover can be surprising to some. Many employers think they miscalculated when they find turnover costs of $30,000 per employee. Even though the cost can be quite high, employers may not know the cost of employee turnover because it rarely shows up as a budget line item. Its costs are distributed all along the chain. As the first chapter explains, the direct costs often are only the tip of the iceberg. Employers find most of the costs are contained in the indirect costs. One of the keys to positioning TDM strategies as potential solutions to business problems is understanding the components of turnover and providing a basis for employers to evaluate the potential impact of those strategies. Employers then can measure the costs before an intervention (e.g., transit pass subsidy) is offered and compare those cost to those measured after the intervention is provided.

There are nine components that contribute to the cost of turnover:

1. Inefficiency of the Departing Employee
2. Inefficiency of those closely associated with departing employee
3. Inefficiency of position being filled while vacant
4. Out-of-pocket processing costs
5. Human resources department processing costs
6. Processing costs of other departments
7. Relocation costs (prorated across all hires)
8. Incoming employee inefficiency
9. Inefficiency of those closely associated with incoming employee

The following nine tables illustrate a process for calculating the cost of turnover. The values in the shaded boxes are the inputs required to estimate the cost though the actual values will vary. Table 21 totals the nine elements.

**Table 11. Departing Employee Inefficiency.**

<table>
<thead>
<tr>
<th>Efficiency Level</th>
<th>Weeks Operating at Given Efficiency Level</th>
<th>Average Efficiency</th>
<th>Weeks of Full Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-75%</td>
<td>2.00</td>
<td>87.5%</td>
<td>1.75</td>
</tr>
<tr>
<td>75-50%</td>
<td>1.00</td>
<td>62.5%</td>
<td>0.63</td>
</tr>
<tr>
<td>50-25%</td>
<td>0.50</td>
<td>37.5%</td>
<td>0.19</td>
</tr>
<tr>
<td>25-0%</td>
<td>0.50</td>
<td>12.5%</td>
<td>0.06</td>
</tr>
<tr>
<td>Cumulative Weeks</td>
<td>4.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average number of weeks per month</td>
<td>4.33</td>
<td>4.33</td>
<td></td>
</tr>
<tr>
<td>Equivalent Months (Cumulative weeks/weeks per month)</td>
<td>0.92</td>
<td>0.66</td>
<td></td>
</tr>
</tbody>
</table>

**Table 12. Incoming Employee Inefficiency.**

<table>
<thead>
<tr>
<th>Efficiency Level</th>
<th>Months Operating at Given Efficiency Level</th>
<th>Average Efficiency</th>
<th>Weighted Months of Full Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25%</td>
<td>1.7</td>
<td>12.5%</td>
<td>0.21</td>
</tr>
<tr>
<td>25-50%</td>
<td>1.9</td>
<td>37.5%</td>
<td>0.71</td>
</tr>
<tr>
<td>50-75%</td>
<td>3.5</td>
<td>62.5%</td>
<td>2.19</td>
</tr>
<tr>
<td>75-100%</td>
<td>4.8</td>
<td>87.5%</td>
<td>4.20</td>
</tr>
<tr>
<td>Total Months</td>
<td>11.9</td>
<td></td>
<td>7.31</td>
</tr>
</tbody>
</table>
Table 13. Costs of Turnover – Inefficiency of the Departing Employee.

<table>
<thead>
<tr>
<th>Months before employee departs</th>
<th>sum(a) = 0.92</th>
</tr>
</thead>
<tbody>
<tr>
<td>Months of full productivity before employee departs</td>
<td>Sum(c) = 0.66</td>
</tr>
<tr>
<td>Value of lost productivity before employee departs</td>
<td>sum(a) – sum(c) = 0.27</td>
</tr>
<tr>
<td></td>
<td>$3,300</td>
</tr>
<tr>
<td></td>
<td>$881</td>
</tr>
</tbody>
</table>

Table 14. Costs of Turnover – Inefficiency of the Position Being Filled While Vacant.

<table>
<thead>
<tr>
<th>Efficiency Sacrificed while Vacant</th>
<th>Weeks Until Position Filled</th>
<th>Weekly Salary and benefits of Vacant Position</th>
<th>Total Value of Inefficiency of Position Being Filled While Vacant</th>
</tr>
</thead>
<tbody>
<tr>
<td>q</td>
<td>r</td>
<td>s = h/(52/12)</td>
<td>t = q x r x s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>y = u x v x w</td>
<td></td>
</tr>
<tr>
<td>Position efficiency sacrificed while vacant</td>
<td>67%</td>
<td>10</td>
<td>$762</td>
</tr>
<tr>
<td>Coverage for Vacant Position (Regular Hours)</td>
<td>u</td>
<td>v = r</td>
<td>w = m/(20 x 8)</td>
</tr>
<tr>
<td>Supervisor</td>
<td>2</td>
<td>10</td>
<td>$31.25</td>
</tr>
<tr>
<td>Staff</td>
<td>10</td>
<td>10</td>
<td>$17.50</td>
</tr>
<tr>
<td>Support Staff</td>
<td>10</td>
<td>10</td>
<td>$9.38</td>
</tr>
<tr>
<td>Coverage for Vacant Position (Overtime Hours) (assume paid at 1.5 hours for every 1 hour overtime)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff</td>
<td>1</td>
<td>10</td>
<td>$26.25</td>
</tr>
<tr>
<td>Support Staff</td>
<td>2</td>
<td>10</td>
<td>$14.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$8,959</td>
</tr>
</tbody>
</table>
Table 15. Costs of Turnover – Out-of-Pocket Processing Hiring Costs.

<table>
<thead>
<tr>
<th></th>
<th>Direct Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$z</td>
</tr>
<tr>
<td>Agency search fees</td>
<td>$ -</td>
</tr>
<tr>
<td>Outplacement fees</td>
<td>$ -</td>
</tr>
<tr>
<td>Advertising costs</td>
<td>$ 500</td>
</tr>
<tr>
<td>Travel costs for recruiters and candidates</td>
<td>$ 750</td>
</tr>
<tr>
<td>Other</td>
<td>$ 125</td>
</tr>
<tr>
<td>Total</td>
<td>$ 1,375</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Percent HR Dept Effort</th>
<th>Annual department salaries, wages, benefits and expenses</th>
<th>Number of total hires</th>
<th>Total Human Resource Dept. Processing Costs Per Hire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing incoming and departing employees</td>
<td>25%</td>
<td>$100,000</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 17. Costs of Turnover – Human Resource Department Processing Costs.

<table>
<thead>
<tr>
<th>Processing a replacement</th>
<th>Hours</th>
<th>Hourly Salary and Benefits</th>
<th>Total Processing Costs Per Hire - Other Departments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>hh</td>
<td>$Jj = z</td>
<td>$kk = hh \times jj</td>
</tr>
<tr>
<td>Hiring supervisor</td>
<td>40</td>
<td>$31.25</td>
<td>$1,250.00</td>
</tr>
<tr>
<td>Exempt staff</td>
<td>20</td>
<td>$17.50</td>
<td>$350.00</td>
</tr>
<tr>
<td>Nonexempt staff</td>
<td>16</td>
<td>$9.38</td>
<td>$150.00</td>
</tr>
</tbody>
</table>


Table 18. Costs of Turnover – Relocation Costs.

<table>
<thead>
<tr>
<th>Average cost of relocation</th>
<th>Percent of hires relocated</th>
<th>Total Relocation Costs per New Hire</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Mm</td>
<td>$nn</td>
<td>$pp = Mm x nn</td>
</tr>
<tr>
<td>Moving costs, temporary quarters, etc.</td>
<td>10%</td>
<td>$800.00</td>
</tr>
</tbody>
</table>

Table 19. Costs of Turnover – Inefficiency of the Incoming Employee.

<table>
<thead>
<tr>
<th>Months</th>
<th>Monthly Salary and benefits of Incoming Employee</th>
<th>Value of Lost Productivity Due to the Inefficiency of the Incoming Employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>$qq = 12 - f</td>
<td>$rr</td>
<td>$s = qq x rr</td>
</tr>
<tr>
<td>Lost productivity due to learning curve</td>
<td>4.69</td>
<td>$3,000</td>
</tr>
</tbody>
</table>

Table 20. Costs of Turnover – Inefficiency of Those Closely Associated with Incoming Employee.

<table>
<thead>
<tr>
<th>Those Closely Associated with Incoming Employee</th>
<th>Percent of time spent help incoming employee reach full efficiency</th>
<th>Monthly salary and benefits</th>
<th>Total Months Worked Until New Hire at Full Efficiency</th>
<th>Cost of Inefficiency Associated with Incoming Employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor</td>
<td>11%</td>
<td>$5,000</td>
<td>11.9</td>
<td>$6,545</td>
</tr>
<tr>
<td>Staff</td>
<td>11%</td>
<td>$2,800</td>
<td>11.9</td>
<td>$3,665</td>
</tr>
<tr>
<td>Support Staff</td>
<td>8%</td>
<td>$1,500</td>
<td>11.9</td>
<td>$1,428</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$11,638</td>
</tr>
</tbody>
</table>
Table 21. Total Costs of Turnover.

<table>
<thead>
<tr>
<th>Source of Cost</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inefficiency of the Departing Employee</td>
<td>$ 881</td>
</tr>
<tr>
<td>Inefficiency of those closely associated with departing employee</td>
<td>$ 558</td>
</tr>
<tr>
<td>Inefficiency of position being filled while vacant</td>
<td>$ 8,959</td>
</tr>
<tr>
<td>Out-of-pocket processing costs</td>
<td>$ 1,375</td>
</tr>
<tr>
<td>Human resources department processing costs</td>
<td>$ 1,667</td>
</tr>
<tr>
<td>Processing costs of other departments</td>
<td>$ 1,750</td>
</tr>
<tr>
<td>Relocation costs (prorated across all hires)</td>
<td>$ 800</td>
</tr>
<tr>
<td>Incoming employee inefficiency</td>
<td>$ 14,063</td>
</tr>
<tr>
<td>Inefficiency of those closely associated with incoming employee</td>
<td>$ 11,638</td>
</tr>
<tr>
<td><strong>Total cost of turnover</strong></td>
<td><strong>$ 41,690</strong></td>
</tr>
<tr>
<td>Average salary and benefits of position being filled</td>
<td>$ 39,600</td>
</tr>
<tr>
<td>Ratio of cost of turnover to Average salary of position being filled</td>
<td>105%</td>
</tr>
</tbody>
</table>

After estimating costs, employers can compare these costs to investment in strategies to reduce turnover. Table 22 shows data about the cost of turnover that can be used to estimate the “breakeven” point, expressed in terms of the number of employees retained by the employer. Assume the average cost per turnover was $40,000 and the average salary and benefits of the employee was also $40,000. The employer would recoup its investment of $100,000 (or $100 per month for 83 employees) in 12 months by reducing the number of employees leaving by five.

22. Employee Retention Required Per $100,000 Investment with a 12 month Payback.

<table>
<thead>
<tr>
<th>Annual Salary of Employee to Be Replaced</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20,000</td>
<td>40</td>
<td>20</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>$30,000</td>
<td>27</td>
<td>13</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>$40,000</td>
<td>20</td>
<td>10</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>$50,000</td>
<td>16</td>
<td>8</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>


Of course, there is no assurance that a particular intervention such as the introduction of a telework program or the inclusion of a day care center will reduce turnover by such an amount. The above example does place the investments in the context of the business
objective – reducing turnover. Additional research is needed on the linkage between TDM and business benefits. Until then the question remains whether TDM agencies can actually have a substantial impact on these organizational variables through changes in either employer TDM policies or the incentives.

Any program of turnover control, including TDM strategies aimed at reducing turnover, must begin with accurate data on employee separations. Only with such information is management able to:

- Determine whether the rate of turnover is cause for concern, particularly by comparing data with national or industry averages.
- Identify major causes of employee separations, with special emphasis on avoidable separations and absences.
- Carry out measures for reducing the rate of turnover.

Exit interviews with employees or internal surveys are methods used by companies to identifying the major causes of employee separations. TDM agencies can encourage employers to include commuting-related issues in such exit interviews. For example, issues such as the price, availability or location of parking may be major concerns for a downtown employer. Strategies such as preferential treatment of carpools in assigning spaces may be a low cost way for reducing turnover. Long travel times or the quality and/or lack of transit service may be other issues employers may wish to examine, especially employers planning to relocate. These concerns may contribute to an employee's decision to leave.
Business Benefit: Reducing the Costs of Absenteeism

Absenteeism and lateness are two of the most costly and disruptive employee problems faced daily by all business operations. Employee absenteeism occurs when an employee fails to report for work as scheduled. Organizations may classify absences as “excused” and “unexcused”. Organizational policies communicate the acceptable norms from the organization to the employees. To provide a sense of the extent of the problem, the following tables provides information about the absence and lost work time rates for various occupations.


<table>
<thead>
<tr>
<th>Occupation</th>
<th>Total Employed (000)</th>
<th>Absence rate(a)</th>
<th>Lost work time rate(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>Illness or injury</td>
</tr>
<tr>
<td>Managerial and professional specialty</td>
<td>32,231</td>
<td>2.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Executive, admin. and managerial</td>
<td>15,881</td>
<td>2.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Professional specialty</td>
<td>16,350</td>
<td>3.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Technical, sales, and administrative support</td>
<td>28,047</td>
<td>4.0</td>
<td>2.7</td>
</tr>
<tr>
<td>Technicians and related support</td>
<td>3,755</td>
<td>4.1</td>
<td>2.9</td>
</tr>
<tr>
<td>Sales occupations</td>
<td>10,128</td>
<td>3.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Administrative support, including clerical</td>
<td>3,755</td>
<td>4.1</td>
<td>2.9</td>
</tr>
<tr>
<td>Service occupations</td>
<td>11,034</td>
<td>4.2</td>
<td>3.0</td>
</tr>
<tr>
<td>Precision production, craft, and repair</td>
<td>12,006</td>
<td>3.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Operators, fabricators, and laborers</td>
<td>14,685</td>
<td>4.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Farming, forestry, and fishing</td>
<td>1,505</td>
<td>2.6</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Source: Bureau of Labor Statistics

---

a. Absences are defined as instances when persons who usually work 35 or more hours a week worked less than 35 hours during the reference week for one of the following reasons: Own illness, injury, or medical problems; child-care problems; other family or personal obligations; civic or military duty; and maternity or paternity leave. Excluded are situations in which work was missed due to vacation or personal days, holiday, labor dispute, and other reasons. For multiple jobholders, absence data refer only to work missed at their main jobs. The absence rate is the ratio of workers with absences to total full-time wage and salary employment.

b. Hours absent as a percent of hours usually worked.
According to the Society of Human Resource Managers (SHRM), the three common ways of measuring absenteeism are incidence rate, inactivity rate, and severity rate. The incidence rate is a measure of the number of absences per 100 employees during any given work period. It may be adjusted to reflect a particular group of employees (e.g., employees by shift). The inactivity rate focuses on the share of time that is lost due to absenteeism. The total hours of absence is divided by the total scheduled work hours to calculate the inactivity rate. The severity rate measures the average time lost per absent employee during a specified period. The average number of hours lost by absent employers is divided by the average number of hours normally worked by the employees who are absent to estimate the severity rate.

It, therefore, becomes extremely hard for supervisors and managers to run a productive and efficient operation that runs on schedules based not only on time, but also on a specific number of employees. The cost of lower productivity, scheduling difficulties, overtime costs, lower product quality, damaged or downgraded products, shipping problems, customer service delays, and more cost millions of dollars annually.

According to the 1999 CCH Unscheduled Absence Survey by CCH Inc, Personal illness and family issues tied as the two most common reasons for unscheduled absences, each at 21%, followed by personal needs (20%). Quickly gaining as reasons were stress and entitlement mentality, each accounting for 19% of unscheduled absences. Stress has seen a 316% increase as a reason for absenteeism since 1995.\(^{25}\)

There are numerous challenges in measuring absenteeism or comparing the impacts of various interventions across employers. In order to effectively capture the data, it is necessary to make the time interval of recalling absences correspond to a relevant unit of time according to the work cycle and absence control system. For example, you would ask a teacher how many times s/he was absent within the last semester of a school year rather than over the past year. When unable to determine their relevant unit of time, the time interval must be long enough to allow for reliability but short enough to avoid memory loss. A review of the literature has shown that people begin to estimate instead of enumerate when the recall task is over a couple of months or involves more than a few events. Generally, 3 to 6 months is the suggested time frame, but it should be noted that there are seasonal variations in absence rates.

Perhaps most importantly, one must determine what constitutes absenteeism. Most often it is expressed as total time lost or frequency but some measure percentage of absence, 1-day absences, or frequency of absences.

Fundamentally, the assumption must be made that asking questions about absenteeism may be viewed as asking threatening questions about their behavior, which is directly related to why the majority of people underreport their absences. Attendance at work is well understood by employees to be a highly valued behavior by employers. To minimize this, Johns recommends the use of longer questions that assume s/he has been absent, such as “People have many reasons for missing work. Most people miss an

\(^{25}\) USA Today (Periodical) v. 128 no2659 (Apr. 2000) p. 4-5
occasional day once and a while. How many days of work did you miss in the past month?"26

The following example lists the steps necessary for calculating the cost of absenteeism for a company with 500 employees.

Table 24. Estimating the Cost of Absenteeism.

<table>
<thead>
<tr>
<th>Calculating the Cost of Absenteeism</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of employees</td>
<td>500</td>
</tr>
<tr>
<td>1. Lost work-time rate</td>
<td>1.90%</td>
</tr>
<tr>
<td>2. Total hours usually worked</td>
<td>960,000</td>
</tr>
<tr>
<td>3. Hours lost due to absence</td>
<td>18,240</td>
</tr>
<tr>
<td>4. Median weekly earnings</td>
<td>$597</td>
</tr>
<tr>
<td>5. Median Hours worked</td>
<td>42.8</td>
</tr>
<tr>
<td>6. Weighted average hourly salary/wage</td>
<td>$13.95</td>
</tr>
<tr>
<td>7. Employee benefits expressed</td>
<td>30%</td>
</tr>
<tr>
<td>8. Cost of employee benefits</td>
<td>$4.18</td>
</tr>
<tr>
<td>9. Total compensation lost per hour per absent employee</td>
<td>$18.13</td>
</tr>
<tr>
<td>10. Total compensation lost to absent employees</td>
<td>$330,749</td>
</tr>
<tr>
<td>11. Total supervisory person-hours lost to employee absenteeism per year</td>
<td>1,459</td>
</tr>
<tr>
<td>12. Median weekly earnings (supervisor for example)</td>
<td>$696</td>
</tr>
<tr>
<td>13. Median Hours worked</td>
<td>42.8</td>
</tr>
<tr>
<td>14. Weighted average hourly salary/wage</td>
<td>$16.26</td>
</tr>
<tr>
<td>15. Supervisor benefits expressed</td>
<td>30%</td>
</tr>
<tr>
<td>16. Cost of supervisor benefits per hour</td>
<td>$4.88</td>
</tr>
<tr>
<td>17. Total supervisor compensation per hour spent on absenteeism</td>
<td>$21.14</td>
</tr>
<tr>
<td>18. Total supervisory salaries lost to managing problems of absenteeism</td>
<td>$30,848</td>
</tr>
<tr>
<td>19. All other costs incidental to absenteeism, not included above</td>
<td>-</td>
</tr>
<tr>
<td>20. Total estimated cost of absenteeism (sum of #10,#18,#19)</td>
<td>$361,597</td>
</tr>
<tr>
<td>21. Total estimated cost of absenteeism per employee</td>
<td>$723.19</td>
</tr>
</tbody>
</table>

The following table relates the total maximum investment allowed to reduce the cost of turnover by a targeted amount. The budget numbers are based on investments per 100 employees. For example, if the current cost per employee due to absenteeism is $600 per employee for a company with 500 employees and they expect the TDM program to

reduce the cost by 20% then the company could budget up to $30,000 to recoup the company’s investment in absentee reduction within one year.

Table 25. Maximum Investment Per 100 Employees Allowed to Reduce Cost of Employee Absenteeism To Reach Goal (with a 12 month return on investment).

<table>
<thead>
<tr>
<th>Absentee Cost Per Employee</th>
<th>Total Annual Budget Per 100 Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>$400</td>
<td>$2,000</td>
</tr>
<tr>
<td>$450</td>
<td>$2,250</td>
</tr>
<tr>
<td>$500</td>
<td>$2,500</td>
</tr>
<tr>
<td>$550</td>
<td>$2,750</td>
</tr>
<tr>
<td>$600</td>
<td>$3,000</td>
</tr>
<tr>
<td>$650</td>
<td>$3,250</td>
</tr>
<tr>
<td>$700</td>
<td>$3,500</td>
</tr>
<tr>
<td>$750</td>
<td>$3,750</td>
</tr>
<tr>
<td>$800</td>
<td>$4,000</td>
</tr>
<tr>
<td>$850</td>
<td>$4,250</td>
</tr>
<tr>
<td>$900</td>
<td>$4,500</td>
</tr>
<tr>
<td>$950</td>
<td>$4,750</td>
</tr>
</tbody>
</table>
Business Benefit: Reducing the Cost of Parking

Shoup and others have well documented the role of parking on mode choice.27 According to Shoup, “When commuters paid for parking, they drove an average of 53 cars to work per 100 employees. When commuters parked free, they drove an average of 72 cars per 100 employees. These studies show that, per 100 commuters, employer-paid parking replaced commuters’ payments for parking 53 cars (the number driven to work when commuters paid for parking), but also stimulated a 36 percent increase in the number of cars driven to work.”

Parking is the most prevalent commute benefit offered by employers. The provision of parking is seemingly so prevalent that surveys such as the employer benefit survey by the BLS do not track it. To gather information on the extent of employer-provided commute benefits of all types (parking, transit and carpool/vanpool), a national telephone survey of 603 employers was conducted in 1995. The survey found that parking benefits were provided by 80% of employers whereas vanpool/carpool benefits are provided by only 3.2% and less than 1% offer transit benefits.28

Table 26. Employer-Provided Commute Benefits.

<table>
<thead>
<tr>
<th>Benefits Provided</th>
<th>Total</th>
<th>1-4</th>
<th>5-25</th>
<th>26-99</th>
<th>100-499</th>
<th>500+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Commute Benefits</td>
<td>80.1%</td>
<td>80.0%</td>
<td>77.2%</td>
<td>92.0%</td>
<td>93.2%</td>
<td>93.0%</td>
</tr>
<tr>
<td>Parking benefits</td>
<td>79.8%</td>
<td>80.0%</td>
<td>76.2%</td>
<td>92.0%</td>
<td>92.6%</td>
<td>92.0%</td>
</tr>
<tr>
<td>Transit benefits</td>
<td>0.5%</td>
<td>0.0</td>
<td>1.0%</td>
<td>2.3%</td>
<td>3.4%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Administers carpool and/or vanpool program</td>
<td>3.2%</td>
<td>4.0%</td>
<td>1.0%</td>
<td>2.8%</td>
<td>13.6%</td>
<td>36.0%</td>
</tr>
</tbody>
</table>

This survey also sought to obtain an assessment of employer practices with respect to the provision of employee transportation benefits, including parking. As the report points out, the reasons for providing parking are not decision factors. The provision of parking by employers reflects a “continuation of long standing arrangements that have not been re-examined or reflect a pass through from employers to employees of a resource that does not have a market.” Only the fourth most cited reason recognizes the value to the business interests of the company.

Table 27. Reasons for Providing a Given Commute Benefit.

<table>
<thead>
<tr>
<th>Four Most Frequent Responses</th>
<th>Percent by Type of Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PARKING BENEFITS</strong></td>
<td></td>
</tr>
<tr>
<td>1. Have always provided parking</td>
<td>37.4%</td>
</tr>
<tr>
<td>2. Receive parking as part of lease</td>
<td>19.9%</td>
</tr>
<tr>
<td>3. Parking built along with employer’s building</td>
<td>9.9%</td>
</tr>
<tr>
<td>4. Recruitment and retention of employees</td>
<td>7.9%</td>
</tr>
<tr>
<td><strong>TRANSIT BENEFITS</strong></td>
<td></td>
</tr>
<tr>
<td>1. Recruitment/Retention of Employees</td>
<td>11.7%</td>
</tr>
<tr>
<td>2. Have always provided transit benefits</td>
<td>6.9%</td>
</tr>
<tr>
<td>3. Transit benefits are tax exempt to employees</td>
<td>6.5%</td>
</tr>
<tr>
<td>4. Promote ridesharing/alt. transportation programs</td>
<td>4.5%</td>
</tr>
<tr>
<td><strong>VANPOOL/CARPOOL BENEFITS</strong></td>
<td></td>
</tr>
<tr>
<td>1. No alternative transportation available</td>
<td>47.7%</td>
</tr>
<tr>
<td>2. Environmental concerns</td>
<td>39.3%</td>
</tr>
<tr>
<td>3. Convenience</td>
<td>38.1%</td>
</tr>
<tr>
<td>4. Recruitment/Retention</td>
<td>2.8%</td>
</tr>
</tbody>
</table>

Employers were asked to estimate the time spent administering each of these programs. Employers estimated the mean value of 7 hours per month to administer transit benefit program and 1 hour per month for the carpool/vanpool program. Perhaps the most revealing about attitudes regarding parking, is that most employers reported that administering the parking program required no time. Clearly, the costs of parking are not well-understood by the business community responsible for commute-related programs. The following section will outline the costs and a method for calculating the costs.

The cost of parking has two major components: capital (including construction) and operating. The capital cost for parking depends on numerous factors including land, design, development, and construction costs. Operating costs may include attendant, regular maintenance on the facility, security, etc.
Table 28. Construction Cost per Parking Space.

<table>
<thead>
<tr>
<th>Cost Sq. Ft.</th>
<th>250</th>
<th>300</th>
<th>350</th>
</tr>
</thead>
<tbody>
<tr>
<td>SURFACE LOT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$5.00</td>
<td>$1,250</td>
<td>$1,500</td>
<td>$1,750</td>
</tr>
<tr>
<td>$10.00</td>
<td>$2,500</td>
<td>$3,000</td>
<td>$3,500</td>
</tr>
<tr>
<td>ABOVE GRADE STRUCTURES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$20.00</td>
<td>$5,000</td>
<td>$6,000</td>
<td>$7,000</td>
</tr>
<tr>
<td>$25.00</td>
<td>$6,250</td>
<td>$7,500</td>
<td>$8,750</td>
</tr>
<tr>
<td>$35.00</td>
<td>$8,750</td>
<td>$10,500</td>
<td>$12,250</td>
</tr>
</tbody>
</table>

The following tables estimate the cost of constructing a new surface lot or above grade structure, with and without the need to acquire the land. Each scenario includes two financing periods – 10 and 20 years. Regardless of the scenario, it becomes abundantly clear that the cost to construct and maintain a parking facility would require significant revenue per month to breakeven. Given that employers provide most of the parking to employees for “free”, the employer is incurring this expense in SG&A.

Table 29. Cost of Parking – Surface Lot Scenarios.

<table>
<thead>
<tr>
<th>Surface Lot on Existing Property</th>
<th>Surface Lot on Existing Property with 10% Fewer Parking Spaces</th>
<th>Surface Lot on Acquired Property</th>
<th>Surface Lot on Acquired Property with 10% Fewer Parking Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land (footprint)</td>
<td>160,000</td>
<td>160,000</td>
<td>160,000</td>
</tr>
<tr>
<td>Size of structure</td>
<td>500</td>
<td>450</td>
<td>500</td>
</tr>
<tr>
<td>Construction Cost/Sq. Ft.</td>
<td>$5.00</td>
<td>$5.00</td>
<td>$5.00</td>
</tr>
<tr>
<td>Sq. Ft./Space</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Land cost/sq. ft.</td>
<td>$-</td>
<td>$-</td>
<td>$10</td>
</tr>
<tr>
<td>Construction cost per space</td>
<td>$1,500</td>
<td>$1,500</td>
<td>$1,500</td>
</tr>
<tr>
<td>Construction costs</td>
<td>$750,000</td>
<td>$675,000</td>
<td>$750,000</td>
</tr>
<tr>
<td>Land acquisition costs</td>
<td>$-</td>
<td>$-</td>
<td>$1,600,000</td>
</tr>
<tr>
<td>Share of other project costs as percentage of construction costs</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>Other project costs</td>
<td>$187,500</td>
<td>$168,750</td>
<td>$587,500</td>
</tr>
</tbody>
</table>

61
<table>
<thead>
<tr>
<th></th>
<th>Surface Lot on Existing Property</th>
<th>Surface Lot on Existing Property with 10% Fewer Parking Spaces</th>
<th>Surface Lot on Acquired Property</th>
<th>Surface Lot on Acquired Property with 10% Fewer Parking Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total project cost</td>
<td>$937,500</td>
<td>$843,750</td>
<td>$2,937,500</td>
<td>$2,843,750</td>
</tr>
<tr>
<td>Interest rate</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Financing term (years)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Annual debt service</td>
<td>($139,715)</td>
<td>($125,744)</td>
<td>($437,774)</td>
<td>($423,803)</td>
</tr>
<tr>
<td>Total financed cost</td>
<td>($1,397,152)</td>
<td>($1,257,437)</td>
<td>($4,377,742)</td>
<td>($4,238,026)</td>
</tr>
<tr>
<td>Total interest paid</td>
<td>$459,652</td>
<td>$413,686</td>
<td>$1,440,241</td>
<td>$1,394,276</td>
</tr>
<tr>
<td>Project Cost per space</td>
<td>$1,875</td>
<td>$1,875</td>
<td>$5,875</td>
<td>$6,319</td>
</tr>
<tr>
<td>Annual capital cost per space</td>
<td>($279)</td>
<td>($279)</td>
<td>($876)</td>
<td>($942)</td>
</tr>
<tr>
<td>Annual operating cost per space</td>
<td>($400)</td>
<td>($400)</td>
<td>($400)</td>
<td>($400)</td>
</tr>
<tr>
<td>Total annual cost per space</td>
<td>($679)</td>
<td>($679)</td>
<td>($1,276)</td>
<td>($1,342)</td>
</tr>
<tr>
<td>Required revenue per space per month</td>
<td>($57)</td>
<td>($57)</td>
<td>($106)</td>
<td>($112)</td>
</tr>
<tr>
<td>Financing term (years)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Annual debt service</td>
<td>($95,486)</td>
<td>($85,938)</td>
<td>($299,191)</td>
<td>($289,642)</td>
</tr>
<tr>
<td>Total financed cost</td>
<td>($1,909,729)</td>
<td>($1,718,757)</td>
<td>($5,983,818)</td>
<td>($5,792,845)</td>
</tr>
<tr>
<td>Total interest paid</td>
<td>$972,229</td>
<td>$875,006</td>
<td>$(3,046,318)</td>
<td>$(2,949,095)</td>
</tr>
<tr>
<td>Annual capital cost per space</td>
<td>($191)</td>
<td>($191)</td>
<td>($598)</td>
<td>($644)</td>
</tr>
<tr>
<td>Annual operating cost per space</td>
<td>($400)</td>
<td>($400)</td>
<td>($400)</td>
<td>($400)</td>
</tr>
<tr>
<td>Total annual cost per space</td>
<td>($591)</td>
<td>($591)</td>
<td>($998)</td>
<td>($1,044)</td>
</tr>
<tr>
<td>Required revenue per space per month</td>
<td>($49)</td>
<td>($49)</td>
<td>($83)</td>
<td>($87)</td>
</tr>
</tbody>
</table>
### Table 30. Cost of Parking – Above Grade Structure Scenarios.

<table>
<thead>
<tr>
<th></th>
<th>Above Grade Structure on Existing Property</th>
<th>Above Grade Structure on Existing Property with 10% Fewer Parking Spaces</th>
<th>Above Grade Structure on Existing Property</th>
<th>Above Grade Structure on Existing Property with 10% Fewer Parking Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land (footprint)</td>
<td>160,000</td>
<td>160,000</td>
<td>160,000</td>
<td>160,000</td>
</tr>
<tr>
<td>Size of structure</td>
<td>500</td>
<td>450</td>
<td>500</td>
<td>450</td>
</tr>
<tr>
<td>Construction Cost/Sq. Ft.</td>
<td>$35.00</td>
<td>$35.00</td>
<td>$35.00</td>
<td>$35.00</td>
</tr>
<tr>
<td>Sq. Ft./Space</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Land cost/sq. ft.</td>
<td>$-</td>
<td>$-</td>
<td>$20</td>
<td>$20</td>
</tr>
<tr>
<td>Construction cost per space</td>
<td>$10,500</td>
<td>$10,500</td>
<td>$10,500</td>
<td>$10,500</td>
</tr>
<tr>
<td>Construction costs</td>
<td>$5,250,000</td>
<td>$4,725,000</td>
<td>$5,250,000</td>
<td>$4,725,000</td>
</tr>
<tr>
<td>Land acquisition costs</td>
<td>$-</td>
<td>$-</td>
<td>$3,200,000</td>
<td>$3,200,000</td>
</tr>
<tr>
<td>Share of other project costs as percentage of construction costs</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>Other project costs</td>
<td>$1,312,500</td>
<td>$1,181,250</td>
<td>$2,112,500</td>
<td>$1,981,250</td>
</tr>
<tr>
<td>Total project cost</td>
<td>$6,562,500</td>
<td>$5,906,250</td>
<td>$10,562,500</td>
<td>$9,906,250</td>
</tr>
<tr>
<td>Interest rate</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Financing term (years)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Annual debt service</td>
<td>($978,006)</td>
<td>($880,205)</td>
<td>($1,574,124)</td>
<td>($1,476,323)</td>
</tr>
<tr>
<td>Total financed cost</td>
<td>($9,780,061)</td>
<td>($8,802,055)</td>
<td>($15,741,240)</td>
<td>($14,763,234)</td>
</tr>
<tr>
<td>Total interest paid</td>
<td>$3,217,560</td>
<td>$2,895,804</td>
<td>$5,178,740</td>
<td>$4,856,984</td>
</tr>
<tr>
<td>Project Cost per space</td>
<td>$13,125</td>
<td>$13,125</td>
<td>$21,125</td>
<td>$22,014</td>
</tr>
<tr>
<td>Annual capital cost per space</td>
<td>($1,956)</td>
<td>($1,956)</td>
<td>($3,148)</td>
<td>($3,281)</td>
</tr>
<tr>
<td>Annual operating cost per space</td>
<td>($400)</td>
<td>($400)</td>
<td>($400)</td>
<td>($400)</td>
</tr>
<tr>
<td>Total annual cost per space</td>
<td>($2,356)</td>
<td>($2,356)</td>
<td>($3,548)</td>
<td>($3,681)</td>
</tr>
<tr>
<td>Required revenue per space per month</td>
<td>($196)</td>
<td>($196)</td>
<td>($296)</td>
<td>($307)</td>
</tr>
<tr>
<td>Financing term (years)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Annual debt service</td>
<td>($668,405)</td>
<td>($601,565)</td>
<td>($1,075,814)</td>
<td>($1,008,973)</td>
</tr>
<tr>
<td>Total financed cost</td>
<td>($13,368,103)</td>
<td>($12,031,293)</td>
<td>($21,516,280)</td>
<td>($20,179,469)</td>
</tr>
<tr>
<td>Total interest paid</td>
<td>$6,805,603</td>
<td>$6,125,042</td>
<td>$6,805,603</td>
<td>$6,125,042</td>
</tr>
</tbody>
</table>
Changes in parking demand will depend on the TDM program strategies offered. The COMMUTER Model and CUTR_AVR model provide the means for estimating the change in vehicle trips and, therefore, potential reductions in parking demand. As one might expect, the amount of vehicle trip reduction can vary significantly depending on the incentives and disincentives offered by employers. A review of the literature finds reductions in vehicle trips in the 20% to 40% range are possible though not typical.
Business Benefit: Employer-Provided Commuter Benefits

The "qualified transportation fringe benefit" (QTFB) is a provision of the Internal Revenue Code (IRC), Section 132 (f), that permits employers to subsidize their employees’ cost of commuting to work by transit and vanpools up to $100 per month. Up to $190 per month can be provided by employers to employees for parking at or near an employer’s worksite, or at a facility from which employee commutes via transit, vanpool, or carpool. It also allows employees to use pre-tax dollars to pay for their qualified transportation fringe benefits such as transit passes, vanpool fares, and qualified parking.

Employers are not required to provide the QTFB. How and under what circumstances an employer provides these benefits to its employees is entirely within the employer’s discretion. The employer may provide only one kind of benefit or all types of qualified transportation fringe benefits, at its sole discretion.

A closer look at commuting-related benefits finds that three percent of all private employers provide subsidized commuting in 2000, down from four percent in 1999. In 2000, this benefit was more common among companies with more than 100 employees with 5 percent versus 2 percent for companies with 1 to 99 employees.29 30

| Table 31. Subsidized Commuting Trends for Medium and Large Private Employers. |
|---------------------------------|------------------|------------------|------------------|
| All Employees | Professional, technical and related | Clerical and sales employees | Blue-collar and service employees |
| 1995 | 5 | 8 | 5 | 3 |
| 1997 | 6 | 10 | 7 | 3 |
| 1999 | 4 | 9 | 4 | 3 |
| 2000 | 3 | 6 | 3 | 2 |

According to a survey by Bright Horizons Family Solutions and William M. Mercer, a human resources consulting concern, employers cited flexible work arrangements as the most beneficial work/life benefit.31 National statistics show that increasing numbers and proportions of full-time workers in the United States are able to opt for flexible work hours, allowing workers to vary the actual times they arrive and leave the work place. Among full-time wage and salary workers, according to BLS, nearly 28.8 percent had

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flexible work schedules. About one-third of these workers (11.1 percent of the total) worked flexible hours as part of a formal employer-sponsored flexitime program.32

One frequently mentioned benefit cited is the ability to reduce taxes by providing commuter benefits to employees and/or allowing employees to similar to a flexible spending account. Section 132(f) of the Internal Revenue Code permits employers to provide employees tax-free qualified transportation fringe benefits. As of January 1, 2003, employers can provide employees with up to $100 per month for transit passes/vouchers or commuter highway vehicle. A commuter highway vehicle must hold at least 6 people excluding the driver, be used 80% mileage for commuting and carry at least 4 people including the driver.

Initially, employers may view the commuter choice tax benefits like other cafeteria benefit plans. However, there are several important distinctions between cafeteria benefits such as flexible spending accounts (FSAs) authorized under Section 125 and qualified transportation fringe benefit (QTFB) programs authorized under Section 132 that will have a bearing on participation and administration. Under medical flexible spending accounts, for example, eligible claims can be reimbursed up to the plan year election less any prior reimbursements. If the person elects to set aside $100 per month ($1,200 annually), for example, for eligible medical expenses and incurs $800 in eligible expenses in the second month, he or she can receive the full $800 though he may have only paid in $200 into the plan year.

Commuter benefit reimbursements programs also are different from the other traditional benefit programs that employers may offer their employees. These QTFB programs are not required to operate under a specific plan year concept with an open enrollment period; QTFBs can operate on a monthly basis (or other cycle). Therefore, all elections, deposits and reimbursements are calculated and recorded on a monthly basis, and each month is seen as a separate period of time from all other months employer’s employees participate. As a result, QTFB claims can only be reimbursed up to the balance in the account when the claim is processed and can not to exceed the IRS monthly maximum. Therefore, in the first month, the employee, in effect, pays twice for the same transit pass. For example, the employee’s pay is deducted $65 for a transit pass in May. However, since this is a reimbursement program, the employee must also purchase the transit pass from the employer or transit operator and submit a receipt or proof of purchase/use to the third-party administrator (TPA) for reimbursement. The employee will then receive a $65 check from the TPA (i.e., from the $65 taken out of their paycheck in May). The lag time between the cash outlay by the employee and receipt of the reimbursement will depend on employer policies and the processing speed of the TPA.

Eligibility for these programs is quite broad. Any type of transit service, publicly or privately owned or operated, including bus, rail, subway, ferry, subscription bus, shuttle bus, and commuter highway vehicles under contract which provides general or special service on a regular and continuing basis to the public and/or employees are eligible uses

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under Section 132. In addition, transportation in a commuter highway vehicle (vanpool) which is provided "by-and for" (on behalf of) the employer is eligible for the Transportation Commute Benefit. These types of vanpool arrangements are: employer-owned; employer-leased; employee-owned; employee-leased, and public transit operated/

Under Section 132(f)(2), an employee may receive a qualified parking benefit in addition to the transit or commuter highway vehicle benefit. The designated employee "prime member" (often the driver or the person assigned the parking space) who travels in a commuter highway vehicle (e.g., vanpool) that uses commercial parking is eligible for the parking benefit (up to $190/month), and at the same time he is entitled to the commuter highway vehicle benefit (up to $100/month). All other employees commuting in a highway vehicle who are not the "prime member" are only eligible for the vanpool benefit, not the parking benefit. Another employee might choose to combine up to $100/month for using transit and up to $190 of the qualified parking benefit to subsidize the employee’s cost of parking at a train station and riding transit.

While transit riders and vanpool riders are eligible recipients, carpoolers, bicyclists and/or walkers are not covered under the Transportation Commute Benefit. However, employers may offer incentive programs that would be taxable subsidies for employees who chose to walk, bicycle, or carpool to work.

As noted above, employers can give their employees up to $100/month to commute via transit or vanpool and up to $190 per month for parking. Such expenses are tax deductible to the employer and cost the employer less than providing the employee an equivalent raise in gross income.

Employers can also allow employees to use pre-tax income to pay for qualified transportation fringes. Even the employer does not provide a transit subsidy or co-payment; employers will save on payroll taxes. Finally, employers have the utmost flexibility in offering any combination of the transit and vanpool benefits and the pre-tax options up to statutory limits.

In addition to providing flexibility on the investment in the program, employers can offer the benefit to any employee or group of employees within the work force. The amount can vary among employees, it can be provided on a regular basis or once a year instead of a bonus, or it can be provided as recruitment or an incentive payment to address a problem such as recurring absenteeism. It can also be used only for a limited group of employees or available to all employees, at the employer’s discretion. It must, however, be provided for commuting expenses—not for personal travel.

Employer involvement must occur if the benefits are to accrue to the business and the employees. While an employee may buy transit passes without going through the employer, there is no way that the employee can obtain the tax savings without employer involvement. QTFB are employer-provided benefits that allow employers to treat benefits provided to employees in a tax-preferred way. The employee cannot deduct the amount when they file their personal income tax forms. However, the employer can treat the
amount they provide to their employees in the form of qualified transportation fringe benefits as tax free and excludible from gross income of the employee thereby giving employees a financial saving.

Employers certainly incur costs for implementing the program, primarily in the administration and record keeping areas. The employer’s record keeping requirements of the QTFB require, in the case of cash reimbursements, a bona-fide reimbursement arrangement to meet the adequate record keeping requirement. Even then cash reimbursement option only exists for employers where a voucher program is not readily available. There are exceptions to this prohibition against the use of cash reimbursement. Employers are allowed to used cash reimbursement if faced with extenuating circumstances such as incurring handling charges of more than 1 percent and/or unreasonable minimum dollar or volume purchase requirements (e.g., employer would be required by the transit agency to purchase 100 passes per month but they only have 20 employees who ride transit each month).

In the case of the voucher system used for transit or vanpools, employers need only maintain a record of the purchase of the vouchers. In all other cases, the employer must maintain adequate records, which reasonably demonstrates expenditures under the benefit. As an example, in the case of an employer who participates in a transit pass program by selling passes of a local transit provider at a discount, the employer should keep records of the pass sales to employees in addition to the arrangement with the transit provider(s).

If the employer utilizes a cash reimbursement system, employees may have to provide the employer with receipts or some record of their expenses. If the employee receives vouchers from his or her employer to pay for transit expenses, for example, he or she may not have any record keeping requirements but the employee may have to certify to his or her use of transit and monthly expenses to the employer. There is no employee record keeping requirements for purposes of any tax filing such as the annual personal income tax form. The amount of the fringe benefit an employee receives from their employer will not be included in an employee’s W-2 form, for example.

The IRS may make annual adjustments to the limits each December for the following calendar year. Increases triggered by cost of living increases only occur in $5 increments. However, the employer makes the decision if and when to increase the benefit or even whether to provide the maximum regardless of whether the employer or employee is paying for the benefit.

The following example is provided to show the savings that could accrue to one individual and her employer. Nita Ryder lives in Florida (no state income tax), is single, earns $30,920 per year, claims one exemption, takes the standard deduction on her taxes, and is a dedicated transit rider (Table 32). After the tax break signed into law by President Bush in 2003, she has decided to estimate the increase in her spendable income if she decided to use pre-tax income to pay for her $100 per month transit pass.
Table 32. Qualified Transportation Fringe Benefit Example - Assumptions.

<table>
<thead>
<tr>
<th>Assumption</th>
<th>Assumption</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Adjusted Gross Income</td>
<td>$ 30,920.00</td>
<td>For example (Florida 2001 averages): $66,960 for managerial occupations, $30,920 for all occupations; $25,110 office and administrative support occupations</td>
</tr>
<tr>
<td>b Yearly Commute Benefit</td>
<td>$ 1,200.00</td>
<td>Maximum tax-free benefit for transit and vanpools is $100 per month per worker; may be combined with parking</td>
</tr>
<tr>
<td>c Yearly Parking Cost</td>
<td>$ -</td>
<td>Maximum tax-free benefit for parking is $190 per month per worker; may be combined with transit or vanpool benefit</td>
</tr>
<tr>
<td>d Exemptions</td>
<td>1</td>
<td>Number exemptions claimed on 1040</td>
</tr>
<tr>
<td>e Withholding Allowance</td>
<td>$3,100.00</td>
<td>Source: IRS Notice 1036 May 2003 for monthly payroll period</td>
</tr>
<tr>
<td>f FICA</td>
<td>7.65%</td>
<td>Up to $87,000</td>
</tr>
<tr>
<td>g Standard Deduction</td>
<td>$ 4,500.00</td>
<td>per exemption</td>
</tr>
<tr>
<td>h Marital Status (Married (M) or Single (S))</td>
<td>S</td>
<td>Marital status</td>
</tr>
</tbody>
</table>

Using Table 34 to estimate her tax liability, the first column in Table 33 shows that without the pre-tax commute benefit program her net income after paying taxes would be $26,972. After paying for her monthly transit passes ($1,200 for the year), she was left with $25,772 in spendable income. However, under Nita’s employer pre-tax commute benefit option, she could choose to deduct $100 per month from her gross pay before taxes to buy the transit pass. As a result, her spendable income increased by $263 per year.

It should be noted that while her FICA contribution also decreased by $92 per year so did her employer’s matching contribution. As a result of this new program, Nita saved $263 per year and her employer saved $92 per year (less the discount that would have been received by the business when it deducts the expense as a business expense).
Table 33. Comparison of Pre-Tax Qualified Transportation Fringe Benefit Plan.

<table>
<thead>
<tr>
<th></th>
<th>Without Pre-Tax Qualified Transportation Fringe Benefit Plan</th>
<th>With Pre-Tax Qualified Transportation Fringe Benefit Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>j  Adjusted Gross Income</td>
<td>$30,920.00</td>
<td>$30,920.00</td>
</tr>
<tr>
<td>k  Pretax Commuter Benefits</td>
<td>$ -</td>
<td>$ (1,200.00)</td>
</tr>
<tr>
<td>l  Pretax Parking</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>m  Taxable Adjusted Gross Income</td>
<td>$30,920.00</td>
<td>$29,720.00</td>
</tr>
<tr>
<td>n  Standard deduction</td>
<td>$ (4,500.00)</td>
<td>$ (4,500.00)</td>
</tr>
<tr>
<td>p  Total exemptions multiplied by withholding allowance ($3,100 for 2003)</td>
<td>$ (3,100.00)</td>
<td>$ (3,100.00)</td>
</tr>
<tr>
<td>q  Taxable Income</td>
<td>$23,320.00</td>
<td>$22,120.00</td>
</tr>
<tr>
<td>r  Withholding tax</td>
<td>$ (1,583.00)</td>
<td>$ (1,412.00)</td>
</tr>
<tr>
<td>s  FICA (7.65% of Taxable Gross)</td>
<td>$ (2,365.38)</td>
<td>$ (2,273.58)</td>
</tr>
<tr>
<td>t  Net income</td>
<td>26,971.62</td>
<td>26,034.42</td>
</tr>
<tr>
<td>u  Commuter Benefits</td>
<td>$ (1,200.00)</td>
<td>$ -</td>
</tr>
<tr>
<td>v  Parking</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>w  Spendable Income</td>
<td>$25,771.62</td>
<td>$26,034.42</td>
</tr>
<tr>
<td>y  Annual Savings</td>
<td>$ (262.80)</td>
<td>$ -</td>
</tr>
<tr>
<td>z  Monthly Savings</td>
<td>$ (21.90)</td>
<td>$ -</td>
</tr>
</tbody>
</table>

\( j = a \)
\( k = 0 \) for no pretax arrangement; \( k = -b \) for pretax commute benefit
\( l = 0 \) for no pretax arrangement; \( l = -d \) for pretax parking
\( m = j + k + l \)
\( n = g \)
\( p = d \times e \)
\( q = m + n + p \)
\( r = \) Withholding tax determined by using the taxable gross (\( q \)) for the appropriate row of either the Single or Married tables below.
\( s = m \times f \)
\( t = m + r + s \)
\( u = 0 \) for no pretax arrangement; \( u = -b \) for pretax commute benefit
\( v = 0 \) for no pretax arrangement; \( v = -d \) for pretax parking
\( w = t + u + v \)
\( y = w(\text{without}) - w(\text{with}) \)
\( z = y/12 \)
Table 34. 2003 Tax Tables – Single Person (including head of household).

<table>
<thead>
<tr>
<th>If the amount of wages (after subtracting withholding allowances) is:</th>
<th>The amount of tax to withhold is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over -- But not over --</td>
<td></td>
</tr>
<tr>
<td>$ - $ 2,650.00</td>
<td></td>
</tr>
<tr>
<td>$ 2,650.00 $ 9,700.00</td>
<td>$ - plus 10% of excess over $ 2,650.00</td>
</tr>
<tr>
<td>$ 9,700.00 $ 30,800.00</td>
<td>$ 705.00 plus 15% of excess over $ 9,700.00</td>
</tr>
<tr>
<td>$ 30,800.00 $ 68,500.00</td>
<td>$ 3,870.00 plus 25% of excess over $ 30,800.00</td>
</tr>
<tr>
<td>$ 68,500.00 $ 148,700.00</td>
<td>$ 13,295.00 plus 28% of excess over $ 68,500.00</td>
</tr>
<tr>
<td>$ 148,700.00 $ 321,200.00</td>
<td>$ 35,751.00 plus 33% of excess over $ 148,700.00</td>
</tr>
<tr>
<td>$ 321,200.00</td>
<td>$ 92,676.00 plus 35% of excess over $ 321,200.00</td>
</tr>
</tbody>
</table>

Table 35. 2003 Tax Tables – Married Person.

<table>
<thead>
<tr>
<th>If the amount of wages (after subtracting withholding allowances) is:</th>
<th>The amount of tax to withhold is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over -- But not over --</td>
<td></td>
</tr>
<tr>
<td>$ - $ 8,000.00</td>
<td></td>
</tr>
<tr>
<td>$ 8,000.00 $ 22,300.00</td>
<td>$ - plus 10% of excess over $ 8,000.00</td>
</tr>
<tr>
<td>$ 22,300.00 $ 64,750.00</td>
<td>$ 1,430.00 plus 15% of excess over $ 22,300.00</td>
</tr>
<tr>
<td>$ 64,750.00 $ 118,050.00</td>
<td>$ 7,797.50 plus 25% of excess over $ 64,750.00</td>
</tr>
<tr>
<td>$ 118,050.00 $ 185,550.00</td>
<td>$ 21,122.50 plus 28% of excess over $ 118,050.00</td>
</tr>
<tr>
<td>$ 185,550.00 $ 326,100.00</td>
<td>$ 40,022.50 plus 33% of excess over $ 185,550.00</td>
</tr>
<tr>
<td>$ 326,100.00</td>
<td>$ 86,404.00 plus 35% of excess over $ 326,100.00</td>
</tr>
</tbody>
</table>

The annual increase in spendable income depends on the marital status, number of exemptions, the pre-tax benefit set aside and the adjusted gross income. The following tables provide estimates of the increases in spendable income for several scenarios. For example, a single person with 1 exemption making $40,000 per year would increase spendable income by $392 per year by using $100 per month in pre-tax dollars to purchase a transit pass or parking permit. A married person making the same amount would increase spendable income by $272 with the same $100 amount set aside.
Table 36. Increase in Spendable Income to Employee with Pre-Tax Benefit – Single Person.

<table>
<thead>
<tr>
<th>Adjusted Gross Income</th>
<th>Single 1 exempt. @$50 per month</th>
<th>Single 1 exempt. @$100 per month</th>
<th>Single 1 exempt. @$190 per month</th>
<th>Single 1 exempt. @$290 per month</th>
<th>Single 2 exempt. @$50 per month</th>
<th>Single 2 exempt. @$100 per month</th>
<th>Single 2 exempt. @$190 per month</th>
<th>Single 2 exempt. @$290 per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ 10,000</td>
<td>$ 46</td>
<td>$ 92</td>
<td>$ 174</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
</tr>
<tr>
<td>$ 15,000</td>
<td>$ 106</td>
<td>$ 212</td>
<td>$ 402</td>
<td>$ 614</td>
<td>$ 106</td>
<td>$ 212</td>
<td>$ 339</td>
<td>$ 431</td>
</tr>
<tr>
<td>$ 20,000</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 749</td>
<td>$ 106</td>
<td>$ 212</td>
<td>$ 402</td>
<td>$ 614</td>
</tr>
<tr>
<td>$ 25,000</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
</tr>
<tr>
<td>$ 30,000</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
</tr>
<tr>
<td>$ 35,000</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
</tr>
<tr>
<td>$ 40,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 676</td>
<td>$ 948</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
</tr>
<tr>
<td>$ 45,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$ 50,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$ 55,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$ 60,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$ 65,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$ 70,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$ 75,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$ 80,000</td>
<td>$ 214</td>
<td>$ 428</td>
<td>$ 813</td>
<td>$ 1,241</td>
<td>$ 214</td>
<td>$ 416</td>
<td>$ 768</td>
<td>$ 1,160</td>
</tr>
<tr>
<td>$ 85,000</td>
<td>$ 214</td>
<td>$ 428</td>
<td>$ 813</td>
<td>$ 1,241</td>
<td>$ 214</td>
<td>$ 428</td>
<td>$ 813</td>
<td>$ 1,241</td>
</tr>
</tbody>
</table>
**Table 37. Increase in Spendable Income to Employee with Pre-Tax Benefit – Married Person.**

<table>
<thead>
<tr>
<th>Adjusted Gross Income</th>
<th>Married 2 exempt @$50 per month</th>
<th>Married 2 exempt @$100 per month</th>
<th>Married 2 exempt @$190 per month</th>
<th>Married 2 exempt @$290 per month</th>
<th>Married 4 exempt @$50 per month</th>
<th>Married 4 exempt @$100 per month</th>
<th>Married 4 exempt @$190 per month</th>
<th>Married 4 exempt @$290 per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10,000</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
</tr>
<tr>
<td>$15,000</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
</tr>
<tr>
<td>$20,000</td>
<td>$ 106</td>
<td>$ 212</td>
<td>$ 389</td>
<td>$ 481</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
<td>No taxes</td>
</tr>
<tr>
<td>$25,000</td>
<td>$ 111</td>
<td>$ 217</td>
<td>$ 407</td>
<td>$ 619</td>
<td>$ 106</td>
<td>$ 187</td>
<td>$ 269</td>
<td>$ 361</td>
</tr>
<tr>
<td>$30,000</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
<td>$ 106</td>
<td>$ 212</td>
<td>$ 402</td>
<td>$ 614</td>
</tr>
<tr>
<td>$35,000</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
</tr>
<tr>
<td>$40,000</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
</tr>
<tr>
<td>$45,000</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
</tr>
<tr>
<td>$50,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 136</td>
<td>$ 272</td>
<td>$ 516</td>
<td>$ 788</td>
</tr>
<tr>
<td>$55,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,068</td>
</tr>
<tr>
<td>$60,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$65,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$70,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$75,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$80,000</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
<tr>
<td>$85,000</td>
<td>$ 214</td>
<td>$ 428</td>
<td>$ 783</td>
<td>$ 1,175</td>
<td>$ 196</td>
<td>$ 392</td>
<td>$ 744</td>
<td>$ 1,136</td>
</tr>
</tbody>
</table>

The use of pre-tax payments for commute benefits provides employers with a cost effective method for increasing the spendable income of employees without increasing the gross salary (and any benefits based on the gross salary such as retirement, life insurance, etc.). In addition, the employer will save on payroll taxes. For employees earning up to $87,000, the employers pay 7.65 percent of the taxable adjusted gross income as payroll taxes (FICA and Medicare). Over $87,000, the employees no longer pay FICA. This amount matches the employee-paid amount. Lowering the taxable adjusted gross income, therefore, decreases the payroll tax paid by the employer. At the same time, the amount of savings accruing the employers (before claiming corporate tax deductions) is modest.
Table 38. Total Estimated Annual Payroll Tax Savings to Employer.

<table>
<thead>
<tr>
<th>Employee Pretax Monthly Amount</th>
<th>Employer Annual FICA Savings Per Employee</th>
<th>Total Estimated Annual Payroll Tax Savings to Employer (# of employees participating)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>$50</td>
<td>$ 45.90</td>
<td>$ 4,590</td>
</tr>
<tr>
<td>$100</td>
<td>$ 91.80</td>
<td>$ 9,180</td>
</tr>
<tr>
<td>$190</td>
<td>$174.42</td>
<td>$17,442</td>
</tr>
<tr>
<td>$290</td>
<td>$266.22</td>
<td>$26,622</td>
</tr>
</tbody>
</table>
Chapter 4 – Conclusions and Recommendations

The review of the efforts to quantify business benefits by employers and agencies points to several clear conclusions and recommendations.

1. **Increase public sector research and technical assistance efforts to evaluate employer TDM programs for the impacts on business, not only transportation and emission impacts.** Businesses do attribute benefits to various TDM programs but no systematic, consistent method of measuring these benefits exists. In fact, some employers are reluctant to share results because of the perceived competitive advantage it provides. This project has compiled various techniques for measuring some of the major benefits of TDM. Establishing a standard methodology for measuring the change across employers would allow for comparison of the relative effectiveness of given strategies whether or not the information is shared with the outside world. Employers and agencies should be encouraged and supported to use the human-cost approach, tracking costs before the intervention is offered and comparing those costs measured after the intervention. This is perhaps the easiest approach. Ideally, comparing costs and between users and nonusers of the intervention would provide a means of assessing the relative effectiveness.

2. **Expand the tracking of employer-provided commute benefits to include parking.** The Bureau of Labor Statistics tracks subsidized commuting benefits and flexible work place information. State departments of transportation and groups such as the Association for Commuter Transportation should encourage BLS to add parking (including the employer-provided subsidized parking) benefits to the list. This addition would begin to allow employers to see parking as a benefit rather than a right. The tracking of the subsidy amount would increase its visibility as a Selling, General and Administrative cost to the business, and, thus, controllable.

3. **Integrate, update, and aggressively distribute the tools to estimate the impacts and costs/benefits of TDM to businesses.** Whether the employers implicitly or explicitly quantify the benefits of TDM to their business, the need remains for tools to help quantify the business as well as the community benefits of TDM. The current tools each bring particular strengths and weaknesses. An effort to more closely integrate the tools to assist business would be beneficial. The mere existence of the tools does not mean they are widely used, or even known to exist among the target populations. One tactic would be to provide TDM agencies with a copy of the Business Benefit Calculator javascript program to place on their own websites so their businesses in their areas could find it. It should also allow for the locals to customize the default values to their communities. Another tactic would be to establish self-paced online training programs (e.g., streaming video) to help teach employers and TDM agencies how to use these particular tools.
Figure 11. Commuter Model Opening Screen.

Figure 12. Commuter Model – Scenario Information Screen.
The COMMUTER model can be used to evaluate commuter choice programs on both an urban area-wide and individual employer (or site-specific) basis. The Analysis Scope input controls whether the model calculates area-wide or site-specific impacts of commuter choice programs.

**Employment in Analysis Area**

<table>
<thead>
<tr>
<th>Employment Type</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Employment</td>
<td>1,000</td>
</tr>
<tr>
<td>Non-Office Employment</td>
<td></td>
</tr>
<tr>
<td>Total Employment</td>
<td>1,000</td>
</tr>
</tbody>
</table>

Refers to "traditional" professional office space employment.

Manufacturing, warehousing, retail, medical, educational, entertainment and other employment-generating land uses.

The COMMUTER model may generate abnormally large mode shifts under a regional or area-wide analysis scenario if realistic limits are not applied in estimating the affected employment input above. For site-specific analysis, enter the employment of the workplace being analyzed. For area-wide analysis, the user is encouraged to consult Section 3.1 of the COMMUTER Model User Manual for more detailed guidance on estimating affected employment inputs for region being modeled.

**Programs (Mark All Programs Being Analyzed with an "X")**

1. Site Walk Access Improvements
   Includes preferential parking, improved access to transit

2. Transit Service Improvements
   Includes more frequent and/or faster transit service

3. Financial Incentives
   Includes parking costs, transit fare/pass subsidies, or other financial incentives

4. Employer Support Programs
   Includes support programs for carpooling, vanpooling, transit, and/or bicycling

5. Alternative Work Schedules
   Includes flex time, telecommuting, staggered work hours, and/or compressed work weeks
### LOCAL DATA

<table>
<thead>
<tr>
<th>Work-Trip Mode Shares</th>
<th>X</th>
<th>Supply Final Mode Shares?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto - Drive Alone</td>
<td></td>
<td>75.4%</td>
</tr>
<tr>
<td>Auto - Carpool</td>
<td></td>
<td>13.2%</td>
</tr>
<tr>
<td>Vanpool</td>
<td></td>
<td>0.5%</td>
</tr>
<tr>
<td>Transit</td>
<td></td>
<td>5.3%</td>
</tr>
<tr>
<td>Bicycle</td>
<td></td>
<td>0.4%</td>
</tr>
<tr>
<td>Walk</td>
<td></td>
<td>4.0%</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>1.1%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Trip Length (mi)</th>
<th>X</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average person-trip length</td>
<td></td>
<td>11.4</td>
</tr>
<tr>
<td>Average trip length — vanpool</td>
<td></td>
<td>17.7</td>
</tr>
<tr>
<td>Average trip length — bicycle</td>
<td></td>
<td>1.8</td>
</tr>
<tr>
<td>Average trip length — walk</td>
<td></td>
<td>1.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vehicle Occupancy</th>
<th>X</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Carpool Occupancy</td>
<td></td>
<td>2.2</td>
</tr>
<tr>
<td>Average Vanpool Occupancy</td>
<td></td>
<td>6.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length of Peak Period (hours)</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent of Work Trips in Peak Periods</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>61.4%</td>
</tr>
</tbody>
</table>

Figure 15. Commuter Model – Local Data Screen.

---

Baseline mode share, trip length, average occupancy and peak period data representing local conditions are entered in this input screen. From these inputs and data entered in the "Mode Choice Model Coefficients" screen, the COMMUTER model internally calculates final mode shares and travel changes resulting from TCM programs selected. If you want to supply your own estimates of final mode shares (such as might be obtained from employee survey data), mark the box labeled "Supply Final Mode Shares" (with an "X"). When this option is selected, the COMMUTER model displays an additional series of input cells below the box where final mode share inputs can be entered. Remember, these final mode shares should reflect work-trip mode choice after implementation of the TCM programs you're currently analyzing and override the mode share calculations made by the model.

The peak period includes the morning and evening time periods when highways are most congested. These periods may be defined differently in different areas. For the default "percent of work trips in peak period" provided, the AM peak is defined as 6:00 to 9:00 AM and the PM peak as 4:00 to 7:00 PM. The same peak period should be used for reporting percent of work trips in peak period and affected vehicle speeds (which are entered later in the "Other Emissions-Related Data" screen).

"Length of peak period" refers to the length (in hours) of the AM or PM peak period. If the AM and PM peak periods are different lengths, this can be an average of the two lengths.

"Percent of work trips in peak period" should also be reported as an average for the AM and PM peak periods combined. For example, assume there are 200,000 and 300,000 total vehicle trips in the AM and PM peak periods, respectively. If the number of work trips are 150,000 in the AM peak and 250,000 in the PM peak, then the percentage of work trips in peak period is \( \frac{150,000 + 250,000}{200,000 + 300,000} = 80\% \).

Figure 16. Commuter Model – Local Data Screen (cont.).
**SITE ACCESS & TRANSIT SERVICE IMPROVEMENTS**

### I. Site Access Improvements

<table>
<thead>
<tr>
<th>Mode</th>
<th>Change in Walk Access Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Alone</td>
<td>-1.0</td>
</tr>
<tr>
<td>Carpool</td>
<td>1.0</td>
</tr>
<tr>
<td>Vanpool</td>
<td>1.0</td>
</tr>
<tr>
<td>Transit</td>
<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td></td>
</tr>
<tr>
<td>Pedestrian</td>
<td></td>
</tr>
</tbody>
</table>

Employer Participation Rate: 100%

*Change in Walk Access Time* represents the difference in walking time associated with travel to or from the workplace as a result of worksite access changes. Walking time includes the time taken to walk from a parking lot or a bus stop to the actual worksite. Walk access time can be affected through policies such as preferential parking for carpoolers and vanpoolers or through improvements to the worksite or area which make access to transit easier. A decrease in walk access time for any particular mode should be entered as a negative value.

*Employer participation rate* refers to the percent of employers in the analysis area implementing the walk access improvements. (This option is not necessary for site-specific analysis because the "participation rate" is 100%.)

**Figure 17. Commuter Model – Site Access and Transit Service Improvements Screen.**

### II. Transit Service Improvements

#### IIa. More Frequent Service

| Change in avg. headway (min) | 0.0 |
| Employment Served            | 0%  |

#### IIb. Faster Service

| Change in route travel time (min) | 0.0 |
| Employment Served                | 0%  |

**Transit Operating Data**

| Increase in daily VMT by Transit Vehicles | 5   |
| Average speed of affected transit vehicles (mph) | 0.0 |
| Default average speed                | 19.6 |
| Check here to use default transit speed | X   |

**Figure 18. Commuter Model – Site Access and Transit Service Improvements Screen (cont.).**
“Change in average headway” refers to the average change in frequency of service for transit service to the employment center or analysis area. An increase in service frequency is entered as a negative number. For example, if peak period transit service frequency increases from 20-minute to 15-minute intervals, the change in average headway would be entered as “-5.0”.

“Change in route travel time” refers to the average change in total route travel time for all transit service to the area. A decrease in travel time is entered as a negative number. For example, if new express bus service decreases the overall route travel time by 5 minutes, this would be entered as “-5.0”.

“Employment served” refers to the percent of employment in the analysis area which is served by the improved transit service. (This option is not available for site-specific analysis).

“Increase in daily VMT by transit vehicles” refers to the additional transit vehicle-miles of travel as a result of the improved transit service. Refer to Section 4.1 of the COMMUTER Model User Manual for guidance on how to calculate this parameter.

Figure 19. Commuter Model – Site Access and Transit Service Improvements Screen (cont.).

<table>
<thead>
<tr>
<th>Mode:</th>
<th>Parking Cost ($/Vehicle)</th>
<th>Fare Cost ($/person/RT)</th>
<th>Other Financial Cost ($/person/RT)</th>
<th>Total Change ($/person/RT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Alone</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>Carpool</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>Vanpool</td>
<td>$ -</td>
<td>$ -1.00</td>
<td>$ -1.00</td>
<td>$ -1.00</td>
</tr>
<tr>
<td>Transit</td>
<td>$ -1.00</td>
<td>$ -</td>
<td>$ -1.00</td>
<td>$ -1.00</td>
</tr>
<tr>
<td>Bicycle</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
</tbody>
</table>

Employer Participation Rate: 100%

“Financial incentives and parking costs” may include higher parking charges for single-occupant vehicles, reduced parking fees for carpools or vanpools, transit subsidies such as free monthly passes, or other financial incentives for specific modes. A decrease in cost is entered as a negative number. For example, provision of a transit pass valued at $30 a month would be entered as a change in fare cost of -$1.50 ($30 / 20 days). The cost change inputs are entered on a daily basis.

“Employer participation rate” refers to the percent of employers in the analysis area offering these incentives to their employees. (This option is not required for site-specific analysis because the “participation rate” is 100%.)

Figure 20. Commuter Model – Financial Incentives and Parking Screen.
Figure 21. Commuter Model – Employer Support Programs for Alternative Modes – Site Specific Analysis Screen.

<table>
<thead>
<tr>
<th>Program</th>
<th>Existing</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpool</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Vanpool</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Transit</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Bicycle</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Specify Program Level:

“Program Level” and “Mode Share Increase” input options are mutually exclusive. You enter input data for either one or the other based on which Entry Format box you check to the left. See the help box below for an explanation of each input.

Specify Mode Share Increase:

<table>
<thead>
<tr>
<th>Program</th>
<th>Existing</th>
<th>Increase</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpool</td>
<td>13.2%</td>
<td></td>
<td>13.2%</td>
</tr>
<tr>
<td>Vanpool</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Transit</td>
<td>5.3%</td>
<td>5.3%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>0.4%</td>
<td></td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Figure 22. Commuter Model – Employer Support Programs for Alternative Modes – Site Specific Analysis Screen.

“Employer Support Programs” include programs such as provision for an on-site transportation coordinator, ridematching, transit information, and other actions aside from time and cost incentives which encourage employees to utilize alternative modes. Two entry options are available for site-specific analysis:

1. Specify existing and new program levels for Carpool, Vanpool, Transit, and Bicycle program support. A program level of “0” represents no program. Program levels of “1” through “4” indicate varying levels of effort for the programs. These program levels are described in Section 4.3 of the COMMUTER Model User Manual.

2. Specify an expected mode share increase for each mode. This increase is added to the baseline mode share as specified in the input data.

IMPORTANT: This entry option should not be utilized unless the user has definitive data indicating a likely mode share increase as a result of proposed programs. If a mode share increase is specified, the user should document existing support programs and programs to be implemented, along with survey or other data indicating the basis for the mode share increase estimates.
### Alternative Work Schedules

**A. Eligibility for Participation**

<table>
<thead>
<tr>
<th>Program</th>
<th>Existing</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flex Time</td>
<td>60%</td>
<td>25%</td>
</tr>
<tr>
<td>Compressed 4/40</td>
<td>0%</td>
<td>15%</td>
</tr>
<tr>
<td>Compressed 9/50</td>
<td>0%</td>
<td>15%</td>
</tr>
<tr>
<td>Staggered Hours</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Telecommute</td>
<td>5%</td>
<td>15%</td>
</tr>
<tr>
<td>Not Eligible</td>
<td>35%</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Figure 23. Commuter Model – Alternative Work Schedules Screen.**

### B. Participation Rates

<table>
<thead>
<tr>
<th>Program</th>
<th>% Participating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
</tr>
<tr>
<td>Flex Time</td>
<td>100%</td>
</tr>
<tr>
<td>Compressed 4/40</td>
<td>100%</td>
</tr>
<tr>
<td>Compressed 9/50</td>
<td>100%</td>
</tr>
<tr>
<td>Staggered Hours</td>
<td>100%</td>
</tr>
<tr>
<td>Telecommute</td>
<td>100%</td>
</tr>
<tr>
<td>Not Participating</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

"Alternative Work Schedules" include the option to allow employees to utilize flex time, compressed work weeks, staggered work hours, or telecommuting. Flex time and staggered hours will have the effect of shifting some trips outside of the peak period, while compressed work weeks and telecommuting will have the effect of eliminating some work trips. Two program entry options are available:

1. The user can specify the percentage of employees eligible for each program. Both existing and new levels of eligibility should be specified.
2. The user can specify existing and expected participation rates for each program.

To accommodate instances where employees are eligible for, or participate in multiple programs, the model allows the user to enter rates that exceed 100% when summed across all alternative programs. The model then internally normalizes the rates before using them in the travel calculations. Section 4.5 of the COMMUTER Model User Manual presents an example for this situation.

**IMPORTANT:** Entry option (2) should not be utilized unless the user has definitive data indicating a likely participation rate as a result of proposed programs. If participation rates are specified, the employer/analyst should document existing support programs and programs to be implemented, along with survey or other data indicating the basis for the participation rate estimates.

**Figure 24. Commuter Model – Alternative Work Schedules Screen.**
Figure 25. Commuter Model – Fleet Emissions Information Screen.

Figure 26. Commuter Model – Fleet Emissions Information Screen (cont.).
Figure 27. Commuter Model – Fleet Emissions Information Screen (cont.).

The COMMUTER model has been designed to use pre-loaded MOBILESb emission factors for a defined range of input conditions or a set of user-supplied emission factors for specific local conditions. Before user-supplied emission factors can be used, they must be loaded into model using the "Import Emission Factors" command from the File menu. If the box above is marked and no user-supplied factors have been loaded, the model will signal an error when you try to view output results.

The "Calendar Year of User EFs" input identifies the specific calendar year factors from the set of user-supplied factors. You can load user-supplied emission factors for any number of individual calendar years. This input allows you to select and compute emission impacts for any one of the calendar years for which emission factors were supplied. If you enter a calendar year that doesn't match those in the user-supplied factors, an error is signaled.

Note: The VMT mixes (percent of travel by vehicle class) contained in the user-supplied emission factors are automatically loaded into the model and used in the emission calculations. If you are computing impacts with user-supplied emission factors, you cannot change the VMT mix from the "Other Emission-Related Data" input screen. When applying user-supplied emission factors, the VMT mix must be specified in the MOBILESb runs. However, you must still supply affected vehicle speed and cold start percentage inputs in the "Other Emissions-Related Data" screen, regardless of whether pre-loaded or user-supplied emission factors are being used.

Figure 28. Commuter Model – Other Emissions-Related Data Screen.
### OTHER EMISSIONS-RELATED DATA

#### Vehicle Fleet VMT Mix
MOBILE5b generates emission factors for each of the eight different vehicle classes listed. Fleet "composite" emission factors are then calculated by weighting these emission factors by the percentage of travel (i.e., VMT) in each vehicle class. The default VMT mixes provided by this program are MOBILE5b national default values. These defaults are calendar year and season specific. This input is required only when you are using the pre-loaded emission factors. If user-supplied factors are used, the VMT mix is obtained automatically from the MOBILE5b runs and these input cells are ignored.

#### Affected Vehicle Speed
Vehicle emissions vary with speed. The values entered here should represent regional network average speeds during the peak and off-peak periods. Default values supplied are based upon HPMS (Highway Performance Monitoring System) averages compiled by urban area size. This input must always be entered whether using either pre-loaded or user-supplied emission factors.

---

**Figure 29. Commuter Model – Other Emissions-Related Data Screen (cont.).**

#### OTHER EMISSIONS-RELATED DATA

#### Cold Start Percentages
Emission factor models address the fact that vehicles have higher emission rates when started "cold" before the catalyst and engine are fully warmed up. In MOBILE5b, trips are defined as either cold starts or hot starts, depending on the time the engine was off (referred to as "soak time") prior to the previous trip. A cold start is defined as any start with a soak time of at least 4 hours for non-catalyst vehicles and at least 1 hour for catalyst vehicles. In MOBILE5b, all other starts are hot starts. For example, if the cold start percentage is 80%, the hot start percentage is 20% (100-80%)

The user must enter the cold start trip percentage of trips for both the baseline trips and for the trips that would be eliminated by TCMs. Note that separate cold start percentages must be entered for both peak and off-peak periods. This input must always be entered whether using either pre-loaded or user-supplied emission factors.

**NOTE TO MOBILE5b USERS:** The cold start percentage inputs used by this program should not be confused with the operating mode fraction inputs required by MOBILE5. Those fractions include specification of the amount of stabilized (Bag 2) operation. In this program, the amount of stabilized operation is internally calculated from the start percentage inputs and the average trip length.

---

**Figure 30. Commuter Model – Other Emissions-Related Data Screen (cont.).**
**Figure 31. Commuter Model – Results Screen.**

**Figure 32. Commuter Model – Results Screen (cont.).**

**COMMUTER MODEL RESULTS**

<table>
<thead>
<tr>
<th>SCENARIO INFORMATION</th>
<th>PROGRAMS EVALUATED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>X Site Walk Access Improvements</td>
</tr>
<tr>
<td>Scenario Filename</td>
<td>X Transit Service improvements</td>
</tr>
<tr>
<td>Emission Factor File</td>
<td>X Financial Incentives</td>
</tr>
<tr>
<td>Performing Agency</td>
<td>X Employer Support Programs</td>
</tr>
<tr>
<td>Analyst</td>
<td>X Alternative Work Schedules</td>
</tr>
<tr>
<td>Metropolitan Area</td>
<td>User-Supplied Final Mode Shares</td>
</tr>
<tr>
<td>Area Size</td>
<td></td>
</tr>
<tr>
<td>Analysis Scope</td>
<td>1 - Large (over 2 million)</td>
</tr>
<tr>
<td>Analysis Area/Site</td>
<td>2 - Site or Employer-Based</td>
</tr>
<tr>
<td>Total Employment</td>
<td>Employer worksite</td>
</tr>
</tbody>
</table>

**MODE SHARE IMPACTS**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Baseline</th>
<th>Final</th>
<th>%Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Alone</td>
<td>75.4%</td>
<td>69.2%</td>
<td>-6.3%</td>
</tr>
<tr>
<td>Carpool</td>
<td>13.2%</td>
<td>12.0%</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Vanpool</td>
<td>0.5%</td>
<td>2.4%</td>
<td>+1.9%</td>
</tr>
<tr>
<td>Transit</td>
<td>5.3%</td>
<td>9.2%</td>
<td>+4.0%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>0.4%</td>
<td>0.7%</td>
<td>+0.2%</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>4.0%</td>
<td>3.8%</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Other</td>
<td>1.1%</td>
<td>1.0%</td>
<td>-0.1%</td>
</tr>
<tr>
<td>No Trip</td>
<td>-</td>
<td>1.8%</td>
<td>+1.8%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>-</td>
</tr>
</tbody>
</table>

**TRAVEL IMPACTS (relative to affected employment)**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Baseline VMT</th>
<th>Final VMT</th>
<th>VMT Reduction</th>
<th>% VMT Reduction</th>
<th>Baseline Trips</th>
<th>Final Trips</th>
<th>Trip Reduction</th>
<th>% Trip Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>11,885</td>
<td>7,427</td>
<td>19,356</td>
<td></td>
<td>1,000</td>
<td>561</td>
<td>63</td>
<td>130</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EMISIION REDUCTIONS (tons/day except CO2 in metric tons/day, positive values are decreases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollutant</td>
</tr>
<tr>
<td>HC</td>
</tr>
<tr>
<td>CO</td>
</tr>
<tr>
<td>NOx</td>
</tr>
<tr>
<td>CO2</td>
</tr>
</tbody>
</table>
Other

HOW DOES YOUR DEVELOPMENT REVIEW PROCESS AFFECT ECONOMIC DEVELOPMENT?
Development Review as Economic Development

By Michael Blue, FAICP

Development review is more than just a series of perfunctory steps to run a project through prior to approval.

Done well, it is an economic development tool for a community to attract and secure desirable development, implement plans, and add to the local tax base. Conversely, an unpredictable development approval process can discourage development that the community wants. It can lead to difficulty in implementing plans and create the impression that the community is not a good place to do business.

We’ve all been to a meeting like this: The planning and zoning commission is on its third review meeting of a major retail development on the main commercial corridor in town. The staff has worked with the developer to understand city codes and expectations, and the proposal has begun to reflect those needs. In keeping with the outline of the staff report, the commission has dutifully considered land use, zoning, site plan and circulation, traffic, landscaping, signage, lighting, light fixtures, and now, building materials. The discussion has gone as expected so far, with the commission requesting “just a couple more” details on types of plant materials and a bit of discussion over which of the light fixture styles was most appropriate.

Then the commission turns its attention to the awnings. The signage on the awnings for the project’s anchor tenant was within code and the color was the company’s usual red. One of the commission members suggested that while the awning was the company’s standard and was in context with the overall building, perhaps a different shade of red would be more attractive, maybe even a maroon. A second commission member chimes in that maroon is much too dark, and that something more vibrant, perhaps leaning toward orange, would be better. The debate on which shade of red was best for the awning rages on for 45 minutes. To resolve the matter, the chair suggests that the applicant return to the next meeting with three samples of shades of red they would like to propose for the commission to evaluate and then adds that it is now too late to make any formal decisions.

The aftermath of the meeting is predictable. The applicant is frustrated because there is a corporate deadline to start construction that this “hurdle” will delay. He will tell the planner how the whole project is now in jeopardy and that all those people who warned him not to build in this town were right! A call from the mayor or city administrator wanting to know what happened is also likely since this is a project the community wants.

Development review is an essential element of municipal operations, and when done well, it provides an opportunity for planners to bring a great value to the communities they serve. The process should always improve marginal developments and reject those that are inappropriate, but it should not be the stumbling block that inhibits desirable outcomes.
THE WARNING
Elected and appointed officials, planners, and other development process participants can become comfortable with their communities’ zoning approval processes. However, we must realize that just because a process worked in the “old” economy, prior to the mid-2000s, it will not necessarily function well today. Well-capitalized builders and developers who feel they can put a project in the ground on spec and then attract tenants are rare, if they exist anywhere. Communities are faced with a new range of development and financial challenges. For these reasons, it is time to revisit approval processes and find the next set of best practices to ensure that development review tasks and requirements add value to our communities.

THE CHARGE
A development review processes should incorporate three essential themes:
• The process must be predictable to the applicant, elected and appointed officials, other departments, and the public in order to assure the best outcomes.
• Each step in the development approval process must add value to the process, the development, and the community.
• The process must ensure open and continuous communication to the applicant, elected and appointed officials, other departments, and the public.

Communities should audit their processes in light of these three themes. But remember, the purpose is not just to do “more with less” or to streamline a process. Yes, efficiency and timely review are important, but we must be careful that streamlining is not just doing the same work in less time. A faster development review isn’t necessarily a better review. Rather, the question should be to look at the aspects of the review and determine if they advance the community vision. Did the commission need to review awning colors (or, for that matter, landscape and lighting, which could be defined in a code and approved administratively)? If the answer for the community is yes, these are important elements that must be considered by a formal body, and the community should continue to do so. However, if items of limited significance are being reviewed or approval through a commission process isn’t essential to enhancing development, they should be eliminated, made administrative, or set to meet clearly defined code standards. This is the type of process streamlining that will save time and money for the community by focusing effort on the issues that matter most and making it a more attractive place to pursue development.

THE CAVEAT
Is this about tossing out the way communities have conducted development review and starting over? Absolutely not. The steps in development review that reflect the unique values and

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Figure 1. Single-family housing sales, January 2000–November 2013.
needs of the community should continue. And while it should go without saying, the purpose is not about accepting development the community neither wants nor needs, nor is it about assuring large profits to an applicant. The objective is to strike a balance in approval processes so as to smoothly facilitate quality development outcomes for the community and its residents.

**WHY IS THIS IMPORTANT NOW?**

To state the obvious, the world of development, and therefore development approval, has changed over the last several years from what it was prior to the Great Recession. Figures 1 and 2 for new home sales and building permits reflect the very familiar trend line of peaking in the middle part of the last decade, falling sharply, and now returning (slowly) to an upward trend. But even as the economy begins to gain traction, it is important to ask: Will it ever be 2005 again in the development world? Can communities expect or count on that pace of development returning? Communities cannot rely on securing tax-base support from desired development at the pace they did 10 years ago. That economy is past. The way in which development is done has changed, and development approval practice must reflect that reality. It must be thought of as part of the community’s economic development toolbox.

**The Development Business Has Changed**

Figure 3 (showing the familiar pattern and an uncertain 2013) indicates annual rates of private construction in the U.S. Anecdotal stories heard at building counters reflect that while developers are out there looking to take on projects, capital is hard to find and is impacting the number of projects being initiated. Not only will developers be limited by access to capital, but they will be more likely to seek public financial participation. More to the point of this discussion, developers will be more risk averse and less likely to pursue development where the approval process is unpredictable.

**Development Approval and Economic Development Have Changed**

The capacity of municipalities to regulate and support development has been threatened and impacted by state referenda on property rights and Supreme Court cases such as _Nollan_, _Dolan_, and _Kelo_. These challenges have not gutted the role of municipalities in developing their communities, but they do give communities reason to be cautious. In this environment, a sound and predictable development approval process becomes an even more valuable economic development tool.

**Public Finance Has Changed**

Established revenue sources to communities have been reduced. In addition, local governments all over the country are dealing with having lost, or the risk of losing, funds from state and federal sources. Further, municipalities are facing challenges imposed by funding pension responsibilities; the table below shows the increasing trend of these payments. As those obligations grow, so will the pressure to find new revenue sources to support them. Again,
the need for attracting desirable development to support fiscal needs becomes an important element of municipal finance.

**Government Operations Have Changed**

The mantras heard at budget hearings everywhere are the echoes of very real fiscal constraints: “do more with less,” “consolidate,” “share services,” “outsource,” “think like a business,” etc. These concepts have merit, but at some point (and many places are already there) budget reductions are cutting bone, not fat. A number of communities set staffing levels based on average, or typical, operations. In areas that do not have a year-round construction season, maintaining staff needed during a busier summer season allows for “catching up” or project work during the winter. Communities unable to carry staff in this way may move to third-party services for peak times. No matter how communities address the budget and staffing challenge, it is important to maintain the emphasis on quality development review. Too often the concern in light of budget constraints is how to do development review faster, but the question should be how to do it better.

**THE WARNING SIGNS**

So how do you know when the process isn’t functioning optimally and you need to look at serious change? Keep your eyes open for some warning signs:

**A Lack of Understanding or Respect for the Process**

The approval process is not always going to be smooth. It is inherently a negotiation and may well be contentious. But it does not need to be mean spirited or belligerent; it doesn’t have to be cops and robbers. If there is a lack of trust, communication, or respect at meetings between staffs and applicants, realize that this is not normal and acceptable. It is time to find and eliminate the cause of a caustic working relationship.

In addition, some applicants will go through the motions of the approval process with little regard for staff review or commission evaluation. This approach may be a political calculation by the applicant in the hope that a desire for their project by the community negates the need for in-depth vetting through a public process. This is not the case and should be a warning sign. A deliberative process that seeks and applies concerns brought up by the staff, commissioners, and public input creates a thoughtful deliberation and brings a well-reasoned recommendation to the elected officials. Further discussion at that stage isn’t a problem, but officials should be working from a foundation established in the process.

**Development by Litigation**

In some cases an approval process will result in litigation. While always possible, the keys to avoiding this outcome are a well-crafted comprehensive plan and set of development policies, practices, and regulations that reflect that plan. In addition, a predictable approval process will lessen the chances of a community being sued by an applicant. Working from the notion that the applicant will most likely proceed if there is a reasonable chance for success, it is the denial that seems unexpected to them or comes from a late shift in the position of the community that inspires litigation. A predictable process, well communicated and well executed, can help diminish the potential for litigation.

**Amending Unnecessary or Inappropriate Requirements**

It is essential to know and be able to explain why code requirements exist. Dismissive answers such as “because the code says so” or “because we’ve always done it that way” do not communicate properly to applicants or the community the value of development (and building permit) review. Also, there is efficiency to be found in making sure that every step has a purpose—benefiting both the community and applicants. The question is whether the review requirement adds value to the development and the community. If it does, keep it; if not, look to amend the code.

That said, change for the sake of change (or to give the appearance of progress) has no value. Likewise, a knee-jerk code or policy change in response to a single undesirable outcome (like an unusual sign or odd-sized porch) is not always necessary. But if patterns appear in approvals that are contrary to community desires or a “loophole” is identified that creates unwelcome development forms, communities should be willing to amend local codes to support desired outcomes. The same is true should the need arise to consider updates to the approval process. In making changes, communities should take note that seeking out different perspectives and being open to the changes they propose (even small ones) can improve the process and are appreciated by applicants.

**A Reliance on Last-Minute Negotiation**

As stated earlier, development includes negotiations. When that negotiation happens is important, and the earlier in the process the better. The ability to be flexible diminishes, for both municipality and applicant, as the process moves forward. A last-minute demand will either be a genuine issue or create a perception of unreasonableness (from either party) and may upend a desired outcome.

**A Lack of Internal Communication**

In most communities the team that conducts development review is multidisciplinary and from different departments. Communication...
among these groups is essential. A lack of com-
munication will limit desirable outcomes and
send the message that the community is not
ready to do business.

A Lack of Positive Development Outcomes
Securing desired developments that advance
the community’s plans, vision, and quality
of life is the ultimate aim of an effective de-
velopment approval process. To ensure this
is working, always go back and see how the
development turned out. See what the local
commissioners, residents, and elected officials
think. Not everyone will like every develop-
ment, but finding that the community is consis-
tently not pleased with outcomes is reason to
reconsider how projects are approved.

HOW TO IMPROVE THE DEVELOPMENT
APPROVAL PROCESS
If you notice any of the warning signs above,
it’s time to start an internal discussion. Identify
a point person to talk with staff, commissions,
and elected officials to understand what the
community needs and wants from the process.
Talk to the customers (developers) about their
take on the process. Review your development
approval steps to see that they add value. You
should ask: Why do we do this? Who does it
help? Is the cost for review greater than the
benefit? Evaluate the system in light of the
themes, truisms, and best practices outlined
below.

Predictability
The best development approval process will
have a defined structure understood by all
involved. To facilitate such an outcome, com-
munities should be cognizant of the numerous
perspectives in the process and work to create
a common understanding of how the process
functions.

Certainty versus flexibility. Communities
want to know precisely what will be built, who
will occupy it, when it will be finished, and
what it will look like. Developers want to make
many of these determinations later (to be sure
the construction material is in stock, negoti-
ate leases over time, change the appearance
depending on tenants plans, etc.). There is no
way to completely bridge the certainty versus
flexibility gap, but the answer is to provide
predictability. Approval ordinances, codes,
or development agreements should spell out
what can change after approval, including what
can be signed off on administratively and what
will require a new hearing.

Different game for the little guys. Large
developers or businesses may have a team of
attorneys, architects, traffic engineers, land-
scape architects, and other professionals to as-
sist with review processes. Smaller applicants
will not. They may have never been through
an approval before. The process will be full of
jargon and intimidating meetings. They will
need assistance (and time) from staff to make
it through the process. Many communities
note a desire to emphasize locally owned busi-
nesses as part of their economic development
program, and having an approval process they
can navigate is a great place to start.

Conduct commissioner training. The com-
munity members sitting on various develop-
ment-related boards and commissions more
often than not have no technical training or
professional expertise in development review
or code preparation. Even the best staff reports
cannot make them experts in the field, and
many will be unwilling to ask questions they
feel are too simple. They are on the commis-
sions because of their interest in and commit-
ment to their community. Further, as residents
they will certainly have a keen understanding
of the town’s quality of life, expectations of
community members, local history, etc. While
volunteer board members will bring these
insights to the commission deliberations, staff
can help enhance the efficacy of these boards
and commissions by finding the time and op-
portunity to provide training in commission
operations and development review practice.

Communicate the process and expecta-
tions. Developers should know early in the
process what information, studies, meetings,
and approvals will be required. This need not
be sugarcoated; it should be realistic. Part of
this communication is also to understand the
applicant’s position (with an open mind). Be

Desirable developments that implement community plans are the most direct indicator that a development approval process is succeeding.
Dealing with limited staff resources.

Frequent applicant communications, in-depth technical analysis, and being available to elected and appointed officials can be difficult for planners in communities with limited resources. However, this does not diminish their importance. A review of the approval process should certainly consider how to meet local objectives with limited staff resources.

Little efforts can make a big difference.

Revisiting a development approval process does not require wholesale change, especially just for the sake of change. It may be that an updated explanation or diagram of the process, or consolidating steps, serves the community and applicants well. In addition, involving the development and business community in the evaluation provides value by showing that the community is committed to reviewing proposed development in the most effective manner available.

Communication

Open and continuous communication with applicants, community officials, other staff, residents, and other stakeholders is foundational to all of the concepts described in this article. This point is often forgotten, either because it is so basic or because in some situations it is inconvenient, but no approval process can succeed without this key ingredient.

No surprises.

The city manager, public commissions, and elected officials should be well informed (early on) of issues or questions that are likely to be controversial. Likewise, a developer should be made aware of what they may expect in the process; again, it should be realistic and reflect an understanding of previous project approvals.

Communicate early and often in the process.

A clear and comfortable path for communication is essential. This must exist between the staff and the applicant and between staff and appointed and elected officials. This can be formal or informal, but it must be present. If you haven’t already, consider establishing single points of contact for such communications.

Communicate internally.

Organizational “silos” are problematic in many instances. This is certainly the case for effective development review; the process must include discussion among all work groups on a regular basis (this cannot be stressed enough). The process may be led by a planning or community development department, but must involve public works, fire, police, parks and recreation, corporation counsel, and other internal stakeholders. These groups should meet regularly to assure consistency and be available to the applicant to clarify matters early in the review process.

CONCLUSION

It is not the place of any municipality to swing open the doors and allow development at all costs or to tilt the process in favor of anyone’s profit motive. That is not the intent of the concepts raised here. The point is that to conduct development review as if it were 2005—or to use the same process that was in place in 2005—is detrimental to the community. Creating an environment that facilitates a good development process leads to desired outcomes that benefit the entire community; it is a role for which planners are uniquely qualified and should be leading in their municipalities.
HOW DOES YOUR DEVELOPMENT REVIEW PROCESS AFFECT ECONOMIC DEVELOPMENT?
America in 2013

Key Findings on Housing, Community, Transportation, and the Generations

ULI Urban Land Institute
Infrastructure Initiative

ULI Urban Land Institute
Terwilliger Center for Housing
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  Focus on Commuting
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Focus on the Generations
  Focus on War Babies and the Silent Generation
  Focus on the Baby Boomer Generation
  Focus on Generation X
  Focus on Generation Y

Visit www.uilt.org/communitysurvey to learn more about “America in 2013.”
Since 1982, Belden Russonello Strategists LLC has helped nonprofits, political campaigns, news media, and other clients understand the relationships between issues and motivations for action, whether it is rethinking policy, attracting new members, or changing attitudes and behavior.

ULI’s Infrastructure Initiative works to promote more sustainable infrastructure investment choices and to foster an improved understanding of the links between infrastructure and land use.

ULI’s Terwilliger Center for Housing engages in a multifaceted program of work that furthers the development of mixed-income, mixed-use communities with a full spectrum of housing affordable to all, a critical aspect of ULI’s core mission of “providing leadership in the responsible use of land.”

Learn more about “America in 2013” at www.uli.org/communitysurvey.
Focus on Community Satisfaction

How satisfied are Americans with their communities? This fact sheet shares key findings from “America in 2013” on community satisfaction.

“America in 2013” is a national survey conducted by Belden Russonello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

About Half of Americans Are Very Satisfied with the Quality of Life in Their Community
According to the survey, 49 percent of Americans are somewhat or very satisfied with the quality of life in their community. The oldest Americans report the highest satisfaction levels, with 67 percent of war babies/the silent generation saying they are very satisfied with their community’s quality of life. However, only 40 percent of gen Yers report being very satisfied with their community.

Overall, 38 percent of Americans say they are somewhat satisfied, leaving some room for improvement. Dissatisfaction is especially pronounced among gen Yers and baby boomers: 16 percent of gen Yers and 14 percent of baby boomers say they are somewhat or very dissatisfied with life in their community.

Satisfaction with Community’s Quality of Life, by Generation
Percentage

<table>
<thead>
<tr>
<th></th>
<th>Very satisfied</th>
<th>Somewhat satisfied</th>
<th>Somewhat dissatisfied</th>
<th>Very dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>49</td>
<td>38</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Gen Y</td>
<td>40</td>
<td>42</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Gen X</td>
<td>51</td>
<td>40</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>47</td>
<td>37</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>67</td>
<td>28</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
Satisfaction with Community Quality of Life Varies by Income and Location
Satisfaction with the quality of life in a community correlates with income. Lower-income Americans report the lowest levels of satisfaction, with 20 percent of those making less than $25,000 annually per household saying they are somewhat or very dissatisfied with their community’s quality of life, and only 42 percent saying they are somewhat satisfied. In contrast, 60 percent of people making more than $75,000 report being very satisfied with their community.

### Satisfaction with Community’s Quality of Life, by Household Income

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Very satisfied</th>
<th>Somewhat satisfied</th>
<th>Somewhat dissatisfied</th>
<th>Very dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25,000</td>
<td>37</td>
<td>42</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>$25,000–$50,000</td>
<td>44</td>
<td>46</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>$50,000–$75,000</td>
<td>52</td>
<td>38</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Over $75,000</td>
<td>60</td>
<td>31</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

Satisfaction with community quality of life is lowest among big-city dwellers, 24 percent of whom report being somewhat or very dissatisfied with their community. Suburban residents are the most satisfied with their community.

### Satisfaction with Community’s Quality of Life, by Size of Community

<table>
<thead>
<tr>
<th>Community Size</th>
<th>Very satisfied</th>
<th>Somewhat satisfied</th>
<th>Somewhat dissatisfied</th>
<th>Very dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>50</td>
<td>40</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Small town</td>
<td>47</td>
<td>40</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Suburbs</td>
<td>52</td>
<td>39</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>53</td>
<td>37</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Big city</td>
<td>43</td>
<td>31</td>
<td>13</td>
<td>11</td>
</tr>
</tbody>
</table>

Americans Generally Think Community Quality of Life Will Remain the Same
About 63 percent of Americans expect the quality of life in their community to stay the same. However, a significant portion of the country—17 percent—thinks life in their community is getting worse. Nineteen percent thinks things are getting better. Baby boomers are the most pessimistic of all the generations, with 22 percent thinking things are getting worse and 17 percent thinking things are getting better. The oldest Americans expect no change in the status quo.

### Impression of Trend of Quality of Life in the Community, by Generation

<table>
<thead>
<tr>
<th>Generation</th>
<th>Better</th>
<th>Worse</th>
<th>Same</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>19</td>
<td>17</td>
<td>63</td>
</tr>
<tr>
<td>Gen Y</td>
<td>21</td>
<td>16</td>
<td>62</td>
</tr>
<tr>
<td>Gen X</td>
<td>21</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>17</td>
<td>22</td>
<td>61</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>16</td>
<td>10</td>
<td>72</td>
</tr>
</tbody>
</table>

Visit [www.ull.org/communitysurvey](http://www.ull.org/communitysurvey) to learn more about “America in 2013.”
Jobs Are a Key Area of Dissatisfaction
In contrast with other categories, where Americans tend to report higher satisfaction levels, on quality and quantity of jobs, only about half of Americans say they are satisfied. Gen Yers are the most dissatisfied, followed by baby boomers.

Rural dwellers also tend to be dissatisfied with job quality and quantity, with 56 percent reporting dissatisfaction, compared with 40 percent of big-city dwellers. Fifty-five percent of Latinos are dissatisfied with the job situation in their community, as are 58 percent of African Americans. Among general feelings of satisfaction in other areas, job opportunities stand out as a key challenge.

<table>
<thead>
<tr>
<th>Satisfaction with Quality and Quantity of Job Opportunities, by Generation</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All adults</td>
<td>49</td>
<td>43</td>
</tr>
<tr>
<td>Gen Y</td>
<td>46</td>
<td>49</td>
</tr>
<tr>
<td>Gen X</td>
<td>56</td>
<td>41</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>46</td>
<td>47</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>50</td>
<td>26</td>
</tr>
</tbody>
</table>

Americans Are Fairly Satisfied with Their Home; Gen Y, Lower-Income People, Big-City Dwellers, and Renters Are Least Satisfied
Most Americans—89 percent, according to the survey—are fairly satisfied with their current home; 11 percent report dissatisfaction. However, for gen Yers, there is plenty of room for improvement: 20 percent indicate they are dissatisfied with their current home. Baby boomers follow, with 9 percent reporting dissatisfaction. The oldest Americans are the most content in their home: 96 percent say they are satisfied, and only 3 percent report dissatisfaction.

<table>
<thead>
<tr>
<th>Satisfaction with Current Home, by Generation</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All adults</td>
<td>89</td>
<td>11</td>
</tr>
<tr>
<td>Gen Y</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>Gen X</td>
<td>93</td>
<td>7</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>91</td>
<td>9</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>96</td>
<td>3</td>
</tr>
</tbody>
</table>
Lower-income Americans are the least satisfied with their current home. Eighteen percent of those making less than $25,000, and 15 percent of those making $25,000 to $50,000, say they are dissatisfied with their home.

**Satisfaction with Current Home, by Household Income**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 25,000</td>
<td>81</td>
<td>18</td>
</tr>
<tr>
<td>$25,000–$50,000</td>
<td>84</td>
<td>15</td>
</tr>
<tr>
<td>$50,000–$75,000</td>
<td>93</td>
<td>6</td>
</tr>
<tr>
<td>Over $75,000</td>
<td>95</td>
<td>5</td>
</tr>
</tbody>
</table>

When it comes to their home, big-city dwellers are also the least satisfied of Americans, with 19 percent reporting dissatisfaction. Rural dwellers are the most satisfied.

**Satisfaction with Current Home, by Size of Community**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>93</td>
<td>7</td>
</tr>
<tr>
<td>Small town</td>
<td>91</td>
<td>9</td>
</tr>
<tr>
<td>Suburbs</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>86</td>
<td>13</td>
</tr>
<tr>
<td>Big city</td>
<td>81</td>
<td>19</td>
</tr>
</tbody>
</table>

There is also a large difference in satisfaction between owners and renters, with 22 percent of renters saying they are dissatisfied with their current home, compared with 5 percent of owners.

**Satisfaction with Current Home, by Homeownership Status**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owners</td>
<td>95</td>
<td>5</td>
</tr>
<tr>
<td>Renters</td>
<td>78</td>
<td>22</td>
</tr>
</tbody>
</table>

**Americans are Fairly Satisfied with Local Housing Options; Gen Y, Lower-Income People, Big-City Dwellers, and Renters Are Least Satisfied**

When it comes to the range of housing types to choose from in communities, most Americans are fairly satisfied: 83 percent of the population reports satisfaction, and 15 percent reports dissatisfaction. Gen Yers are the least satisfied, with 21 percent indicating dissatisfaction with housing options.
Satisfaction with Local Housing Options, by Generation
Percentage

<table>
<thead>
<tr>
<th></th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>83</td>
<td>15</td>
</tr>
<tr>
<td>Gen Y</td>
<td>76</td>
<td>21</td>
</tr>
<tr>
<td>Gen X</td>
<td>83</td>
<td>15</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>84</td>
<td>14</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>90</td>
<td>5</td>
</tr>
</tbody>
</table>

Lower-income Americans are the least satisfied with housing options in their community. Twenty percent of people making less than $25,000, and 17 percent of those making $25,000 to $50,000, say they are dissatisfied with the range of housing types to choose from.

Satisfaction with Local Housing Options, by Household Income
Percentage

<table>
<thead>
<tr>
<th></th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25,000</td>
<td>76</td>
<td>20</td>
</tr>
<tr>
<td>$25,000–$50,000</td>
<td>82</td>
<td>17</td>
</tr>
<tr>
<td>$50,000–$75,000</td>
<td>85</td>
<td>13</td>
</tr>
<tr>
<td>Over $75,000</td>
<td>88</td>
<td>10</td>
</tr>
</tbody>
</table>

Big-city dwellers are also the least satisfied of Americans with their housing options, with 21 percent reporting dissatisfaction. Of note: rural dwellers are also fairly dissatisfied.

Satisfaction with Local Housing Options, by Size of Community
Percentage

<table>
<thead>
<tr>
<th></th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>82</td>
<td>17</td>
</tr>
<tr>
<td>Small town</td>
<td>83</td>
<td>16</td>
</tr>
<tr>
<td>Suburbs</td>
<td>89</td>
<td>9</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>82</td>
<td>13</td>
</tr>
<tr>
<td>Big city</td>
<td>76</td>
<td>21</td>
</tr>
</tbody>
</table>

A large difference also exists in satisfaction with housing options between owners and renters, with 20 percent of renters saying they are dissatisfied, compared with 11 percent of owners.

Satisfaction with Local Housing Options, by Owning and Renting
Percentage

<table>
<thead>
<tr>
<th></th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owners</td>
<td>86</td>
<td>11</td>
</tr>
<tr>
<td>Renters</td>
<td>77</td>
<td>20</td>
</tr>
</tbody>
</table>

Visit [www.ull.org/communitysurvey](http://www.ull.org/communitysurvey) to learn more about “America in 2013.”
Focus on Community Preferences by Generation

When it comes to their communities, what are Americans looking for? What do they value, and what do they see as important? What kind of community would they prefer to live in?

This fact sheet shares key findings about community preferences from “America in 2013,” a national survey conducted by Belden Russonello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

Americans Place a High Value on Safety and Schools
When asked to rank certain community characteristics on a scale of 1 to 10, all generations place neighborhood safety and the quality of public schools at the top. (Of note: the importance of schools declines with the age of each generation, falling from 87 percent of gen Yers ranking it at the top to 68 percent of members of the oldest generations.)

Community Characteristic Importance Rankings, by Generation
Percentage ranking each characteristic 6 or higher in importance on a scale of 1 to 10

<table>
<thead>
<tr>
<th></th>
<th>All adults</th>
<th>Gen Y</th>
<th>Gen X</th>
<th>Baby boomers</th>
<th>War babies/silent generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood safety</td>
<td>92</td>
<td>88</td>
<td>97</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Quality of local public schools</td>
<td>79</td>
<td>87</td>
<td>82</td>
<td>74</td>
<td>68</td>
</tr>
<tr>
<td>Space between neighbors</td>
<td>72</td>
<td>69</td>
<td>79</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Short distance to work or school</td>
<td>71</td>
<td>82</td>
<td>71</td>
<td>67</td>
<td>57</td>
</tr>
<tr>
<td>Distance to medical care</td>
<td>71</td>
<td>73</td>
<td>63</td>
<td>72</td>
<td>78</td>
</tr>
<tr>
<td>Walkability</td>
<td>70</td>
<td>76</td>
<td>67</td>
<td>67</td>
<td>69</td>
</tr>
<tr>
<td>Distance to shopping/entertainment</td>
<td>66</td>
<td>71</td>
<td>58</td>
<td>67</td>
<td>69</td>
</tr>
<tr>
<td>Distance to family/friends</td>
<td>63</td>
<td>69</td>
<td>57</td>
<td>60</td>
<td>66</td>
</tr>
<tr>
<td>Distance to parks/recreational areas</td>
<td>64</td>
<td>68</td>
<td>62</td>
<td>63</td>
<td>60</td>
</tr>
<tr>
<td>Convenience of public transportation</td>
<td>52</td>
<td>57</td>
<td>45</td>
<td>50</td>
<td>56</td>
</tr>
</tbody>
</table>

As shown in the table, gen Y expresses preferences that differ from those of the other generations in interesting ways. Gen Y is the least likely to value neighborhood safety or space between neighbors, but the most likely to want high-quality public schools, a short distance to work or school, walkability, and proximity to amenities like shopping and transit.

Members of generation X have less of a preference for urban living than do gen Yers, though being a short distance from work or school is important to them, matching the strength of preference for U.S. residents
as a whole. Compared with the U.S. average and with other generations, gen X has a strong preference for having more space between neighbors.

The rankings for baby boomers’ preferences tend to mirror those of the nation as a whole, but baby boomers put less emphasis on schools and on being near work or school. America’s oldest generations—war babies and the silent generation—place a high value on being close to medical care but do not care as much about being near work or school.

Compact Development: An Appeal That Cuts Across Generations

“America in 2013” found that more than half of Americans—representing nearly 127 million people—prefer a mix of community attributes typically associated with compact development. When asked to choose between tradeoff choices—living in a community with a mix of incomes or one with similar incomes, having available public transportation or not having it, among others—54 percent of Americans choose three or more of the five community attributes typically associated with compact development.

As shown in the table, preferences for compact development are stronger in some age cohorts than in others—the strongest being among gen Yers, followed by baby boomers. However, across all generations, about half of all Americans prefer a mix of community attributes traditionally associated with compact development.

Community Attribute Preferences, by Generation
Percentage preferring to live in a community with these attributes

<table>
<thead>
<tr>
<th></th>
<th>All adults</th>
<th>Gen Y</th>
<th>Gen X</th>
<th>Baby boomers</th>
<th>War babies/silent generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shorter commute/smaller home</td>
<td>61</td>
<td>54</td>
<td>54</td>
<td>72</td>
<td>65</td>
</tr>
<tr>
<td>Proximity to mix of shops, restaurants, and offices</td>
<td>53</td>
<td>62</td>
<td>50</td>
<td>49</td>
<td>51</td>
</tr>
<tr>
<td>Mix of incomes</td>
<td>52</td>
<td>52</td>
<td>53</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td>Public transportation options</td>
<td>51</td>
<td>55</td>
<td>45</td>
<td>52</td>
<td>48</td>
</tr>
<tr>
<td>Mix of homes</td>
<td>48</td>
<td>59</td>
<td>47</td>
<td>42</td>
<td>44</td>
</tr>
</tbody>
</table>

For Older Americans, the Appeal of a Shorter Commute Is Strong

As shown in the table, among older Americans, many of whom have spent substantial time in the workforce and may continue working beyond the traditional retirement age, the preference for a shorter commute is very strong, even if it means living in a smaller home. Seventy-two percent of baby boomers, or nearly 53 million people, would make that tradeoff.

Similarly, 65 percent of war babies and members of the silent generation—nearly 23 million people—would trade a larger home for a shorter commute. Almost 51 percent of these older Americans (representing 18 million people) also show a slight preference for living in areas close to a mix of shops, restaurants, and offices, reinforcing their preference, particularly as they age, for walkable communities near amenities.

Visit www.ult.org/communitysurvey to learn more about “America in 2013.”
Gen Y Is Focused on Access and Convenience in Compact, Diverse Communities
Among gen Yers, 54 percent—representing nearly 39 million people—would trade a larger home for a shorter commute. Among all generations, gen Y is the most attracted to living in a neighborhood close to a mix of shops, restaurants, and offices. Sixty-two percent of gen Yers (representing more than 44 million people) prefer this type of mixed-use community over one where shops, restaurants, and offices are farther away.

Gen Y is also the only age cohort that shows a preference for living in a neighborhood where there is a mix of housing types. Fifty-nine percent of gen Yers—representing more than 42 million people—would like to live in a community where there is a range of housing. Similarly, 52 percent of gen Yers (representing more than 37 million people) would like to live in a community where there is a range of incomes.

Urban, Compact Living Least Likely to Appeal to Gen X
Gen Xers are the least likely to find community attributes associated with compact development appealing. Despite this, 49 percent prefer three or more of the community attributes associated with compact development. Fifty-three percent of gen Xers value income diversity, and 50 percent would like to be close to a mix of shops, restaurants, and offices.

Visit www.ulf.org/communitysurvey to learn more about “America in 2013.”
Focus on Movers

How many Americans are planning to change homes in the next five years? And what are likely movers looking for in the communities they are moving to? Who has moved recently, and did they move to a bigger home or downsize? This fact sheet shares key findings from “America in 2013” about likely and recent movers.

“America in 2013” is a national survey conducted by Belden Russonello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

Many Americans Plan to Move in the Next Five Years; Gen Yers Are the Most Likely to Move

Many Americans report that they are likely to change homes during the next five years. “America in 2013” found that 42 percent of Americans—representing 98 million people—are likely movers. Making up that 42 percent are 25 percent who are very likely to move and 17 percent who are somewhat likely. Gen Yers are the most likely to move: 63 percent say they expect to move during the next five years. America’s oldest generations are the least likely to move.

<table>
<thead>
<tr>
<th>Likely to move</th>
<th>Not likely to move</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>42</td>
</tr>
<tr>
<td>Gen Y</td>
<td>63</td>
</tr>
<tr>
<td>Gen X</td>
<td>41</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>31</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>22</td>
</tr>
</tbody>
</table>

Lower-income people are more likely to move than those with higher incomes. Fifty-one percent of the people making less than $25,000 report that they are likely to move in the next five years, compared with 43 percent of those making more than $75,000.

Likelihood of Moving, by Household Income

<table>
<thead>
<tr>
<th>Likely to move</th>
<th>Not likely to move</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25,000</td>
<td>51</td>
</tr>
<tr>
<td>$25,000–$50,000</td>
<td>40</td>
</tr>
<tr>
<td>$50,000–$75,000</td>
<td>34</td>
</tr>
<tr>
<td>Over $75,000</td>
<td>43</td>
</tr>
</tbody>
</table>

Visit [www.uli.org/communitysurvey](http://www.uli.org/communitysurvey) to learn more about “America in 2013.”
Most Movers Expect to Own Their New Home; Gen Yers and Older Americans Are More Likely to Expect to Rent

Most movers—73 percent—believe they will own the primary residence they move into; one-quarter expect to rent. Gen Yers and the oldest Americans are the most likely to expect to rent their new home, and gen Xers are the least likely to expect to rent. Just 20 percent of the baby boomers expect to rent.

### Movers’ Expected Homeowner Status, by Generation

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Expect to own</th>
<th>Expect to rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>73</td>
<td>25</td>
</tr>
<tr>
<td>Gen Y</td>
<td>69</td>
<td>31</td>
</tr>
<tr>
<td>Gen X</td>
<td>81</td>
<td>16</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>79</td>
<td>20</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>55</td>
<td>36</td>
</tr>
</tbody>
</table>

Most Prospective Movers Want Single-Family Homes, but Some Desire Other Housing Types

Sixty-five percent of Americans who are moving expect to move into a single-family home. However, 15 percent of movers expect to move to an apartment, and 14 percent expect to move to a duplex, townhouse, or rowhouse. Gen Yers are especially likely to expect to live in an apartment or duplex, townhouse, or rowhouse. Of note: baby boomers are the most likely to expect to live in a manufactured/mobile home.

Most movers in generation X—87 percent—expect to live in a single-family home. For the oldest generations, 30 percent of movers expect to move to apartments or compact homes like townhouses or rowhouses.

### Movers’ Expected Type of Home, by Generation

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Single-family home</th>
<th>Apartment</th>
<th>Duplex, townhouse, rowhouse</th>
<th>Manufactured/mobile home</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>65</td>
<td>15</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Gen Y</td>
<td>60</td>
<td>21</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Gen X</td>
<td>87</td>
<td>6</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>65</td>
<td>11</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>58</td>
<td>17</td>
<td>13</td>
<td>—</td>
</tr>
</tbody>
</table>

Visit [www.uli.org/communitysurvey](http://www.uli.org/communitysurvey) to learn more about “America in 2013.”
Movers See Themselves in All Different Kinds of Communities
American movers are headed to many different kinds of communities. In fact, likely movers are roughly evenly split among wanting rural, small-town, suburban, and medium- or big-city life. Gen Yers have a stronger preference for big cities than do other generations, and baby boomers feel the pull of rural settings.

Desired Size of Community among Likely Movers, by Generation

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Rural</th>
<th>Small town</th>
<th>Suburbs</th>
<th>Medium-sized city</th>
<th>Big city</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>18</td>
<td>23</td>
<td>21</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Gen Y</td>
<td>16</td>
<td>21</td>
<td>20</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Gen X</td>
<td>19</td>
<td>21</td>
<td>25</td>
<td>19</td>
<td>12</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>25</td>
<td>28</td>
<td>15</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>7</td>
<td>25</td>
<td>27</td>
<td>17</td>
<td>12</td>
</tr>
</tbody>
</table>

America Is a Nation on the Move: About One-Third of the Population Has Changed Homes in the Past Five Years
Thirty-two percent of Americans have moved in the past five years. More than half of the gen Yers report moving, and 31 percent of gen Xers have moved. Baby boomers and the oldest Americans are the least likely to have moved.

Recent Moving History, by Generation
Percentage stating they had moved in the past five years

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>32</td>
<td>67</td>
</tr>
<tr>
<td>Gen Y</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td>Gen X</td>
<td>31</td>
<td>69</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>19</td>
<td>80</td>
</tr>
</tbody>
</table>

Big-city dwellers are the most likely to have moved recently: half of big city residents report moving in the past five years. Rural dwellers are the most stable, with only 24 percent reporting moving recently. Twenty-eight percent of residents of medium-sized cities have recently moved.

Recent Moving History, by Size of Community
Percentage stating they had moved in the past five years

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>25</td>
<td>74</td>
</tr>
<tr>
<td>Small town</td>
<td>32</td>
<td>68</td>
</tr>
<tr>
<td>Suburbs</td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>28</td>
<td>72</td>
</tr>
<tr>
<td>Big city</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

Visit [www.uli.org/communitysurvey](http://www.uli.org/communitysurvey) to learn more about “America in 2013.”
About Half of Recent Movers Moved into a Bigger Home; Older Americans Are Likely to Have Downsized

About half the people who report moving within the past five years say they moved into a house that is larger than their old one. About a quarter of recent movers say their new home is the same size as their previous one, and 27 percent say it is smaller. Gen Xers are most likely to have moved into a larger home.

Baby boomers and war babies/members of the silent generation are the most likely to have downsized in their most recent move. In fact, 50 percent of the oldest Americans report that their new home is smaller than their old one. One-third of baby boomers report moving into a smaller home, and 44 percent say they have moved into a larger home.

Recent Change in Home Size, by Generation

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Larger</th>
<th>Smaller</th>
<th>Same</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>48</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td>Gen Y</td>
<td>48</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>Gen X</td>
<td>59</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>44</td>
<td>33</td>
<td>22</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>24</td>
<td>50</td>
<td>25</td>
</tr>
</tbody>
</table>
Focus on Owning and Renting

How many Americans own their homes, and how many rent? What do Americans think about homeownership as an investment? This fact sheet shares key findings from “America in 2013” about owning and renting.

“America in 2013” is a national survey conducted by Belden Russonello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

Two-Thirds of Americans Own Their Home; Baby Boomers Are Most Likely to Own, Gen Y to Rent

America is a nation of homeowners. Survey responses indicate that 66 percent of Americans own their home and 32 percent are renters. Gen Yers are the least likely to own their home: over half—54 percent—currently rent and 40 percent own. Baby boomers are the most likely to own a home, with 80 percent reporting that they own their primary residence.

Current Homeownership Status, by Generation

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Own</th>
<th>Rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>66</td>
<td>32</td>
</tr>
<tr>
<td>Gen Y</td>
<td>40</td>
<td>54</td>
</tr>
<tr>
<td>Gen X</td>
<td>78</td>
<td>22</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>74</td>
<td>26</td>
</tr>
</tbody>
</table>

Most People See Homeownership as a Good Investment, but Many Older Americans Don’t See It That Way

Despite recent upheavals in the housing market, most Americans still believe that buying a home is a good investment for them. That sentiment is strongest among members of generation X. Interestingly, the oldest Americans are the most skeptical of homeownership, with 40 percent of war babies/members of the silent generation saying homeownership was not so good of an investment for them.

Views on Buying a Home as an Investment, by Generation

<table>
<thead>
<tr>
<th>Percentage</th>
<th>A good investment</th>
<th>A not-so-good investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>71</td>
<td>27</td>
</tr>
<tr>
<td>Gen Y</td>
<td>72</td>
<td>27</td>
</tr>
<tr>
<td>Gen X</td>
<td>79</td>
<td>20</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>73</td>
<td>27</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>55</td>
<td>40</td>
</tr>
</tbody>
</table>
Renters Are Also Skeptical of Homeownership
Renters are also quite skeptical of homeownership as an investment, with a surprising 42 percent of renters saying that buying a home was not a good investment for them.

Views on Buying a Home as an Investment, by Homeownership Status
Percentage

<table>
<thead>
<tr>
<th></th>
<th>A good investment</th>
<th>A not-so-good investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owners</td>
<td>79</td>
<td>19</td>
</tr>
<tr>
<td>Renters</td>
<td>56</td>
<td>42</td>
</tr>
</tbody>
</table>

Homeownership Varies with Size of Community and Income
Rural dwellers are the most likely to own their own home, and big-city dwellers the least likely to own. In fact, homeownership declines in a relatively linear way as the size of community rises. Fifty-three percent of big-city dwellers rent, compared with 12 percent of rural residents.

Current Homeownership Status, by Size of Community
Percentage

<table>
<thead>
<tr>
<th></th>
<th>Own</th>
<th>Rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>86</td>
<td>12</td>
</tr>
<tr>
<td>Small town</td>
<td>66</td>
<td>32</td>
</tr>
<tr>
<td>Suburbs</td>
<td>71</td>
<td>28</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>59</td>
<td>38</td>
</tr>
<tr>
<td>Big city</td>
<td>46</td>
<td>53</td>
</tr>
</tbody>
</table>

Lower-income Americans are also less likely to own their homes. Homeownership increases with income level.

Current Homeownership Status, by Income
Percentage

<table>
<thead>
<tr>
<th></th>
<th>Own</th>
<th>Rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25,000</td>
<td>40</td>
<td>56</td>
</tr>
<tr>
<td>$25,000–$50,000</td>
<td>54</td>
<td>44</td>
</tr>
<tr>
<td>$50,000–$75,000</td>
<td>81</td>
<td>19</td>
</tr>
<tr>
<td>Over $75,000</td>
<td>85</td>
<td>14</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
Owners and Renters Express Preferences for Many of the Same Community Attributes
When it comes to community attributes, owners and renters express very similar preferences in some cases, but different preferences in others. Owners and renters have similar preferences when it comes to being in a community with a mix of incomes; they also express a similar willingness to trade a longer commute and a larger home for a shorter commute and a smaller home.

Renters are much more likely than owners to want public transportation options; they are also more likely to want to be in a community with a mix of homes, as well as one that is close to shops, restaurants, and offices.

Community Attribute Preferences, by Homeownership Status
Percentage preferring listed attribute

<table>
<thead>
<tr>
<th></th>
<th>Owners</th>
<th>Renters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shorter commute/smaller home</td>
<td>63</td>
<td>56</td>
</tr>
<tr>
<td>Close to mix of shops, restaurants, and offices</td>
<td>49</td>
<td>60</td>
</tr>
<tr>
<td>Mix of incomes</td>
<td>50</td>
<td>53</td>
</tr>
<tr>
<td>Public transportation options</td>
<td>44</td>
<td>62</td>
</tr>
<tr>
<td>Mix of homes</td>
<td>43</td>
<td>57</td>
</tr>
</tbody>
</table>

Owners and Renters Place Similar Importance on Most Community Characteristics; Renters Are More Likely to Place High Importance on Public Transportation
When asked to rank certain community characteristics on a scale of 1 to 10, owners and renters place about the same emphasis on most characteristics.

In only three categories is the difference between the rankings by owners and renters more than 10 percentage points. Renters are much more likely than owners to rank convenient public transportation as a high priority. Renters are also more likely to highly value being a short distance from both family and friends and work or school.

Importance of Community Characteristics, by Homeownership Status
Percentage ranking each characteristic 6 or higher in importance on a scale of 1 to 10

<table>
<thead>
<tr>
<th></th>
<th>Owners</th>
<th>Renters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood safety</td>
<td>94</td>
<td>88</td>
</tr>
<tr>
<td>Quality of local public schools</td>
<td>77</td>
<td>83</td>
</tr>
<tr>
<td>Space between neighbors</td>
<td>75</td>
<td>68</td>
</tr>
<tr>
<td>Short distance to work or school</td>
<td>66</td>
<td>76</td>
</tr>
<tr>
<td>Distance to medical care</td>
<td>68</td>
<td>65</td>
</tr>
<tr>
<td>Walkability</td>
<td>75</td>
<td>79</td>
</tr>
<tr>
<td>Distance to shopping/entertainment</td>
<td>63</td>
<td>71</td>
</tr>
<tr>
<td>Distance to family/friends</td>
<td>59</td>
<td>70</td>
</tr>
<tr>
<td>Distance to parks/recreational areas</td>
<td>63</td>
<td>64</td>
</tr>
<tr>
<td>Convenience of public transportation</td>
<td>44</td>
<td>67</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
Most Movers Expect to Own Their Homes; Gen Yers and Older Americans Are More Likely to Expect to Rent

Most people changing homes—73 percent—believe they will own the primary residence they move into, whereas just 25 percent expect to rent. Gen Yers and the oldest Americans are the most likely to expect to rent their new home after moving. Gen Xers are the least likely to expect to rent, and just 20 percent of baby boomers expect to rent.

**Movers’ Expected Homeownership Status, by Generation**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Expect to own</th>
<th>Expect to rent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All adults</strong></td>
<td>73</td>
<td>25</td>
</tr>
<tr>
<td>Gen Y</td>
<td>69</td>
<td>31</td>
</tr>
<tr>
<td>Gen X</td>
<td>81</td>
<td>16</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>79</td>
<td>20</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>55</td>
<td>36</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
America in 2013
Focus on Transportation

Urban Land Institute
Infrastructure Initiative

Urban Land Institute
Terwilliger Center for Housing
Focus on Transportation Satisfaction

How satisfied are Americans with their transportation system? This fact sheet shares key findings about transportation satisfaction from “America in 2013.”

“America in 2013” is a national survey conducted by Belden Russonello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

Americans Are Generally Satisfied with Transportation Options; Baby Boomers and Rural Dwellers Are Least Satisfied

Seventy-two percent of Americans are satisfied with the range of transportation options available in their community. Baby boomers report the least satisfaction, with only 68 percent saying they are satisfied and 29 percent indicating dissatisfaction.

<table>
<thead>
<tr>
<th>Satisfaction with Range of Transportation Options Available, by Generation</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>72</td>
<td>25</td>
</tr>
<tr>
<td>Gen Y</td>
<td>73</td>
<td>25</td>
</tr>
<tr>
<td>Gen X</td>
<td>73</td>
<td>24</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>68</td>
<td>29</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>72</td>
<td>17</td>
</tr>
</tbody>
</table>

Evaluated by community type, the survey results show rural residents are the least satisfied with the transportation options available, with 31 percent expressing dissatisfaction. In fact, satisfaction with transportation options increases by size of community, with 79 percent of big-city dwellers indicating they are satisfied with their transportation options and only 18 percent expressing dissatisfaction.

<table>
<thead>
<tr>
<th>Satisfaction with Range of Transportation Options Available, by Size of Community</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>65</td>
<td>31</td>
</tr>
<tr>
<td>Small town</td>
<td>70</td>
<td>27</td>
</tr>
<tr>
<td>Suburbs</td>
<td>71</td>
<td>23</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>77</td>
<td>20</td>
</tr>
<tr>
<td>Big city</td>
<td>79</td>
<td>18</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitiesurvey to learn more about “America in 2013.”
Americans Are Generally Satisfied with Sidewalks
Most Americans are satisfied with the quality of the sidewalks in their community. Older Americans are most satisfied, and gen Yers are least satisfied.

<table>
<thead>
<tr>
<th>Satisfaction with Sidewalks, by Generation</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>71</td>
<td>23</td>
</tr>
<tr>
<td>Gen Y</td>
<td>70</td>
<td>25</td>
</tr>
<tr>
<td>Gen X</td>
<td>72</td>
<td>21</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>71</td>
<td>23</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>75</td>
<td>19</td>
</tr>
</tbody>
</table>

If They Have Access to It, Americans Are Satisfied with Public Transportation
But how satisfied are Americans with public transportation? Among those who have access to transit, satisfaction is high. Seventy-five percent of Americans are satisfied with the transit they have, although satisfaction levels are somewhat lower among older Americans.

<table>
<thead>
<tr>
<th>Satisfaction with Public Transit among Those with Access, by Generation</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>75</td>
<td>17</td>
</tr>
<tr>
<td>Gen Y</td>
<td>75</td>
<td>19</td>
</tr>
<tr>
<td>Gen X</td>
<td>76</td>
<td>19</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>76</td>
<td>17</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>72</td>
<td>9</td>
</tr>
</tbody>
</table>

More Than Half of Americans without Transit Are Dissatisfied with That Condition
Fifty-one percent of Americans who do not have access to transit are dissatisfied with that situation. That is, among the 30 percent of Americans who do not have access to transit, over half wish they did. Dissatisfaction is strongest among baby boomers, followed by gen Yers.

<table>
<thead>
<tr>
<th>Satisfaction with Availability of Public Transit among Those without Access, by Generation</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>43</td>
<td>51</td>
</tr>
<tr>
<td>Gen Y</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Gen X</td>
<td>39</td>
<td>54</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>38</td>
<td>57</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>52</td>
<td>36</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
Focus on Transportation Preferences

What do Americans want from their transportation system? This fact sheet shares key findings about transportation preferences from “America in 2013.”

“America in 2013” is a national survey conducted by Belden Russonello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

When Choosing a New Community, Most Americans Think Walkability and Transit Are Important

“America in 2013” asked respondents to rank, on a scale from 1 to 10 with 10 being the highest, how important various community attributes would be to them if they were moving in the next five years. Overwhelmingly, Americans want walkable communities. A preference for walkability is especially strong among gen Yers, 76 percent of whom give walkability a score of 6 or higher.

Respondents representing over half of Americans, 52 percent, give public transportation a score of 6 or higher. Convenient public transportation is least likely to be important to members of gen X, but is important to many gen Yers, as well as to war babies/members of the silent generation.

Importance Rankings for Walkability and Public Transportation, by Generation

Percentage ranking each characteristic 6 or higher in importance on a scale of 1 to 10

<table>
<thead>
<tr>
<th></th>
<th>Walkability</th>
<th>Convenient public transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>70</td>
<td>52</td>
</tr>
<tr>
<td>Gen Y</td>
<td>76</td>
<td>57</td>
</tr>
<tr>
<td>Gen X</td>
<td>67</td>
<td>45</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>67</td>
<td>50</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>69</td>
<td>56</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
Public Transit Is a Meaningful Community Attribute to a Majority of Americans

“America in 2013” also asked respondents to indicate if they preferred public transportation, or if it did not matter. Strength of preference for public transportation varies across the generations, and is strongest among Gen Yers. However, even among the group with the weakest preference for transit, war babies/the silent generation, nearly half, 48 percent, would prefer to live in a community that has public transit they can use.

Preferences for Public Transportation, by Generation

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Prefer public transportation options</th>
<th>Public transportation options do not matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>51</td>
<td>49</td>
</tr>
<tr>
<td>Gen Y</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>Gen X</td>
<td>45</td>
<td>55</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>52</td>
<td>48</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>48</td>
<td>52</td>
</tr>
</tbody>
</table>

Americans Want to Be Close to It All

Americans want to be close to work, school, and other destinations like shopping and entertainment, as well as family and friends. Gen Yers, especially, place high importance on all aspects of proximity. For older Americans, being close to medical care is a particularly important consideration.

Importance Rankings for Distance, by Generation

Percentage ranking proximity to each destination 6 or higher in importance on a scale of 1 to 10

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Work or school</th>
<th>Medical care</th>
<th>Shopping or entertainment</th>
<th>Family or friends</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>71</td>
<td>71</td>
<td>66</td>
<td>63</td>
</tr>
<tr>
<td>Gen Y</td>
<td>82</td>
<td>73</td>
<td>67</td>
<td>69</td>
</tr>
<tr>
<td>Gen X</td>
<td>71</td>
<td>63</td>
<td>58</td>
<td>57</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>67</td>
<td>72</td>
<td>67</td>
<td>60</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>57</td>
<td>78</td>
<td>69</td>
<td>66</td>
</tr>
</tbody>
</table>
Focus on Transportation Habits

How do Americans use their transportation systems? This fact sheet shares key findings from “America in 2013” about transportation by mode.

“America in 2013” is a national survey conducted by Belden Russonello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

Americans Use a Variety of Transportation Modes to Get Around

Americans are frequent drivers, but they also regularly walk, bike, and use transit to get to their destinations. While 91 percent of Americans go somewhere by motor vehicle at least once a week, 44 percent walk to a destination once a week or more. That makes walking the most important mode of transportation after driving. Eleven percent of Americans take public transit as frequently as once a week. Though few Americans are daily bike riders, 12 percent report biking weekly, and another 12 percent use a bicycle at least once a month.

Frequency of Use, by Transportation Mode

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Nearly every day</th>
<th>At least once a week</th>
<th>At least once a month</th>
<th>Less than once a month or never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go somewhere by car, truck, or motorcycle</td>
<td>77</td>
<td>14</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Take public transit</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td>80</td>
</tr>
<tr>
<td>Walk several blocks or more to a destination</td>
<td>22</td>
<td>22</td>
<td>10</td>
<td>46</td>
</tr>
<tr>
<td>Ride a bicycle</td>
<td>2</td>
<td>12</td>
<td>12</td>
<td>74</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
Most Americans Drive Daily, Especially Gen Xers
Generation X is the most likely to drive on a daily basis, and older Americans are the least likely to do so. Eight percent of the oldest Americans report that they do not drive much at all, and 28 percent say they drive about monthly. About 3 percent of gen Xers say they do not drive much either.

**Frequency of Travel by Car, Truck, or Motorcycle, by Generation**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Nearly every day</th>
<th>At least once a week</th>
<th>At least once a month</th>
<th>Less than once a month or never</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>77</td>
<td>14</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Gen Y</td>
<td>79</td>
<td>11</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Gen X</td>
<td>89</td>
<td>6</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>78</td>
<td>16</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>57</td>
<td>28</td>
<td>28</td>
<td>8</td>
</tr>
</tbody>
</table>

Next Comes Walking
Second only to driving, walking to a destination is a frequent habit of Americans, with 44 percent reporting that they walk to a destination daily or weekly. However, 46 percent report that they never walk several blocks or more to a destination.

The percentages of people walking to a destination at least weekly is relatively consistent across the generations, with 47 percent of gen Yers saying they do so, along with 46 percent of gen Xers and 43 percent of baby boomers. Only the oldest Americans—war babies and members of the silent generation—tend to be less active than that.

**Frequency of Walking Several Blocks or More to a Destination, by Generation**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Nearly every day</th>
<th>At least once a week</th>
<th>At least once a month</th>
<th>Less than once a month or never</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>22</td>
<td>22</td>
<td>10</td>
<td>46</td>
</tr>
<tr>
<td>Gen Y</td>
<td>23</td>
<td>24</td>
<td>11</td>
<td>43</td>
</tr>
<tr>
<td>Gen X</td>
<td>19</td>
<td>27</td>
<td>11</td>
<td>42</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>24</td>
<td>19</td>
<td>11</td>
<td>46</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>17</td>
<td>14</td>
<td>7</td>
<td>61</td>
</tr>
</tbody>
</table>

Visit [www.ult.org/communitysurvey](http://www.ult.org/communitysurvey) to learn more about “America in 2013.”
Then Comes Transit, Which Many Americans Use Frequently
Eleven percent of those surveyed report using transit on a daily or weekly basis. Transit use is especially high among Gen Ys, 29 percent of whom report using transit at least once a month. Older Americans are the least frequent users of public transit.

**Frequency of Transit Use, by Generation**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Nearly every day</th>
<th>At least once a week</th>
<th>At least once a month</th>
<th>Less than once a month or never</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td>80</td>
</tr>
<tr>
<td>Gen Y</td>
<td>10</td>
<td>10</td>
<td>9</td>
<td>71</td>
</tr>
<tr>
<td>Gen X</td>
<td>4</td>
<td>3</td>
<td>9</td>
<td>84</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>83</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>2</td>
<td>2</td>
<td>8</td>
<td>87</td>
</tr>
</tbody>
</table>

Mode Use Varies by Type and Size of Community
How people get around correlates with the nature of the community in which they live. Residents of big cities employ more modes of transportation more frequently, taking transit and walking more than people living in less-populated places. Rural residents and suburbanites drive the most. Of note: rural residents are frequent bikers, with 2 percent biking daily and another 17 percent biking at least once a week. People who live in medium-sized cities also embrace several transportation modes and are both frequent transit users and walkers.

Public transit use is most common among big-city residents, 34 percent of whom use transit nearly every day or at least once a week—with 19 percent using it almost daily.

**Frequency of Mode Use, by Size of Community**

<table>
<thead>
<tr>
<th>Percentage using each mode nearly every day or at least once a week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive</td>
</tr>
<tr>
<td>Rural</td>
</tr>
<tr>
<td>Small town</td>
</tr>
<tr>
<td>Suburbs</td>
</tr>
<tr>
<td>Medium-sized city</td>
</tr>
<tr>
<td>Big city</td>
</tr>
</tbody>
</table>

Visit [www.ult.org/communitysurvey](http://www.ult.org/communitysurvey) to learn more about “America in 2013.”
Focus on Commuting

How do Americans commute, and how does this behavior differ by generation and by location? This fact sheet shares key findings from “America in 2013” about commuting behavior.

“America in 2013” is a national survey conducted by Belden Russonello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

Two-Thirds of Americans Commute to Work or School
Sixth-three percent of Americans commute to work or school three or more days a week. Members of generation Y are the most likely to commute to work or school, followed by gen Xers and then baby boomers. About 8 percent of older Americans commute three days a week or more. The percentages of those who report commuting vary by gender—71 percent of men and 57 percent of women.

Commuting, by Generation
Percentage commuting three or more days per week

<table>
<thead>
<tr>
<th>All adults</th>
<th>63</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gen Y</td>
<td>86</td>
</tr>
<tr>
<td>Gen X</td>
<td>80</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>58</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>8</td>
</tr>
</tbody>
</table>

Transit Is Heavily Used for Commuting by Gen Y, Big-City Dwellers, and People with Low Incomes
The survey found that 85 percent of Americans commute by car on most days. Eleven percent of the population usually commutes by public transit, and about 5 percent walks or bikes. Eighteen percent of gen Yers take transit, making them the most likely of all the generations to do so. Nine percent of baby boomers are also regular transit users.

Commuting Behavior, by Generation
Percentage using particular transportation mode

<table>
<thead>
<tr>
<th>All adults</th>
<th>Car</th>
<th>Public transit</th>
<th>Walk or bike</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>85</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Gen Y</td>
<td>77</td>
<td>18</td>
<td>7</td>
</tr>
<tr>
<td>Gen X</td>
<td>92</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>90</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>91</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
By community size, 32 percent of big-city residents say they commute by transit most of the time, whereas 10 percent of suburban dwellers do so. Big-city residents are also more likely to walk or bike to work.

### Commuting Behavior, by Community Size

<table>
<thead>
<tr>
<th>Mode</th>
<th>Car</th>
<th>Public transit</th>
<th>Walk or bike</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>95</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Small town</td>
<td>89</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Suburbs</td>
<td>90</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>91</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Big city</td>
<td>57</td>
<td>32</td>
<td>11</td>
</tr>
</tbody>
</table>

The likelihood of commuting by automobile increases with income, with 94 percent of Americans who make $75,000 or more reporting that they mostly commute by car. Lower-income Americans are most likely to use public transit to commute (24 percent), and to walk or bike to work or school (15 percent).

### Commuting Behavior, by Household Income

<table>
<thead>
<tr>
<th>Mode</th>
<th>Car</th>
<th>Public transit</th>
<th>Walk or bike</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25,000</td>
<td>68</td>
<td>24</td>
<td>15</td>
</tr>
<tr>
<td>$25,000–$50,000</td>
<td>83</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>$50,000–$75,000</td>
<td>92</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Over $75,000</td>
<td>94</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

### Public Transit Users Have the Longest Commute

More than one-third of Americans, 36 percent, have a commute that is over half an hour. Another 36 percent spend 15 to 29 minutes per day on their commute, and a lucky 27 percent have a commute that takes less than a quarter of an hour.

Public transit users have the longest commute among all commuters, with over half having a commute of 45 minutes or more. Forty-two percent of bikers or walkers have commutes that take less than 15 minutes.

### Length of Commute, by Commute Type

<table>
<thead>
<tr>
<th>Type</th>
<th>0–14 minutes</th>
<th>15–29 minutes</th>
<th>30–44 minutes</th>
<th>45-plus minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>All commutes</td>
<td>27</td>
<td>36</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Public transit</td>
<td>13</td>
<td>16</td>
<td>16</td>
<td>51</td>
</tr>
<tr>
<td>Car</td>
<td>28</td>
<td>38</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>Biking/walking</td>
<td>42</td>
<td>33</td>
<td>21</td>
<td>4</td>
</tr>
</tbody>
</table>

Visit [www.ull.org/communitysurvey](http://www.ull.org/communitysurvey) to learn more about “America in 2013.”
**More Than Half Would Accept a Smaller Home in Exchange for a Shorter Commute**
Sixty-one percent of Americans say they would prefer a commute shorter than 45 minutes, even if it meant living in a smaller home. The other 39 percent say they would prefer the larger home even if meant a long commute. Baby boomers are especially willing to give up a large home for a short commute: 72 percent prefer that option, higher than for any other generation.

**Smaller Home/Shorter Commute versus Bigger Home/Longer Commute, by Generation**
Percentage preferring listed option

<table>
<thead>
<tr>
<th></th>
<th>Smaller home/shorter commute</th>
<th>Bigger home/longer commute</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>61</td>
<td>39</td>
</tr>
<tr>
<td>Gen Y</td>
<td>54</td>
<td>36</td>
</tr>
<tr>
<td>Gen X</td>
<td>54</td>
<td>36</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>72</td>
<td>28</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>65</td>
<td>35</td>
</tr>
</tbody>
</table>

Visit [www.ult.org/communitysurvey](http://www.ult.org/communitysurvey) to learn more about “America in 2013.”
Focus on Public Transportation

When it comes to public transportation or transit, what do Americans think and do? This fact sheet shares key findings from “America in 2013” about public transportation.

“America in 2013” is a national survey conducted by Belden Russinello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

Public Transit Is a Meaningful Community Attribute to a Majority of Americans
The survey asked several questions to illuminate how people feel about public transit. About half of Americans think convenient public transportation is a meaningful community attribute. The strength of that preference varies across the generations and is strongest among members of generation Y. However, even among the group with the weakest preference for transit, war babies/members of the silent generation, nearly half the respondents—48 percent—would prefer to live in a community that has public transit they can use.

Preferences for Public Transportation, by Generation
<table>
<thead>
<tr>
<th>Percentage</th>
<th>Prefer public transportation options</th>
<th>Public transportation options do not matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>51</td>
<td>49</td>
</tr>
<tr>
<td>Gen Y</td>
<td>55</td>
<td>44</td>
</tr>
<tr>
<td>Gen X</td>
<td>45</td>
<td>55</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>52</td>
<td>48</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>48</td>
<td>50</td>
</tr>
</tbody>
</table>

Americans Place a Lot of Importance on Public Transportation
“America in 2013” asked respondents to rank on a scale from 1 to 10, with 10 being the highest, how important public transportation would be to them in choosing a community if they were moving. Over half of Americans, 52 percent, give public transportation a score of 6 or higher. Convenient public transportation is least likely to be important to gen Xers, but is important to many gen Yers, as well as to war babies/members of the silent generation.

Importance Rankings for Public Transportation, by Generation
Percentage giving listed ranking on a scale of 1 to 10, with 10 being highest
| Percentage giving listed ranking on a scale of 1 to 10, with 10 being highest |
|-------------------------------------|-----------------|
| All adults | 46 | 52 |
| Gen Y      | 42 | 56 |
| Gen X      | 54 | 46 |
| Baby boomers | 49 | 51 |
| War babies/silent generation | 42 | 56 |

Visit www.uli.org/communtysurvey to learn more about “America in 2013.”
Of note, as shown in the figure below, older Americans indicate the highest strength of preference on this question: 33 percent of war babies/members of the silent generation give public transportation a ranking of 10, more than any other demographic group.

**Detailed Look at Importance Rankings for Public Transportation, by Generation**
Percentage giving indicated numerical ranking

![Graph showing importance rankings for public transportation by generation.](image)

**Public Transportation Is Widely Available to Americans, but Access Varies Widely by Size of Community**
Most Americans have access to public transit in their community. Gen Yers report the highest level of access and older Americans the lowest.

**Public Transit Availability, by Generation**
Percentage

<table>
<thead>
<tr>
<th></th>
<th>Available</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>69</td>
<td>30</td>
</tr>
<tr>
<td>Gen Y</td>
<td>81</td>
<td>18</td>
</tr>
<tr>
<td>Gen X</td>
<td>63</td>
<td>37</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>63</td>
<td>36</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>65</td>
<td>35</td>
</tr>
</tbody>
</table>

Visit [www.uli.org/communitysurvey](http://www.uli.org/communitysurvey) to learn more about “America in 2013.”
Although transit access is high across the population and generations, rural areas report the lowest level of availability. Most big-city residents have access to transit, and nearly three-quarters of suburban dwellers also report having transit available.

### Public Transit Availability, by Size of Community

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Available</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>23</td>
<td>76</td>
</tr>
<tr>
<td>Small town</td>
<td>66</td>
<td>33</td>
</tr>
<tr>
<td>Suburbs</td>
<td>74</td>
<td>25</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>Big city</td>
<td>95</td>
<td>4</td>
</tr>
</tbody>
</table>

---

**Americans Generally Are Satisfied with Public Transportation—If They Have It**

But how satisfied are Americans with public transportation? Among those who have access to transit, satisfaction levels are high. Overall, 75 percent of Americans say they are satisfied with the transit they have, although satisfaction levels are somewhat lower among older Americans.

### Satisfaction with Public Transit among Those Who Have Access to It, by Generation

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>75</td>
<td>17</td>
</tr>
<tr>
<td>Gen Y</td>
<td>75</td>
<td>19</td>
</tr>
<tr>
<td>Gen X</td>
<td>76</td>
<td>19</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>76</td>
<td>17</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>72</td>
<td>9</td>
</tr>
</tbody>
</table>

---

**More Than Half of Americans without Transit Are Dissatisfied with That Condition**

However, among those without access to transit, 51 percent are dissatisfied with that situation. That is, of the 30 percent of Americans who do not have access to transit, over half wish they did. Dissatisfaction is strongest among baby boomers, followed by gen Xers.

### Satisfaction with Availability of Public Transit among Those without Access, by Generation

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>43</td>
<td>51</td>
</tr>
<tr>
<td>Gen Y</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Gen X</td>
<td>39</td>
<td>54</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>38</td>
<td>57</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>52</td>
<td>36</td>
</tr>
</tbody>
</table>

Visit [www.uli.org/communitysurvey](http://www.uli.org/communitysurvey) to learn more about “America in 2013.”
Many Americans—Especially Those in Cities—Report Being Frequent Users of Public Transit

Although driving is the dominant mode of transportation in the United States, 11 percent of Americans use transit on a daily or weekly basis. Transit use is especially high among gen Yers, 29 percent of whom report using transit at least once a month or more. Older Americans are the least frequent users of public transit.

### Frequency of Transit Use, by Generation

<table>
<thead>
<tr>
<th></th>
<th>Nearly every day</th>
<th>At least once a week</th>
<th>At least once a month</th>
<th>Less than once a week, or never</th>
</tr>
</thead>
<tbody>
<tr>
<td>All adults</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td>80</td>
</tr>
<tr>
<td>Gen Y</td>
<td>10</td>
<td>10</td>
<td>9</td>
<td>71</td>
</tr>
<tr>
<td>Gen X</td>
<td>4</td>
<td>3</td>
<td>9</td>
<td>84</td>
</tr>
<tr>
<td>Baby boomers</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>83</td>
</tr>
<tr>
<td>War babies/silent generation</td>
<td>2</td>
<td>2</td>
<td>8</td>
<td>87</td>
</tr>
</tbody>
</table>

Use of public transit is most common among those living in big cities, 19 percent of whom report using transit daily, with another 15 percent using transit once a week.

### Frequency of Transit Use, by Size of Community

<table>
<thead>
<tr>
<th></th>
<th>Nearly every day</th>
<th>At least once a week</th>
<th>At least once a month</th>
<th>Less than once a week, or never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>2</td>
<td>—</td>
<td>3</td>
<td>94</td>
</tr>
<tr>
<td>Small town</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>84</td>
</tr>
<tr>
<td>Suburbs</td>
<td>6</td>
<td>2</td>
<td>8</td>
<td>83</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>6</td>
<td>8</td>
<td>9</td>
<td>76</td>
</tr>
<tr>
<td>Big city</td>
<td>19</td>
<td>15</td>
<td>9</td>
<td>57</td>
</tr>
</tbody>
</table>

Visit [www.uli.org/communitysurvey](http://www.uli.org/communitysurvey) to learn more about “America in 2013.”
Focus on War Babies and the Silent Generation

What do America’s oldest residents desire when it comes to housing, transportation, and community choices? This fact sheet shares key findings from “America in 2013” about the war babies and the silent generation.

“America in 2013” is a national survey conducted by Belden Russonello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

The Oldest Generations Share Similar Attitudes on Housing, Transportation, and Community Choices

The silent generation, born before 1931, and war babies, born between 1932 and 1946, are the smallest generations in America in numbers. Combined, the war babies (currently age 67 to 82) and members of the silent generation (age 83 and older) account for 35 million people. These generations hold very similar attitudes on community preferences and have been combined for this analysis.

War babies and the silent generation are among the least affluent of America’s generations: 49 percent of members of these generations earn less than $50,000 a year, and many live on a fixed income. A number of other characteristics set members of these generations apart from their younger counterparts: 61 percent are women, compared with 52 percent of the overall population, and 41 percent live alone, compared with 17 percent of Americans overall.

Ethnicity, War Babies/Silent Generation versus All Adults

<table>
<thead>
<tr>
<th>Percentage</th>
<th>War babies/silent generation</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>80</td>
<td>69</td>
</tr>
<tr>
<td>Latino</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>African American</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

Household Income, War Babies/Silent Generation versus All Adults

<table>
<thead>
<tr>
<th>Percentage</th>
<th>War babies/silent generation</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25,000</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>$25,000–$50,000</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>$50,000–$75,000</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Over $75,000</td>
<td>6</td>
<td>28</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
### Education Level, War Babies/Silent Generation versus All Adults

<table>
<thead>
<tr>
<th>Percentage</th>
<th>War babies/silent generation</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school or less</td>
<td>49</td>
<td>40</td>
</tr>
<tr>
<td>Some college</td>
<td>27</td>
<td>31</td>
</tr>
<tr>
<td>College</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

### The Oldest Americans Are Highly Satisfied with the Quality of Life in Their Community

The oldest Americans overwhelmingly say that they are very satisfied with the quality of life in their community. Sixty-seven percent of the oldest Americans say this, compared with 49 percent of the U.S. population overall. What’s more, they are more likely than the broader population to say they expect this high quality of life to continue.

### Satisfaction with Community’s Quality of Life, War Babies/Silent Generation versus All Adults

<table>
<thead>
<tr>
<th>Percentage</th>
<th>War babies/silent generation</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>67</td>
<td>49</td>
</tr>
<tr>
<td>Somewhat satisfied</td>
<td>28</td>
<td>38</td>
</tr>
<tr>
<td>Somewhat dissatisfied</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Very dissatisfied</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

### Impression of Trend of Quality of Life in the Community, War Babies/Silent Generation versus All Adults

<table>
<thead>
<tr>
<th>Percentage</th>
<th>War babies/silent generation</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>Worse</td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>Same</td>
<td>72</td>
<td>63</td>
</tr>
</tbody>
</table>

Visit [www.uli.org/communitysurvey](http://www.uli.org/communitysurvey) to learn more about “America in 2013.”
War Babies/Silent Generation: Small-Town Dwellers
America’s oldest generations tend to live in smaller communities, with 39 percent currently in small towns. About a quarter of the members of these generations live in the suburbs.

<table>
<thead>
<tr>
<th>Percentage</th>
<th>War babies/silent generation, current</th>
<th>War babies/silent generation, preferred</th>
<th>All adults, current</th>
<th>All adults, preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>15</td>
<td>16</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>Small town</td>
<td>39</td>
<td>33</td>
<td>32</td>
<td>26</td>
</tr>
<tr>
<td>Suburbs</td>
<td>24</td>
<td>18</td>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>13</td>
<td>15</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Big city</td>
<td>9</td>
<td>10</td>
<td>14</td>
<td>12</td>
</tr>
</tbody>
</table>

Many Older Americans Plan to Age in Place
Twenty-two percent of the members of these generations expect to move in the next five years, the lowest percentage of any generation. These oldest Americans expect to be able to age in their own homes.

These findings parallel those discussed by John McIlwain, ULI senior resident fellow and ULI/J. Ronald Terwilliger Chair for Housing, in his report *Housing in America: The Baby Boomers Turn 65*. McIlwain cites the growing popularity among older Americans of aging in place and living alone! As these older generations continue to age in their homes and communities, new models of supportive living may be needed for them. In *Housing in America*, McIlwain identifies alternatives to traditional senior care facilities, including multigenerational living.

Moving Statistics, War Babies/Silent Generation versus All Adults
Percentage

<table>
<thead>
<tr>
<th>Percentage</th>
<th>War babies/silent generation</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moved in past five years</td>
<td>19</td>
<td>32</td>
</tr>
<tr>
<td>Likely to move in next five years</td>
<td>22</td>
<td>42</td>
</tr>
</tbody>
</table>

Most Older Americans Own Their Home, But Many Are Skeptical of Homeownership as an Investment
Seventy-four percent of the war babies and members of the silent generation own their home; however, only 55 percent consider homeownership a good investment, the smallest percentage of any generation.

Homeownership Statistics, War Babies/Silent Generation versus All Adults
Percentage

<table>
<thead>
<tr>
<th>Percentage</th>
<th>War babies/silent generation</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own primary residence</td>
<td>74</td>
<td>66</td>
</tr>
<tr>
<td>Rent primary residence</td>
<td>26</td>
<td>32</td>
</tr>
<tr>
<td>See homeownership as good investment</td>
<td>55</td>
<td>71</td>
</tr>
</tbody>
</table>
Few Members of Oldest Generations Commute to Work
Only 8 percent of these oldest Americans commute to work or school regularly. Those that are still commuting travel by car. Sixty-five percent of the oldest Americans report that public transportation is available in their community, slightly lower than the U.S. average of 69 percent.

Transportation Statistics, War Babies/Silent Generation versus All Adults
Percentage

<table>
<thead>
<tr>
<th>War babies/silent generation</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute to work</td>
<td>8</td>
</tr>
<tr>
<td>Commute by car</td>
<td>91</td>
</tr>
<tr>
<td>Public transit available</td>
<td>65</td>
</tr>
</tbody>
</table>

Compact Development Appeals to Half of the Oldest Americans
Fifty-one percent of the oldest Americans say they prefer three or more of the community attributes typically associated with compact development.

Like the baby boomers, many members of these generations would give up living in a larger home in exchange for a shorter commute. Sixty-five percent of this cohort would choose a smaller house and a shorter commute over a larger house with a longer commute, compared with 61 percent of Americans overall (and 72 percent of baby boomers).

Community Attribute Preferences, War Babies/Silent Generation versus All Adults
Percentage naming listed attribute

<table>
<thead>
<tr>
<th>War babies/silent generation</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shorter commute/smaller home</td>
<td>65</td>
</tr>
<tr>
<td>Close to mix of shops, restaurants, and offices</td>
<td>51</td>
</tr>
<tr>
<td>Mix of incomes</td>
<td>47</td>
</tr>
<tr>
<td>Public transportation options</td>
<td>48</td>
</tr>
<tr>
<td>Mix of homes</td>
<td>44</td>
</tr>
<tr>
<td>Percentage choosing three or more compact development attributes</td>
<td>51</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
Distance from Medical Care Is Important to the Oldest Americans
For the oldest Americans, schools are less important than for the U.S. population as a whole. Instead, distance to medical care rises to the top as a key consideration, just behind neighborhood safety.

**Community Characteristic Importance Rankings, War Babies/Silent Generation versus All Adults**
Percentage ranking each characteristic 6 or higher in importance on a scale of 1 to 10

<table>
<thead>
<tr>
<th></th>
<th>War babies/silent generation</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood safety</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Quality of local public schools</td>
<td>68</td>
<td>79</td>
</tr>
<tr>
<td>Space between neighbors</td>
<td>70</td>
<td>72</td>
</tr>
<tr>
<td>Distance to medical care</td>
<td>78</td>
<td>71</td>
</tr>
<tr>
<td>Short distance to work or school</td>
<td>57</td>
<td>71</td>
</tr>
<tr>
<td>Walkability</td>
<td>69</td>
<td>70</td>
</tr>
<tr>
<td>Distance to shopping/entertainment</td>
<td>69</td>
<td>66</td>
</tr>
<tr>
<td>Distance to parks/recreational areas</td>
<td>60</td>
<td>64</td>
</tr>
<tr>
<td>Distance to family/friends</td>
<td>66</td>
<td>63</td>
</tr>
<tr>
<td>Convenience of public transportation</td>
<td>56</td>
<td>52</td>
</tr>
</tbody>
</table>


Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
Focus on the Baby Boomer Generation

What do baby boomers desire when it comes to housing, transportation, and community choices? This fact sheet shares key findings from “America in 2013” about the baby boomer generation.

“America in 2013” is a national survey conducted by Belden Russonello Strategies LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

Baby Boomers Are More Affluent Than the U.S. Average
Members of the baby boom generation, now ages 48 to 66, were born between 1947 and 1965. A total of 73 million baby boomers currently live in the United States, making up 31 percent of the total adult population. Compared with the U.S. population overall, baby boomers have a higher income level. They are also more educated than the U.S. population as a whole and are less diverse.

<table>
<thead>
<tr>
<th>Ethnicity, Baby Boomers versus All Adults</th>
<th>Baby boomers</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>79</td>
<td>69</td>
</tr>
<tr>
<td>Latino</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>African American</td>
<td>9</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Household Income, Baby Boomers versus All Adults</th>
<th>Baby boomers</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25,000</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>$25,000-$50,000</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td>$50,000-$75,000</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Over $75,000</td>
<td>33</td>
<td>28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education Level, Baby Boomers versus All Adults</th>
<th>Baby boomers</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school or less</td>
<td>37</td>
<td>40</td>
</tr>
<tr>
<td>Some college</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>College</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>12</td>
<td>10</td>
</tr>
</tbody>
</table>
Baby Boomers Are More Likely Than the U.S. Average to Say Things Are Getting Worse

Baby boomers are relatively satisfied with the quality of their community, with satisfaction levels that tend to mirror those of the U.S. population as a whole. Eighty-four percent of baby boomers say they are very or somewhat satisfied with the quality of life in their community, roughly comparable with the 87 percent of the U.S. population overall with that opinion.

However, baby boomers are more likely than Americans overall to think life in their community is getting worse. Twenty-two percent of baby boomers have that impression, compared with 17 percent of the U.S. population overall.

Satisfaction with Community’s Quality of Life, Baby Boomers versus All Adults

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Baby boomers</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>47</td>
<td>49</td>
</tr>
<tr>
<td>Somewhat satisfied</td>
<td>37</td>
<td>38</td>
</tr>
<tr>
<td>Somewhat dissatisfied</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Very dissatisfied</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Impression of Trend of Quality of Life in the Community, Baby Boomers versus All Adults

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Baby boomers</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>Worse</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>Same</td>
<td>61</td>
<td>63</td>
</tr>
</tbody>
</table>

Baby Boomers Are Found in Every Community Type, But Many Would Prefer Rural Living

Baby boomers are relatively evenly distributed across all community types: about 28 percent live in a small town, 20 percent in the suburbs, and 30 percent in a medium-sized or big city.

For baby boomers, the pull of rural living is strong. Baby boomers are more likely than the U.S. population overall to say that if they could live anywhere in the next five years, they would like to live in a more rural area, with 30 percent holding that view, rather than a big city, at 9 percent. Twenty-nine percent of baby boomers would like to live in a small town.

Current and Preferred Community Type, Baby Boomers versus All Adults

<table>
<thead>
<tr>
<th>Community Type</th>
<th>Baby boomers, current</th>
<th>Baby boomers, preferred</th>
<th>All adults, current</th>
<th>All adults, preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>19</td>
<td>30</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>Small town</td>
<td>28</td>
<td>29</td>
<td>32</td>
<td>26</td>
</tr>
<tr>
<td>Suburbs</td>
<td>20</td>
<td>21</td>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>16</td>
<td>13</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Big city</td>
<td>14</td>
<td>9</td>
<td>14</td>
<td>12</td>
</tr>
</tbody>
</table>

Visit [www.uli.org/communitysurvey](http://www.uli.org/communitysurvey) to learn more about “America in 2013.”
Many Baby Boomers Are Looking to Age in Place
Baby boomers, most of whom are now empty nesters—though 40 percent still have children at home—are not as anxious to move as the younger generations. Baby boomers may have less reason to move: 80 percent own their own home.

About three in ten baby boomers—31 percent—say they expect to change residence in the next five years, considerably less than the U.S. average of 42 percent, and lower than the percentages for gen Xers (41 percent) and gen Yers (63 percent).

**Moving Statistics, Baby Boomers versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Baby boomers</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moved in past five years</td>
<td>20</td>
<td>32</td>
</tr>
<tr>
<td>Likely to move in next five years</td>
<td>31</td>
<td>42</td>
</tr>
</tbody>
</table>

**Most Baby Boomers Own Their Own Homes**
Baby boomers overwhelmingly consider homeownership a good investment (73 percent); 80 percent own their own home. Most baby boomers who expect to move say that they likely will own their new home.

**Homeownership Statistics, Baby Boomers versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Baby boomers</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own primary residence</td>
<td>80</td>
<td>66</td>
</tr>
<tr>
<td>Rent primary residence</td>
<td>20</td>
<td>32</td>
</tr>
<tr>
<td>If moving, expect to own *</td>
<td>79</td>
<td>73</td>
</tr>
<tr>
<td>If moving, expect to rent*</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>See homeownership as good investment</td>
<td>73</td>
<td>71</td>
</tr>
</tbody>
</table>

*Among those likely or very likely to move in the next five years.

**Many Baby Boomers Continue to Commute to Work, and They Commute by Car**
About 58 percent of baby boomers commute to work or school three or more days a week, and the vast majority commute by car. More than three in five (63 percent) of baby boomers report that public transportation is available in their community, slightly lower than the U.S. average of 69 percent.

**Transportation Statistics, Baby Boomers versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Baby boomers</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute to work</td>
<td>58</td>
<td>63</td>
</tr>
<tr>
<td>Commute by car</td>
<td>90</td>
<td>85</td>
</tr>
<tr>
<td>Public transit available</td>
<td>63</td>
<td>69</td>
</tr>
</tbody>
</table>

Visit [www.uli.org/communitysurvey](http://www.uli.org/communitysurvey) to learn more about “America in 2013.”
Though Most Boomers Live in Single-Family Homes, Many Are Open to Other Options
Unlike previous generations, many baby boomers will need to continue working beyond retirement age, says John McIlwain, ULI senior resident fellow and ULI/J. Ronald Terwilliger Chair for Housing, in his report *Housing in America: The Baby Boomers Turn 65.* McIlwain attributes this change to concerns about long-term financial security and the need to build suitable retirement savings, particularly as life expectancy for older Americans continues to rise.

Perhaps because of these concerns, there is a hint of an increased market for compact housing among this age group. Sixty-five percent of baby boomers who are looking to move have their sights set on a single-family home—a smaller percentage of this group than currently lives in such housing (76 percent). This is a contrast with every other generation, for which a higher percentage of movers want to be in a single-family home than currently live in one.

**Current and Expected Housing Type, Baby Boomers versus All Adults**

<table>
<thead>
<tr>
<th>Housing Type</th>
<th>Baby boomers, current</th>
<th>Baby boomers, expected*</th>
<th>All adults, current</th>
<th>All adults, expected*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family home</td>
<td>76</td>
<td>65</td>
<td>66</td>
<td>67</td>
</tr>
<tr>
<td>Apartment</td>
<td>11</td>
<td>11</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>Duplex, townhouse, or rowhouse</td>
<td>7</td>
<td>16</td>
<td>11</td>
<td>14</td>
</tr>
</tbody>
</table>

*Among those likely or very likely to move in the next five years.

**Baby Boomers Desire Many of the Characteristics of Compact, Mixed-Use Development**

Baby boomers stand out as the generation most likely to give up living in a larger home if it means they could have a shorter commute. Close to three-quarters of this cohort (72 percent) would choose a smaller house with a shorter commute over a larger house with a longer commute, compared with 61 percent of Americans overall.

Baby boomers are divided on their views of living in mixed-use communities close to shops, restaurants, and offices (49 percent preferring a mix, 50 percent preferring no mix) and show a preference for communities with a similar housing stock (55 percent similar and 42 percent a mix).

**Community Attribute Preferences, Baby Boomers versus All Adults**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Baby boomers</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shorter commute/smaller home</td>
<td>72</td>
<td>61</td>
</tr>
<tr>
<td>Close to mix of shops, restaurants, and offices</td>
<td>49</td>
<td>53</td>
</tr>
<tr>
<td>Mix of incomes</td>
<td>53</td>
<td>52</td>
</tr>
<tr>
<td>Public transportation options</td>
<td>52</td>
<td>51</td>
</tr>
<tr>
<td>Mix of homes</td>
<td>42</td>
<td>48</td>
</tr>
<tr>
<td>Percentage choosing three or more compact development attributes</td>
<td>57</td>
<td>54</td>
</tr>
</tbody>
</table>

Visit [www.uli.org/communitysurvey](http://www.uli.org/communitysurvey) to learn more about “America in 2013.”
Baby Boomers Place a High Value on Safety and Schools
When asked to indicate how they view the importance of certain community characteristics, baby boomers’ preferences closely mirror those of the broader U.S. population. Safety and schools top the list of considerations for baby boomers, followed by distance to medical care.

Baby boomers might be willing to forgo the large house, but among the generations they are neither the most nor least interested in living in communities close to shopping and entertainment. Sixty-seven percent rank this attribute 6 or higher in importance on a scale 1 of 10, compared with 71 percent of gen Yers and 58 percent of gen Xers. Baby boomers are also in the middle of the pack when it comes to rating the importance of being close to family and friends (60 percent rank this attribute 6 or higher), close to medical care (72 percent rank it 6 or higher), and walkability (67 percent rank it 6 or higher).

Community Characteristic Importance Rankings, Baby Boomers versus All Adults
Percentage ranking each characteristic 6 or higher in importance on a scale of 1 to 10

<table>
<thead>
<tr>
<th></th>
<th>Baby boomers</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood safety</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Quality of local public schools</td>
<td>74</td>
<td>79</td>
</tr>
<tr>
<td>Space between neighbors</td>
<td>70</td>
<td>72</td>
</tr>
<tr>
<td>Distance to medical care</td>
<td>72</td>
<td>71</td>
</tr>
<tr>
<td>Short distance to work or school</td>
<td>67</td>
<td>71</td>
</tr>
<tr>
<td>Walkability</td>
<td>67</td>
<td>70</td>
</tr>
<tr>
<td>Distance to shopping/entertainment</td>
<td>67</td>
<td>66</td>
</tr>
<tr>
<td>Distance to parks/recreational areas</td>
<td>63</td>
<td>64</td>
</tr>
<tr>
<td>Distance to family/friends</td>
<td>60</td>
<td>63</td>
</tr>
<tr>
<td>Convenience of public transportation</td>
<td>50</td>
<td>52</td>
</tr>
</tbody>
</table>

Focus on Generation X

What does generation X desire when it comes to housing, transportation, and community choices? This fact sheet shares key findings from “America in 2013” about generation X.

“America in 2013” is a national survey conducted by Belden Russonello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

Generation X Is More Affluent Than the U.S. Average
Members of generation X—Americans currently between the ages of 35 and 47—have been raising families during times of both economic boom and bust, and are better educated and more financially well off than most other generations. Born between 1966 and 1978, generation X is made up of 55 million Americans. Gen X is not a particularly diverse generation. The typical gen Xer is married with children, and 44 percent of this generation has an income of $75,000 or more.

Ethnicity, Gen X versus All Adults

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen X</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>73</td>
<td>69</td>
</tr>
<tr>
<td>Latino</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>African American</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>

Household Income, Gen X versus All Adults

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen X</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25,000</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td>$25,000–$50,000</td>
<td>17</td>
<td>25</td>
</tr>
<tr>
<td>$50,000–$75,000</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Over $75,000</td>
<td>44</td>
<td>28</td>
</tr>
</tbody>
</table>

Education Level, Gen X versus All Adults

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen X</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school or less</td>
<td>28</td>
<td>40</td>
</tr>
<tr>
<td>Some college</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>College</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>14</td>
<td>10</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
Members of Gen X Tend to Be Highly Satisfied and Believe Life Is Getting Better
Gen Xers are very satisfied, with 91 percent saying they are very or somewhat satisfied with the quality of life in their community, compared with 87 percent of the U.S. population overall. Gen Xers also tend to believe that life in their community is getting better.

<table>
<thead>
<tr>
<th>Satisfaction with Community’s Quality of Life, Gen X versus All Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
</tr>
<tr>
<td>Very satisfied</td>
</tr>
<tr>
<td>Somewhat satisfied</td>
</tr>
<tr>
<td>Somewhat dissatisfied</td>
</tr>
<tr>
<td>Very dissatisfied</td>
</tr>
</tbody>
</table>

Impression of Trend of Quality of Life in the Community, Gen X versus All Adults

<table>
<thead>
<tr>
<th>Impression of Trend of Quality of Life in the Community, Gen X versus All Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
</tr>
<tr>
<td>Better</td>
</tr>
<tr>
<td>Worse</td>
</tr>
<tr>
<td>Same</td>
</tr>
</tbody>
</table>

Gen X Prefers Suburban, Rural, and Small-Town Life
Gen X is not a very urban generation: 34 percent of gen Xers live in a small town, and 17 percent live in a rural area. Gen Xers also tend to prefer living in a smaller setting. Only 23 percent would like to live in a medium or big city, compared with 28 percent of Americans as a whole.

<table>
<thead>
<tr>
<th>Current and Preferred Community Type, Gen X versus All Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Gen X, current</td>
</tr>
<tr>
<td>Rural</td>
</tr>
<tr>
<td>Small town</td>
</tr>
<tr>
<td>Suburbs</td>
</tr>
<tr>
<td>Medium-sized city</td>
</tr>
<tr>
<td>Big city</td>
</tr>
</tbody>
</table>

Generation X Is on the Move
Gen X is a generation that is moving around: about 31 percent of its members have moved in the past five years, and 41 percent expect to move in the next five. These numbers are comparable with those for the U.S. population overall, but are somewhat lower than those for gen Y, which is the generation most likely to have moved or expect to move.

<table>
<thead>
<tr>
<th>Moving Statistics, Gen X versus All Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
</tr>
<tr>
<td>Moved in past five years</td>
</tr>
<tr>
<td>Likely to move in next five years</td>
</tr>
</tbody>
</table>
**Gen X Is a Generation of Homeowners**
Most members of gen X own their own home and, if they move, they expect to own the next one, too. It is perhaps not surprising then that 79 percent of gen Xers consider homeownership a good investment, a higher percentage than for the broader U.S. population—71 percent.

**Homeownership Statistics, Gen X versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen X</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own primary residence</td>
<td>78</td>
<td>66</td>
</tr>
<tr>
<td>Rent primary residence</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td>If moving, expect to own*</td>
<td>81</td>
<td>73</td>
</tr>
<tr>
<td>If moving, expect to rent*</td>
<td>16</td>
<td>25</td>
</tr>
<tr>
<td>See homeownership as good investment</td>
<td>79</td>
<td>71</td>
</tr>
</tbody>
</table>

*Among those likely or very likely to move in the next five years.

**Gen Xers Commute to Work or School, and They Commute by Car**
Eighty percent of gen Xers commute to school or work three or more days a week, and the vast majority commute by car—92 percent, compared with the U.S. average of 85 percent. About three in five gen Xers (63 percent) report that public transportation is available in their community, slightly lower than the U.S. average of 69 percent.

**Transportation Statistics, Gen X versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen X</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute to work or school</td>
<td>80</td>
<td>63</td>
</tr>
<tr>
<td>Commute by car</td>
<td>92</td>
<td>85</td>
</tr>
<tr>
<td>Public transit available</td>
<td>63</td>
<td>69</td>
</tr>
</tbody>
</table>

**For Gen X, Single-Family Homes Are the Draw**
Seventy-five percent of gen Xers currently live in a single-family home, with 11 percent now living in apartments and 10 percent living in a duplex, townhouse, or rowhouse. What’s more, 87 percent of gen X movers expect to move into a single-family home—a much higher percentage than those who are currently in one (75 percent).

**Current and Expected Housing Type, Gen X versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen X, current</th>
<th>Gen X, expected*</th>
<th>All adults, current</th>
<th>All adults, expected*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family home</td>
<td>75</td>
<td>87</td>
<td>66</td>
<td>67</td>
</tr>
<tr>
<td>Apartment</td>
<td>11</td>
<td>6</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>Duplex, townhouse, or rowhouse</td>
<td>10</td>
<td>4</td>
<td>11</td>
<td>14</td>
</tr>
</tbody>
</table>

*Among those likely or very likely to move in the next five years.

Visit [www.uli.org/communitysurvey](http://www.uli.org/communitysurvey) to learn more about “America in 2013.”
Gen X Has Mixed Feelings about Mixed Use
When it comes to the kind of communities gen X prefers, places featuring attributes associated with compact development appeal to about half the generation. Although gen X’s preferences are less urban than those of gen Y and baby boomers, half of gen Xers prefer being close to a mix of shops, restaurants, and offices, and more than 53 percent prefer communities with a mix of incomes.

Community Attribute Preferences, Gen X versus All Adults
Percentage naming listed attribute

<table>
<thead>
<tr>
<th></th>
<th>Gen X</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shorter commute/smaller home</td>
<td>54</td>
<td>61</td>
</tr>
<tr>
<td>Close to mix of shops, restaurants, and offices</td>
<td>50</td>
<td>53</td>
</tr>
<tr>
<td>Mix of incomes</td>
<td>53</td>
<td>52</td>
</tr>
<tr>
<td>Public transportation options</td>
<td>45</td>
<td>51</td>
</tr>
<tr>
<td>Mix of homes</td>
<td>47</td>
<td>48</td>
</tr>
<tr>
<td><strong>Percentage choosing three or more compact development attributes</strong></td>
<td><strong>49</strong></td>
<td><strong>54</strong></td>
</tr>
</tbody>
</table>

Gen X Cares Most about Safety, Schools, and Space
When asked to indicate how they view the importance of certain community characteristics, 97 percent of gen Xers say safety is paramount. Schools are next on their list. Space between neighbors is also a key consideration, with 79 percent of gen Xers ranking such space high in importance, compared with 72 percent of the U.S. population overall.

Community Characteristic Importance Rankings, Gen X versus All Adults
Percentage ranking each characteristic 6 or higher in importance on a scale of 1 to 10

<table>
<thead>
<tr>
<th></th>
<th>Gen X</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood safety</td>
<td>97</td>
<td>92</td>
</tr>
<tr>
<td>Quality of local public schools</td>
<td>82</td>
<td>79</td>
</tr>
<tr>
<td>Distance to medical care</td>
<td>63</td>
<td>71</td>
</tr>
<tr>
<td>Space between neighbors</td>
<td>79</td>
<td>72</td>
</tr>
<tr>
<td>Short distance to work or school</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>Walkability</td>
<td>67</td>
<td>70</td>
</tr>
<tr>
<td>Distance to shopping/entertainment</td>
<td>58</td>
<td>66</td>
</tr>
<tr>
<td>Distance to parks/recreational areas</td>
<td>62</td>
<td>64</td>
</tr>
<tr>
<td>Distance to family/friends</td>
<td>57</td>
<td>63</td>
</tr>
<tr>
<td>Convenience of public transportation</td>
<td>45</td>
<td>52</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
Focus on Generation Y

What does generation Y desire when it comes to housing, transportation, and community choices? This fact sheet shares key findings from “America in 2013” about gen Y.

“America in 2013” is a national survey conducted by Belden Russnello Strategists LLC on behalf of the ULI Terwilliger Center for Housing and the ULI Infrastructure Initiative.

Generation Y Is America’s Most Diverse Generation

Generation Y, also known as the millennial generation, is the youngest group of adults surveyed as part of “America in 2013.” Gen Y is composed of people born between 1979 and 1995, who are now between the ages of 18 and 34. There are 72 million members of gen Y, a number that continues to grow as immigrants in this age cohort enter the United States.

Gen Y stands out as the most urban, multicultural, and transient generation in America today. Forty percent of generation Y is Latino or African American. Compared with the U.S. population as a whole, gen Y has comparatively low levels of education and income—a testament to their relative youth, as well as to the fact that they are just starting their careers amid a challenging job market.

Ethnicity, Gen Y versus All Adults

<table>
<thead>
<tr>
<th></th>
<th>Gen Y</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>51</td>
<td>69</td>
</tr>
<tr>
<td>Latino</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>African American</td>
<td>22</td>
<td>12</td>
</tr>
</tbody>
</table>

Household Income, Gen Y versus All Adults

<table>
<thead>
<tr>
<th></th>
<th>Gen Y</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25,000</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>$25,000–$50,000</td>
<td>31</td>
<td>25</td>
</tr>
<tr>
<td>$50,000–$75,000</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Over $75,000</td>
<td>18</td>
<td>28</td>
</tr>
</tbody>
</table>

Education Level, Gen Y versus All Adults

<table>
<thead>
<tr>
<th></th>
<th>Gen Y</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school or less</td>
<td>49</td>
<td>40</td>
</tr>
<tr>
<td>Some college</td>
<td>34</td>
<td>31</td>
</tr>
<tr>
<td>College</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

Visit www.uli.org/communitysurvey to learn more about “America in 2013.”
Gen Y Is Less Satisfied Than the U.S. Population as a Whole, But Thinks Life Is Getting Better

Gen Yers’ satisfaction with the quality of life in their community lags that of the overall U.S. population: whereas 82 percent of gen Yers say they are very or somewhat satisfied with the quality of life in their community, 87 percent of the U.S. population as a whole says this. For gen Y, there is room for improvement.

Gen Y is the least satisfied of all the generations with the range of housing options available (25 percent say they are dissatisfied) and with the quality and quantity of job and career opportunities in their community (49 percent express dissatisfaction).

However, gen Yers are optimistic. About 21 percent of gen Yers say life in their community is getting better, compared with 19 percent of Americans overall; 16 percent say it is getting worse, compared with 17 percent of the U.S. population overall.

**Satisfaction with Community’s Quality of Life, Gen Y versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen Y</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>40</td>
<td>49</td>
</tr>
<tr>
<td>Somewhat satisfied</td>
<td>42</td>
<td>38</td>
</tr>
<tr>
<td>Somewhat dissatisfied</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Very dissatisfied</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

**Impression of Trend of Quality of Life in the Community, Gen Y versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen Y</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>Worse</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Same</td>
<td>62</td>
<td>63</td>
</tr>
</tbody>
</table>

Gen Yers Can Be Found in Every Community Type, But Many Are Drawn to Urban Living

Gen Yers are relatively evenly distributed across all community types: about 30 percent of gen Yers live in a small town, 17 percent in the suburbs, and another 39 percent are in a medium-sized or big city.ii

For gen Y, the appeal of urban living is strong. Gen Yers are more likely than the U.S. population overall to say that if they could live anywhere in the next five years, they would live in a medium-sized or big city. Forty percent of gen Yers express that preference, compared with only about 28 percent of the U.S. population as a whole.

**Current and Preferred Community Type, Gen Y versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen Y, current</th>
<th>Gen Y, preferred</th>
<th>All adults, current</th>
<th>All adults, preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>12</td>
<td>20</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>Small town</td>
<td>30</td>
<td>19</td>
<td>32</td>
<td>26</td>
</tr>
<tr>
<td>Suburbs</td>
<td>17</td>
<td>17</td>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>21</td>
<td>20</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Big city</td>
<td>18</td>
<td>20</td>
<td>14</td>
<td>12</td>
</tr>
</tbody>
</table>

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**Generation Y Is on the Move**

Gen Y is a generation on the move: 53 percent of gen Yers say they have moved recently, and 63 percent say they expect to move in the next five years. These numbers are much higher than for the U.S. population overall, and specifically for baby boomers, 31 percent of whom say they expect to move in the next five years, and gen Xers, 41 percent of whom expect to move.

**Moving Statistics, Gen Y versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen Y</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moved in past five years</td>
<td>53</td>
<td>32</td>
</tr>
<tr>
<td>Likely to move in next five years</td>
<td>63</td>
<td>42</td>
</tr>
</tbody>
</table>

**Gen Y Is a Generation of Renters**

Generation Y is a generation of renters: 54 percent of gen Yers currently rent. Of note: only 31 percent of gen-Y movers say they expect to own their new home—perhaps an acknowledgment of a difficult job market.

Despite this generation’s limited experience with owning a home, 72 percent of gen Yers say homeownership is a good investment.

**Homeownership Statistics, Gen Y versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen Y</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own primary residence</td>
<td>40</td>
<td>66</td>
</tr>
<tr>
<td>Rent primary residence</td>
<td>54</td>
<td>32</td>
</tr>
<tr>
<td>If moving, expect to own*</td>
<td>31</td>
<td>73</td>
</tr>
<tr>
<td>If moving, expect to rent*</td>
<td>69</td>
<td>25</td>
</tr>
<tr>
<td>See homeownership as good investment</td>
<td>72</td>
<td>71</td>
</tr>
</tbody>
</table>

*Among those likely or very likely to move in the next five years.*

**Gen Y Uses Public Transit**

About 86 percent of gen Yers commute to work or school three or more days a week. Eighty-one percent reports having access to public transportation, a higher percentage than for the U.S. population as a whole, of which 69 percent says it has access to transit. Though the vast majority of gen Yers commute by car, many take advantage of public transit or other options: the percentage of gen Yers commuting by automobile is lower than for the U.S population overall.

**Transportation Statistics, Gen Y versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen Y</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute to work or school</td>
<td>86</td>
<td>63</td>
</tr>
<tr>
<td>Commute by car</td>
<td>77</td>
<td>85</td>
</tr>
<tr>
<td>Public transit available</td>
<td>81</td>
<td>69</td>
</tr>
</tbody>
</table>
For Gen Y, the Desire for a Single-Family Home Is Strong

Although only 49 percent of gen Yers currently live in a single-family home, 60 percent of those who expect to move in the next five years say they want to move into one. Still, 39 percent of the gen Yers expecting to move think they will end up in an apartment or duplex, townhouse, or rowhouse, higher than the U.S. average of 29 percent.

**Current and Expected Housing Type, Gen Y versus All Adults**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Gen Y, Current</th>
<th>Gen Y, Expected*</th>
<th>All adults, Current</th>
<th>All adults, Expected*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family home</td>
<td>49</td>
<td>60</td>
<td>66</td>
<td>67</td>
</tr>
<tr>
<td>Apartment</td>
<td>31</td>
<td>21</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>Duplex, townhouse, or rowhouse</td>
<td>15</td>
<td>17</td>
<td>11</td>
<td>14</td>
</tr>
</tbody>
</table>

*Among those likely or very likely to move in the next five years.

Gen Y’s Preferences Tend to Be More Urban Than Those of the U.S. Population Overall

When it comes to community attributes, members of gen Y express preferences that skew more urban than those of the country as a whole. Fifty-nine percent of gen Yers like communities with a mix of housing types, compared with 48 percent of the U.S. population overall; 62 percent want to be in community with a mix of shops, restaurants, and offices, compared with 61 percent of the U.S. population overall; and 55 percent want public transportation options, compared with an overall U.S. figure of 51 percent.

Of note: there is one area where gen Y lags the overall U.S. population: only 54 percent of gen Yers would give up a larger home if it meant a shorter commute, compared with 61 percent of the U.S. population overall. Perhaps gen Y has not yet experienced the agony of a long commute.

**Community Attribute Preferences, Gen Y versus All Adults**

<table>
<thead>
<tr>
<th>Percentage naming listed attribute</th>
<th>Gen Y</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shorter commute/smaller home</td>
<td>54</td>
<td>61</td>
</tr>
<tr>
<td>Close to mix of shops, restaurants, and offices</td>
<td>62</td>
<td>53</td>
</tr>
<tr>
<td>Mix of incomes</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>Public transportation options</td>
<td>55</td>
<td>51</td>
</tr>
<tr>
<td>Mix of homes</td>
<td>59</td>
<td>48</td>
</tr>
<tr>
<td>Percentage choosing three or more compact development attributes</td>
<td>59</td>
<td>54</td>
</tr>
</tbody>
</table>
**Gen Y Values Proximity, Walkability**
When asked to indicate how they view the importance of certain community characteristics, gen Yers respond with answers similar to those of the broader population in some areas. As is the case for the country overall, safety and schools top the list of considerations for gen Y. In fact, local public schools are more important to gen Y than to any other generation.

However, gen Y tends to place more importance on being a short distance from work or school and on walkability than does the U.S. population overall. Gen Y ranks other proximity factors—being close to parks and recreational areas, to shopping and entertainment, and to family and friends—high in importance as well.iii Gen Y also places high importance on public transportation.

Gen Y also walks the walks. Like baby boomers, gen Yers walk more than the other generations. Nearly one in four people in generation Y (23 percent) reports walking several blocks to a destination nearly every day.

**Community Characteristic Importance Rankings, Gen Y versus All Adults**
Percentage ranking each characteristic 6 or higher in importance on a scale of 1 to 10

<table>
<thead>
<tr>
<th></th>
<th>Gen Y</th>
<th>All adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood safety</td>
<td>88</td>
<td>92</td>
</tr>
<tr>
<td>Quality of local public schools</td>
<td>87</td>
<td>79</td>
</tr>
<tr>
<td>Distance to medical care</td>
<td>73</td>
<td>71</td>
</tr>
<tr>
<td>Space between neighbors</td>
<td>69</td>
<td>72</td>
</tr>
<tr>
<td>Short distance to work or school</td>
<td>82</td>
<td>71</td>
</tr>
<tr>
<td>Walkability</td>
<td>76</td>
<td>70</td>
</tr>
<tr>
<td>Distance to shopping/entertainment</td>
<td>71</td>
<td>66</td>
</tr>
<tr>
<td>Distance to parks/recreational areas</td>
<td>68</td>
<td>64</td>
</tr>
<tr>
<td>Distance to family/friends</td>
<td>69</td>
<td>63</td>
</tr>
<tr>
<td>Convenience of public transportation</td>
<td>57</td>
<td>52</td>
</tr>
</tbody>
</table>


iii *Generation Y: America’s New Housing Wave* also found that generation Y ranks distance to family and friends high in importance among community features, along with proximity to work. The authors note that gen Yers desire to balance work and life through their community choices. Lachman and Brett, *Generation Y: America’s New Housing Wave*, 13.