MEETING NOTICE
AND AGENDA

SAN DIEGO CONFORMITY WORKING GROUP
The San Diego Conformity Working Group may take action on any item appearing on this agenda.

Wednesday, May 17, 2006

10:30 a.m. to 12 noon

SANDAG, Conference Room 8C
401 B Street, Suite 800
San Diego, CA  92101-4231

Staff Contact:  Elisa Arias
(619) 699-1936
ear@sandag.org

AGENDA HIGHLIGHTS

•  2006 RTIP: DRAFT AIR QUALITY CONFORMITY ANALYSIS
•  STATUS OF THE STATE IMPLEMENTATION PLAN (SIP) FOR 8-HOUR OZONE STANDARD AND EMFAC 2007 UPDATE

Please contact Elisa Arias prior to the meeting if you wish to participate by conference call.

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ITEM # | RECOMMENDATION
---|---
1. INTRODUCTIONS
+2. SUMMARY OF APRIL 19, 2006 MEETING | INFORMATION
3. PUBLIC COMMENTS/COMMUNICATIONS
+4. 2006 RTIP: DRAFT AIR QUALITY CONFORMITY ANALYSIS | DISCUSSION
On May 10, 2006, SANDAG released the draft air quality analysis for the 2006 RTIP Amendment to the CWG for review and comment. Staff will provide an overview of the analysis. On May 19, 2006, the Transportation Committee will be asked to accept the Draft 2006 RTIP and its Air Quality Conformity Analysis for public review and distribution and to schedule a public hearing for June 16, 2006.
5. 2007 REGIONAL TRANSPORTATION PLAN (RTP) SCHEDULE | INFORMATION
On April 21, 2006, the Transportation Committee recommended that the SANDAG Board of Directors approve the revised 2007 RTP schedule. The Board of Directors took action approving the revised schedule on April 28, 2006. A draft 2007 RTP is anticipated to be released in May 2007, and adoption is proposed for November 2007.
6. INTERIM GUIDANCE FOR IMPLEMENTING THE TRANSPORTATION CONFORMITY PROVISIONS IN SAFETEA-LU | DISCUSSION
In February 2006, the U.S. Environmental Protection Agency (EPA), Federal Highway Administration, and Federal Transit Administration issued interim guidance for transportation conformity. The CWG will discuss this guidance, which was included in the March 15, 2006, agenda.
+7. STATUS OF THE STATE IMPLEMENTATION PLAN (SIP) FOR 8-HOUR OZONE STANDARD AND EMFAC 2007 UPDATE | DISCUSSION
The CWG will discuss updates on the development of the 8-Hour Ozone SIP and the EMFAC emissions model. A draft schedule for the San Diego 8-Hour Ozone SIP is attached to the report.
8. TRANSPORTATION CONTROL MEASURES (TCM): DISCUSSION
U.C. DAVIS-CALTRANS AIR QUALITY PROJECT WORKSHOP

Caltrans Headquarters staff will provide the CWG with a summary of the TCM Workshop held at U.C. Davis on February 27, 2006. The workshop agenda is attached for information.

9. U.S. ENVIRONMENTAL PROTECTION AGENCY HEARINGS INFORMATION
ON NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER AND REVISIONS TO AMBIENT AIR MONITORING REGULATIONS

U.S. EPA staff will provide the CWG with an oral update on the March 8, 2006, hearings held to gather public comment on two proposed rules: “National Ambient Air Quality Standards for Particulate Matter” and “Revisions to Ambient Air Monitoring Regulations.” These proposals were published in the Federal Register on January 17, 2006.

10. OTHER BUSINESS

+ next to an item indicates an attachment

The next meeting of the San Diego Region Conformity Working Group is scheduled for Wednesday, June 21, 2006, from 10:30 a.m. to 12 noon at SANDAG.
SUMMARY OF APRIL 19, 2006, MEETING

Item #1: Introductions
Self-introductions were made. See attached attendance list.

Item #2: Summary of February 15, 2006 Meeting
There were no comments or corrections to the meeting notes.

Item #3: Public Comments/Communications
There were none.

Item #4: 2030 Revenue Constrained Regional Transportation Plan (RTP): 2006 Update and Air Quality Conformity Determination
Elisa Arias, SANDAG, reported that the U.S. Department of Transportation issued its conformity finding of the 2030 Revenue Constrained RTP: 2006 Update on March 29, 2006. A copy of the letter was included in the CWG agenda package.

Item #5: 2004 RTIP Amendment Number 16: Draft Air Quality Conformity Analysis
Elisa Arias, SANDAG, noted that the draft air quality analysis for the 2004 RTIP Amendment No. 16 was released to the CWG on March 24, 2006, for review and comment. Appendix B documents the conformity procedures and assumptions. Amendment Number 16 is included on the SANDAG Transportation Committee agenda for April 21st to be released for public review and comment and is scheduled for adoption in May. The document will then be sent to the U.S. Department of Transportation (DOT) for a conformity finding.

Item #6: Development of the 2006 Regional Transportation Improvement Program (RTIP)
SANDAG solicited submissions for new projects or revisions to be included in the 2006 RTIP, and submittals were due to SANDAG by April 7, 2006. Sookyung Kim, SANDAG, provided an overview of the 2006 RTIP revenue assumptions. Elisa Arias, SANDAG, provided the CWG with additional project descriptions for several non-capacity increasing projects. A project list with revised descriptions will be provided to the CWG.
Item #7: Updated Schedule for the Comprehensive 2007 Regional Transportation Plan (RTP)
Heather Werdick, SANDAG, provided an update on the revised schedule for the 2007 RTP, which will be presented to the SANDAG Board on April 28, 2006 for adoption. The 2007 RTP has been delayed due to the need for increased staff time spent on the 2030 Revenue Constrained Regional Transportation Plan (RTP): 2006 Update, as well as the delay of two of the key RTP inputs, the Independent Transit Review and the Smart Growth Concept Map. SANDAG staff reviewed the new schedule with the CWG and informed the CWG that the air quality analysis is expected to begin in February 2007. Elisa Arias noted that SANDAG would be conducting the air quality analysis within the 6-month grace period after the release of EMFAC 2007 and would use EMFAC 2002 for emissions analysis.

Item #8: Interim Guidance for Implementing the Transportation Conformity Provisions in SAFETEA-LU
This item was postponed for discussion until the May 17, 2006 CWG meeting.

Item #9: Status of the State implementation Plan (SIP) for 8-hour Ozone Standard and EMFAC 2007 Update
SANDAG staff reported that Dennis Wade, ARB, informed them that there had not been any updates on the schedule for EMFAC 2007. ARB is currently contacting the individual Metropolitan Planning Organizations for updated travel activity data. SANDAG has not been contacted to date, but will provide the activity data from the 2006 RTP update when requested. The draft SIP development schedule provided by the San Diego Air Pollution Control District (APCD) will be included in the May CWG agenda.

Item #10: Environmental Protection Agency Hearings on National Ambient Air Quality Standards for Particulate Matter and Revisions to Ambient Air Monitoring Regulations
This item was postponed for discussion until the May 17, 2006, CWG meeting. Mike Brady, Caltrans, stated that there is a strong possibility that San Diego may be in non-attainment for the new proposed PM 2.5 standard. Carl Selnick, APCD, stated that he hoped that San Diego will be in attainment prior to the area designations, which most likely will not be made until 2010.

Item #11: Other Business
The next meeting of the San Diego Conformity Working Group is scheduled for May 17, 2006, at 10:30 a.m. at SANDAG. The statewide CWG meeting will be held on June 15, 2006, also at SANDAG.
San Diego Region Conformity Working Group
Meeting Attendance
April 19, 2006

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<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Mike Brady (phone)</td>
<td>Caltrans</td>
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<td>Jacque Clayton</td>
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<td>Sandy Johnson</td>
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<td>Carl Selnick</td>
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<td>Carla Walecka (phone)</td>
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<tr>
<td>Elisa Arias</td>
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<td>Rachel Kennedy</td>
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<td>Sookyung Kim</td>
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<td>Jose Nuncio</td>
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<td>Heather Werdick</td>
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May 17, 2006

AGENDA ITEM NO.: 4

Action Requested: DISCUSSION

2006 RTIP: DRAFT AIR QUALITY CONFORMITY ANALYSIS

File Number 3001300

Attachment related to this item includes:

- Appendix B: Transportation Conformity: Regional Emissions Analysis and Modeling Procedures
Appendix B

TRANSPORTATION CONFORMITY: REGIONAL EMISSIONS ANALYSIS AND MODELING PROCEDURES
BACKGROUND

The federal Clean Air Act (CAA), last amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. California has adopted state air quality standards that are more stringent than the NAAQS. Areas with levels that exceed the standard for specified pollutants are designated as nonattainment areas.

The U.S. EPA requires that each state containing nonattainment areas develop plans to attain the NAAQS by a specified attainment deadline. These attainment plans are called State Implementation Plans. The San Diego County Air Pollution Control District (APCD) prepares the San Diego portion of the California State Implementation Plan (SIP). Once the standards are attained, further plans—called Maintenance Plans—are required to demonstrate continued maintenance of the NAAQS.

SANDAG and the U.S. Department of Transportation (DOT) must make a determination that the Regional Transportation Plan (RTP) and the Regional Transportation Improvement Program (RTIP) conform to the SIP for air quality. Conformity to the SIP means that transportation activities will not create new air quality violations, worsen existing violations, or delay the attainment of the national ambient air quality standards.

On February 24, 2006, the SANDAG Board of Directors made a finding of conformity of the 2030 Revenue Constrained RTP: 2006 Update and adopted the RTP. The U.S. DOT made its conformity determination on March 29, 2006.

The 2004 RTIP was found in conformity with the SIP by the SANDAG Board of Directors and by the U.S. DOT on July 23, 2004, and on October 4, 2004, respectively. Several amendments to the 2004 RTIP have been processed since then.

The current conformity analysis is being prepared simultaneously for the 2006 RTIP and the 2030 Revenue Constrained RTP: 2006 Update to ensure consistency of the long-range transportation plan and the improvement program.

The U.S. EPA designated the San Diego air basin as nonattainment for the federal 8-Hour Ozone standard. This designation took effect on June 15, 2004. The air basin has been classified as a basic nonattainment area under Subpart 1 of the Clean Air Act and the attainment date for the 8-Hour Ozone standard is June 15, 2009. Several areas that are tribal lands in eastern San Diego County were excluded from the nonattainment designation. As shown in Figure B.1 on page 24, La Posta Areas #1 and #2, Cuyapaie, Manzanita, and Campo Areas #1 and #2 are attainment areas for the 8-Hour Ozone NAAQS. In cooperation with the San Diego APCD and SANDAG, the California Air Resources Board (ARB) must develop an 8-Hour Ozone Attainment Plan for submission to the U.S. EPA by June 15, 2007.
The Final Transportation Conformity Rule Amendments for the New 8-Hour Ozone and PM2.5 National Ambient Air Quality Standards of July 2004 require that conformity of the RTP and the RTIP for nonattainment areas be determined to the 8-Hour ozone standard by June 15, 2005. The SANDAG Board of Directors made a finding of conformity of the 2030 RTP and 2004 RTIP, as amended, on April 22, 2005. The U.S. DOT issued its conformity finding on May 20, 2005.


The U.S. EPA also designated the San Diego region as a federal maintenance area for the Carbon Monoxide (CO) standard. On January 30, 2006, the U.S. EPA approved the 2004 Revision to the California State Implementation Plan for Carbon Monoxide or CO Maintenance Plan as a SIP revision. The new CO motor vehicle emissions budgets are the applicable budgets for transportation conformity.

TRANSPORTATION CONFORMITY: REGIONAL EMISSIONS ANALYSIS AND MODELING PROCEDURES

Introduction

SANDAG is conducting a new regional air quality emissions analysis for the 2006 RTIP. Conformity of the 2030 Revenue Constrained RTP: 2006 Update also will be redetermined for consistency purposes. Chapter 3 includes the projects proposed for inclusion in the 2006 RTIP.

Growth Forecasts

Every three to five years, SANDAG produces a long-range forecast of population, housing, and employment growth for the San Diego region. The most recent is the Final 2030 Regional Growth Forecast, which was accepted by the SANDAG Board of Directors on December 19, 2003, for use in planning studies.

The forecast process relies on three integrated forecasting models. First is the Demographic and Economic Forecasting Model (DEFM), which provides a detailed econometric and demographic forecast for the entire region. Second is the Interregional Commuting Model, which provides a forecast of commuting between the San Diego region, southwest Riverside County, and Tijuana/Northern Baja California. Third, the Urban Development Model, allocates the results of the first two models to subregional areas based upon the current plans and policies of the jurisdictions.

The Final 2030 Regional Growth Forecast is based solely on the adopted general plans and community plans and policies of the 18 cities. For the unincorporated area, the forecast is based on the most recent (December 2002) version of the County’s GP2020 plan update, as directed by the County Board of Supervisors.

In February 2006, SANDAG consulted with the San Diego Region Conformity Working Group (CWG) on the use of the Final 2030 Regional Growth Forecast for the air quality conformity analysis of the
2006 RTIP and conformity redetermination of the 2030 Revenue Constrained RTP 2006 Update. Previously, both U.S. DOT and U.S. EPA concurred that approved plans should be used as input in the air quality conformity process. Table B.1 shows the regional population and employment growth forecast for the San Diego region through 2030.

**TABLE B.1—SAN DIEGO REGIONAL POPULATION AND EMPLOYMENT FORECAST**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Population</th>
<th>Total Employment</th>
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<tr>
<td>2000</td>
<td>2,813,833</td>
<td>1,384,676</td>
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<tr>
<td>2010</td>
<td>3,211,721</td>
<td>1,528,522</td>
</tr>
<tr>
<td>2020</td>
<td>3,528,605</td>
<td>1,672,883</td>
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<tr>
<td>2030</td>
<td>3,855,085</td>
<td>1,824,030</td>
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Source: SANDAG, December 2003

**Transportation Modeling**

SANDAG follows a widely used four-step transportation modeling process of trip generation, trip distribution, mode choice, and assignment to forecast travel activity in the San Diego region. After trip generation, several iterations through the trip distribution, mode choice, and assignment steps are made to bring travel demand into equilibrium with supply. Finally, travel model results are combined with additional input and output functions to form the complete modeling chain. Travel forecasting procedures are described in more detail in SANDAG’s Final 2030 Forecast Process and Model Documentation (April 2004) and the Addendum to Transportation Model Documentation (June 2005).

The estimates of regional transportation-related emissions analysis meet the requirements established in the Transportation Conformity Rule, Sections 93.122(b) and 93.122(c). These requirements relate to the procedures to determine regional transportation-related emissions, including the use of network-based travel models, methods to estimate traffic speeds and delays, and the estimation of vehicle miles of travel.

TransCAD is the transportation planning computer package used by SANDAG to provide a framework for performing much of the computer processing involved with modeling. Another software package used extensively in the modeling process is ArcInfo. This geographic information system (GIS) maintains, manipulates, and displays transportation, land use, and demographic data. SANDAG has written numerous programs that provide a linkage between TransCAD and ArcInfo. Other programs manipulate data and perform some modeling functions such as trip generation and mode choice.

A number of data files and surveys are used to calibrate the transportation models. These include:
In addition to model parameters derived from these surveys, there are three major inputs to the transportation models:

- growth forecast inputs used to describe existing and planned land use patterns and demographic characteristics
- highway networks used to describe existing roadway facilities and planned improvements to the roadway system
- transit networks used to describe existing and planned public transit service

Highway Networks

The regional highway networks in the 2006 RTIP and the 2030 Revenue Constrained RTP: 2006 Update include all roads classified by local jurisdictions in their General Plan circulation elements. These roads include freeways, expressways, and the Regional Arterial System (RAS). The RAS consists of all conventional state highways, prime arterials, and selected major streets. In addition, some local streets are included in the networks for connectivity between zones.

The route improvements and additions in the 2006 RTIP and the 2030 Revenue Constrained RTP: 2006 Update provides adequate travel service that is compatible with adopted regional policies for land use and population growth. All regionally significant projects are included in the quantitative emissions analysis. These include all state highways, all proposed National Highway System routes, all regionally significant arterials, and all FHWA functionally classified "Other Principal Arterials."

The networks also account for programs intended to improve the operation of the highway system, including high-occupancy-vehicle (HOV) lanes and ramp metering. Existing and proposed toll facilities also are modeled to reflect time, cost, and capacity effects of these facilities. The SR 125 South project and SR 241 are the only modeled toll facilities in the San Diego region.

In addition, several managed/HOV lanes are included in the Revenue Constrained Plan. Facilities with proposed managed lanes include I-5, I-15, I-805, and SR 52. Managed lanes are defined as reversible HOV routes and HOV routes with two or more lanes in the peak direction. It is assumed that the excess capacity not utilized by carpools and transit on these facilities would be managed so that single occupant vehicles could use these lanes under a pricing mechanism. Traffic flows would be managed so that the facility would operate at level of service C or better.

Based on the networks and programs described above, the transportation forecasts of the 2006 RTIP and the 2030 Revenue Constrained RTP: 2006 Update differentiate between four highway modes: drive alone/non-toll, drive alone/toll, shared-ride/HOV, and shared-ride/non-HOV.
SANDAG normally maintains networks for 2000 (the 2030 Regional Growth Forecast base year) and the years 2010, 2020, and 2030. A 2014 network also was created to conduct air quality conformity analyses for the 2006 RTIP and conformity redetermination of the 2030 Revenue Constrained RTP: 2006 Update to the 2014 1-Hour ozone emissions budgets. Additionally, a base year 2002 network and a 2009 network were created to conduct the interim emissions test for the 8-Hour ozone standard attainment year.

**Transit Networks**

SANDAG also maintains transit network datasets for existing and proposed transit systems. Most transit routes run over the same streets, freeways, HOV lanes and ramps used in the highway networks. As a result the only additional facilities that are added to the transportation coverage for transit modeling purposes are:

- trolley and commuter rail lines
- streets used by buses that are not part of local general plan circulation elements

There are seven transit modes, which group routes with similar operating characteristics: commuter rail, trolley, regional bus rapid transit (BRT), corridor BRT, limited express bus, express bus, and local bus. Regional and corridor BRT modes were recently added to represent a new type of transit service proposed in the 2030 RTP. BRT service would have stations and operating characteristics similar to commuter rail and trolleys, but service would be provided by advanced design buses operating on HOV lanes, some grade-separated transit ways, and surface streets. Once TransCAD transit networks have been built, TransCAD finds minimum time paths between transit access points (TAPs). TAPs are selected transit stops that are used to represent walk and auto access to the transit system. The following four sets of paths are created for modes:

- AM peak period local bus
- AM peak period premium service
- Mid-day local bus
- Mid-day premium service

Bus speeds assumed in the transit networks are derived from modeled highway speeds and reflect the effects of congestion. Regional and express transit routes on surface streets are assumed to operate out of congestion due to priority transit treatments. Higher bus speeds may result for transit vehicles operating on highways with HOV lanes and HOV bypass lanes at ramp meters, compared to those routes that operate on highways where these facilities do not exist.

In addition to transit travel times, transit fares are required as input to the mode choice model. TransCAD procedures replicate the San Diego region’s complicated fare policies that differ between:

- buses which collect a flat fare of between $1.75 and $4.00 depending on the type of service;
- trolleys which charge a variable fare of between $1.25 and $3.00 depending on how many stations are traversed;
- commuter rail which has a zone-based fare of between $3.50 and $4.75;
- proposed regional BRT routes which are assumed to charge a distance based fare of between $0.14 and $0.60 per mile that replicates limited express and commuter rail fares; and
proposed corridor BRT routes, which are assumed to use trolley station-based fares.

Fares are expressed in 2004 dollars and assumed to remain constant in inflation-adjusted dollars over the forecast period.

Near-term transit route changes are drawn from the Regional Short-Range Transit Plan produced in cooperation with the region’s transit agencies. Longer-range improvements are proposed as a part of the RTP development and other transit corridor studies. In addition to federal and state funded projects, locally funded regionally significant transit projects have been included in the air quality conformity analysis of the 2006 Revenue Constrained Scenario of the 2030 RTP. These transit projects also are funded with TransNet funds or other local revenue sources. Once network coding is completed, the transportation models are run for the applicable scenarios (2002, 2009, 2010, 2014, 2020, and 2030).

**Trip Generation**

Trip generation is the first step in the transportation modeling process. Average weekday trip ends by all forms of transportation starting and ending in each zone are estimated for ten trip types: home-work, home-college, home-school, home-shop, home-other, work-other, and other-other, serve passenger, visitor, and airport. The model computes person trips, which account for all forms of transportation including automobiles, trucks, taxicabs, motorcycles, public transit, bicycling and walking.

The trip generation model works by applying trip rates to zone level growth forecasts. The model calculates each of the trip ends separately, as trip productions and attractions. Trip production rates are expressed as trips per household while trip production rates vary by trip type and structure type. Trip attraction rates are expressed as trips per acre of nonresidential land use or trips per household. Trip attraction rates vary by trip type and land use category. The Final 2030 Regional Growth Forecast was used to produce trip generation forecasts for the years 2002, 2009, 2010, 2014, 2020, and 2030. Trip generation rates were established by utilizing data from traffic generator studies and expanding rates from the 1995 Travel Behavior Survey and 2001 Caltrans Statewide Travel Survey.

SANDAG’s regional transportation model uses a relatively high trip generation rate for households (8.1 vehicle trips per day), which may account for possible increases in trip making as new facilities are built. Also, the model accounts for travel diversion among facilities.

The model reduces future year person trips by a small amount to reflect increased use of teleworking and e-commerce. Reduction factors of 3 to 5 percent were applied to selected trip purposes and land uses.

**Trip Distribution**

After trip generation, trip movements between zones are determined using a doubly-constrained gamma-function gravity model form of the trip distribution model. Inputs to the trip distribution model include zone level trip generation forecasts by trip type, zone-to-zone impedances, and gamma function parameters by trip type. The model is designed to modify trip patterns in response
to new development and reflects shortened trip lengths in the vicinity of Smart Growth, mixed-use developments. The model also modifies trip patterns as new roadways are added.

The model is calibrated to match observed trip length frequencies from the 1995 Travel Behavior Survey and 2001 Caltrans Statewide Travel Survey. Zone-to-zone impedances are a composite measure of peak and off-peak travel times and costs by highway, transit and non-motorized modes. Several iterations of trip distribution, mode choice, and assignment are performed to bring model-estimated highway travel into equilibrium with supply. After each iteration or feedback loop, impedances are recomputed to reflect changes in highway congestion.

**Mode Choice**

At this point in the modeling process, total person trip movements between zones are split into different forms of transportation by highway, transit, and non-motorized modes (bicycling and walking). Highway modes include drive alone/non-toll, drive alone toll, shared-ride/HOV, and shared-ride/non-HOV. Nine transit modes differentiate transit trips by three ride modes (rail/BRT, express bus and local bus) and three access modes (walk, drive, and drop-off). The mode choice model is designed to link mode use to demographic assumptions, highway network conditions, transit system configuration, land use alternatives, parking costs, transit fares, and auto operating costs. Trips between zone pairs are allocated to modes based on the cost and time of traveling by a particular mode compared to the cost and time of traveling by other modes. For example, vehicle trips on a congested route would be more likely to be diverted to light rail than vehicle trips on an uncongested freeway.

Income level also is considered since lower income households tend to own fewer automobiles and therefore make more trips by transit and carpooling. People in higher income households tend to choose modes based on time and convenience rather than cost. The mode choice model is calibrated using 1995 and 2001 Travel Behavior Survey trip tables by mode and income and 2001-2003 Regional Transit Survey transit trip characteristics. Regional level Census 2000 work trip mode shares were also used to fine-tune mode share estimates.

Highway and transit travel times reflect highway congestion effects from the final iteration of the feedback loop. The model produces a.m. peak, p.m. peak, and off-peak period trip tables for vehicles and transit riders. The a.m. peak period is from 6 to 9 in the morning and the p.m. peak period is from 3 to 6 in the afternoon. The off-peak period covers the remaining 18 hours of the day. A series of mode choice model runs were performed in the course of analyzing the 2006 RTIP and the 2030 Revenue Constrained RTP: 2006 Update through two model iterations.

**Highway and Transit Assignment**

Highway

Highway assignment produces traffic volume estimates for all roadway segments in the system. These traffic volumes are an important input to emissions modeling. Similarly, transit trips are assigned to transit routes and segments.
SANDAG loads traffic using TransCAD’s “Multimodal Multiclass Assignment” function. The highway assignment model works by finding roads that provide the shortest travel impedance between each zone pair. Trips between zone pairs are then accumulated on road segments making up minimum paths. Highway impedances consider posted speed limits, signal delays, congestion delays, and costs. The model computes congestion delays for each segment based on the ratio of the traffic volume to roadway capacity. Motorists may choose different paths during peak hours when congestion can be heavy and off-peak hours when roadways are typically free flowing. For this reason, traffic is assigned separately for a.m. peak, p.m. peak, and off-peak periods. Vehicle trip tables for each scenario reflect increased trip-making due to population growth and variations in travel patterns due to the alternative transportation facilities/networks proposed.

Model accuracy is assessed by comparing model estimated traffic volumes with actual traffic counts obtained through SANDAG’s traffic monitoring program and Highway Performance Monitoring System (HPMS) estimates of vehicle miles of travel (VMT).

After completing the highway assignments additional processing is needed. Adjustments are made for calibration error volume, HOV/managed lane volume, bus volumes, hourly distribution factors, level-of-service (LOS), and travel time.

Transit

For transit assignment, TransCAD software assigns Transit Access Point (TAP)-to-TAP transit trips to the network. Eight separate transit assignments are produced for peak and off-peak periods; walk and auto access; and local bus and premium service. These individual assignments are summed to obtain total transit ridership forecasts.

Before assigning transit trips, external transit trips coming into San Diego from outside the region are added to the internal transit trips estimated by the mode choice model. Currently few transit trips enter from the north or east, however, over 20,000 transit trips cross the Mexican border each day. An external transit trip table for the base year is developed from on-board transit ridership surveys and factored to future years based on border crossing trends to account for these trips.

For accuracy transit ridership forecasts from the transit assignment model are compared with transit counts from SANDAG’s transit passenger counting program to determine whether transit modeling parameters need to be adjusted.

Some of these comparisons of model-estimated boardings with actual boardings include:

- system level boardings, which may reveal transfer rate problems and lead to changes to the transfer wait time factor in the mode choice model;
- boardings by mode, which may reveal modal biases and lead to changes in mode choice modal constants;
- boardings by frequency of service, which may show biases that lead to changes in the first wait factor in the mode choice model; and
- Centre City screenline crossings, which may lead to changes in parking costs, boardings by stop location, which may indicate problems which specific generators such as a university.
Post-TransCAD Processing

Standard TransCAD output needs to be reformatted and adjusted to be useful for emissions modeling. Several routines and computer programs have been written to accomplish the following major functions:

- Correcting link specific traffic volume forecasts for calibration error
- Adding in estimated travel on roads not in the transportation modeling process
- Computing link speeds based on corrected link volumes, Highway Capacity Manual relationships between congestion and speed (or signal delay)
- Splitting link volumes into heavy-duty truck and other traffic to obtain speed distributions by vehicle class
- Preparing a data set that contains total VMT, number of trip starts, and VMT by speed category by time of day for each vehicle class.

Motor Vehicle Emissions Modeling

Emissions Model

In October 2002, ARB released EMFAC 2002, an emissions inventory model that calculates emissions for motor vehicles operating in California. It is an integrated model that combines emission rate data with vehicle activity to calculate regional emissions. The U.S. EPA approved EMFAC 2002 for use in conformity determinations on April 1, 2003.

The EMFAC 2002 model supports calculation of emissions for the Burden mode. The Burden mode is used for calculating regional emission inventories. In this mode, the model reports total emissions as tons per day for each pollutant, by vehicle class and the total vehicle fleet. The Burden mode uses emission factors that have been corrected for ambient conditions and speeds combined with vehicle activity to calculate emissions in tons per day. Vehicle activity includes the number of vehicles, daily vehicle miles traveled, and the number of daily trips.

The air quality analysis of the 2006 RTIP and the conformity redetermination of the 2030 Revenue Constrained RTP: 2006 Update were conducted using EMFAC 2002’s Burden mode. Projections of daily regional emissions were prepared for reactive organic gases (ROG), nitrogen oxides (NOx), and carbon monoxide (CO).

On-road motor vehicle emissions are attributed to several different processes:

- Starting exhaust
- Running exhaust
- Idle exhaust (calculated for heavy-duty trucks only)
- Resting and diurnal evaporation
- Running losses
- Hot soak evaporation
Emission factors vary by vehicle class, fuel usage, and technology. Thirteen vehicle classes are modeled: passenger car, two types of light-duty trucks, medium-duty truck, two types of light-heavy-duty trucks, medium-heavy-duty truck, heavy-heavy-duty truck, line-haul vehicle, urban bus, school bus, motorcycle, and motor-home. The fuels modeled are gasoline, diesel, and electrically powered vehicles. Technology categories can be grouped into catalyst, noncatalyst, and diesel.

Emission factors for processes that vary by temperature (i.e., starting exhaust, hot soak, and running exhaust) are broken down further by specified temperature ranges. Exhaust emission factors also are broken down by speed range.

**Regional Emissions Forecasts**

Regional transportation forecasts were initiated in April 2006. Output from the TransCAD model was then reformatted and adjusted to be useful for emissions modeling.

**8-Hour Ozone Standard**

The transportation conformity rule prescribes different conformity tests for 8-Hour ozone areas that have 1-Hour Ozone SIP budgets and for areas that do not have 1-Hour Ozone SIPs. The San Diego 1-Hour Ozone Maintenance Plan established ROG and NOx budgets for 2010 and 2014, but not for 2009. On June 26, 2003, The U.S. EPA approved the Maintenance Plan and motor vehicle emissions budgets as SIP revisions. These SIP revisions became effective on July 28, 2003.

In August 2004, SANDAG consulted with the CWG on various options for interim emissions analysis. The approach agreed by the CWG is as follows:

- Under the new 8-Hour ozone standard, the San Diego air basin falls under Boundary Scenario 2, where the 8-Hour ozone area is smaller than and within the 1-Hour ozone boundary. Figure B.1 shows the Eastern San Diego County attainment areas, which are tribal lands (Cuyapaipe, La Posta #1 and #2, Campo #1 and #2, and Manzanita). The CWG agreed to use the existing approved budget for the entire 1-Hour ozone nonattainment area for the analysis years for which 1-Hour ozone budgets are available (2010 and 2014) and for the remaining analysis years (2020 and 2030).
- To conduct the interim emissions test for 2009, the CWG agreed to use the no-greater-than-2002 test for the attainment year 2009.

In February 2006, the CWG reaffirmed the approach described above for the 8-hour ozone emissions analysis of the 2006 RTIP and conformity redetermination of the 2030 Revenue Constrained RTP: 2006 Update. Countywide forecasts of average weekday ROG and NOx emissions were produced for 2002, 2009, 2010, 2014, 2020, and 2030 using the EMFAC 2002 model. ROG and NOx emissions are based on the summer season.

The analysis years were selected to comply with Sections 93.106(a) (1) and 93.118 (a) of the Transportation Conformity Rule. According to these sections, the first horizon year (2010) must be within ten years from the base year used to validate the regional transportation model (2000), the last horizon year must be the last year of the transportation plan’s forecast period (2030), and the horizon years may be no more than ten years apart (2020). In addition, as explained above, the interim regional emissions analysis for the 8-Hour ozone standard must be conducted for the
emissions budgets in the applicable SIP (ROG and NOx budgets for 2010 and 2014). Finally, emissions forecasts for 2002 and 2009 were prepared to conduct the interim attainment year 2009 test.

CO Standard

CO regional emissions were projected for 2010, 2018, 2020, and 2030 for the conformity determination of the 2006 RTIP and redetermination of the Constrained RTP: 2006 Update. CO emissions are based on the winter season.

Emissions Modeling Results

An emissions budget is the part of the SIP that identifies emissions levels necessary for meeting emissions reduction milestones, attainment, or maintenance demonstrations.

To determine conformity of the 2006 RTIP and redetermine conformity of the 2030 Revenue Constrained RTP: 2006 Update, the plan must comply with the interim emission analysis described in the Regional Emissions Forecast section.

Table B.2 summarizes the 2006 RTIP and 2030 Revenue Constrained RTP: 2006 Update air quality conformity analysis for the 8-Hour ozone standard. This analysis shows that the 2006 RTIP and the 2030 Revenue Constrained RTP: 2006 Update (including interim years) meets the applicable budgets and interim tests. Projected ROG and NOx emissions for 2009 are lower than the base year 2002 and those for 2010, 2014, 2020, and 2030 are below the SIP budgets for 2010 and 2014.

| TABLE B.2—2006 RTIP & 2030 REVENUE CONSTRAINED RTP: 2006 UPDATE
Air Quality Conformity Analysis for 8-Hour Ozone |
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Average Weekday Vehicle Starts (1,000s)</td>
<td>Average Weekday Vehicle Miles (1,000s)</td>
<td>ROG</td>
<td>NOx</td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>2002</td>
<td>13,316</td>
<td>79,088</td>
<td>---</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>14,316</td>
<td>88,299</td>
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<td>44</td>
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<tr>
<td></td>
<td>2010</td>
<td>14,273</td>
<td>87,979</td>
<td>46</td>
<td>40</td>
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<tr>
<td></td>
<td>2014</td>
<td>15,048</td>
<td>93,466</td>
<td>36</td>
<td>32</td>
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<tr>
<td></td>
<td>2020</td>
<td>15,578</td>
<td>97,751</td>
<td>36</td>
<td>24</td>
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<td></td>
<td>2030</td>
<td>17,133</td>
<td>108,047</td>
<td>36</td>
<td>17</td>
</tr>
</tbody>
</table>

Note: Emissions budgets from San Diego Region 1-Hour Ozone Maintenance Plan (Approved as SIP revision in July 2003).

Table B.3 shows that projected CO emissions from the 2006 RTIP and the 2030 Revenue Constrained RTP: 2006 Update are below the 2003 CO budget of 730 tons per day.
### TABLE B.3—2006 RTIP & 2030 REVENUE CONSTRAINED RTP: 2006 UPDATE
Air Quality Conformity Analysis for Carbon Monoxide

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Weekday Vehicle Starts (1,000s)</th>
<th>Average Weekday Vehicle Miles (1,000s)</th>
<th>SIP Emissions Budget Tons/Day</th>
<th>CO Emissions Tons/Day</th>
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</thead>
<tbody>
<tr>
<td>2010</td>
<td>14,273</td>
<td>87,979</td>
<td>730</td>
<td>425</td>
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<tr>
<td>2018</td>
<td>15,317</td>
<td>95,797</td>
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<td>2020</td>
<td>15,578</td>
<td>97,751</td>
<td>730</td>
<td>215</td>
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<tr>
<td>2030</td>
<td>17,133</td>
<td>108,047</td>
<td>730</td>
<td>136</td>
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Exempt Projects

Section 93.126 of the Transportation Conformity Rule exempts certain highway and transit projects from the requirement to determine conformity. The categories of exempt projects include safety, mass transit, air quality (ridesharing and bicycle and pedestrian facilities), and other (such as planning studies).

Chapter 3 lists the exempt projects included in the 2006 RTIP.

Interagency Consultation Process and Public Input

The consultation process followed to prepare the air quality conformity analysis for the 2006 RTIP and the 2030 Revenue Constrained RTP: 2006 Update complies with the San Diego Transportation Conformity Procedures adopted in July 1998. In turn, these procedures comply with federal requirements under 40 CFR 93. Interagency consultation involves SANDAG (as the MPO for San Diego County), the APCD, Caltrans, ARB, U.S. DOT, and U.S. EPA.

Consultation is a three-tier process that:

1. formulates and reviews drafts through a conformity working group
2. provides local agencies and the public with opportunities for input through existing regional advisory committees and workshops
3. seeks comments from affected federal and state agencies through participation in the development of draft documents and circulation of supporting materials prior to formal adoption


SANDAG staff presented the schedule for the preparation and adoption of the 2006 RTIP and its conformity analysis and the concurrent conformity determination of the 2030 Revenue Constrained RTP: 2006 Update. Staff also consulted on criteria and procedures for determining conformity. Items discussed included fiscal constraint analysis, projects exempt from regional emissions analysis, interim emissions analysis, the use of latest planning assumptions, implementation of TCMs, emissions model and budgets, as well as consultation and public involvement. The draft list of projects to be included in the 2006 RTIP was presented at the April 19, 2006 CWG meeting. An updated list, which included comments and revisions discussed at the April 19, 2006 meeting, was distributed to the CWG on April 28, 2006.

On May 19, 2006, the Transportation Committee will be asked to accept for distribution the Draft 2006 RTIP, including its air quality conformity analysis, for public review and comment and to schedule a public hearing on June 16, 2006. Members of the public are welcome to provide comments at meetings of the San Diego Region CWG, the Transportation Committee, and the SANDAG Board of Directors.
Figure B.1
Eastern San Diego County Attainment Areas for the 8-Hour Ozone NAAQS

Eastern San Diego County Attainment Areas For The 8-Hour Ozone NAAQS
STATUS OF THE STATE IMPLEMENTATION PLAN (SIP) FOR 8-HOUR OZONE STANDARD AND EMFAC 2007 UPDATE

File Number 3001300

Attachment related to this item includes:

- Draft San Diego 8-Hour Ozone SIP Development Schedule.
## Draft San Diego 8-Hour Ozone SIP Development Schedule

<table>
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<th>Timeline</th>
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<td>Air Quality Simulation Modeling Development</td>
<td>Spring 2006</td>
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<tr>
<td>Reasonably Available Control Measures Analysis and Attainment Demonstration Documentation</td>
<td>Summer 2006</td>
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<tr>
<td>Incorporate Revised SANDAG Traffic Data for Conformity Emissions Budgets Release Draft SIP, and Workshop</td>
<td>Fall 2006</td>
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<tr>
<td>Air Pollution Control Board Adoption Hearing and Submittal to ARB</td>
<td>Winter 2007</td>
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<tr>
<td>ARB Adoption Hearing &amp; Submittal to U.S. Environmental Protection Agency</td>
<td>Spring 2007</td>
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TRANSPORTATION CONTROL MEASURES (TCM)  
U.C. DAVIS-CALTRANS AIR QUALITY PROJECT WORKSHOP

Attachment related to this item includes:

- February 27, 2006, U.C. Davis-Caltrans Air Quality Project workshop agenda.
TCM Workshop

Transportation Control Measures (TCMs):
Developing Sound State Implementation Plans (SIPs)
While Avoiding Conformity Problems

Presented by the U.C. Davis-Caltrans Air Quality Project
http://aqp.engr.ucdavis.edu/

Monday, February 27, 2006, 1065 Kemper Hall, U.C. Davis

Workshop Goal: Provide a forum that allows air quality and transportation planners to share insights about identifying, analyzing, selecting, and preparing SIP commitments to TCMs.

Agenda

9:45  Welcome  (Deb Niemeier, Director, U.C. Davis-Caltrans Air Quality Project, Professor, Civil & Environmental Engineering, U.C. Davis) (coffee served from 9:30)

10:00  Federal policies—what are the SIP TCM requirements? Or, “Everything you wanted to know about RACM but were afraid to ask…” (Doug Eisinger, U.C. Davis-Caltrans Air Quality Project; Karina O’Connor, EPA Region 9)

10:30  Roundtable Discussion: Conformity Lessons from Recent TCM Experiences in the San Joaquin Valley (David Wampler, EPA Region 9; Leigh Levine, FHWA; Jason Paukovits, Fresno COG). Moderator: Don Hunsaker, SJVUAPCD

(includes open forum for questions and answers on morning discussions)

11:30  Lunch Break

12:45  Roundtable Discussion: Conformity Lessons from Recent TCM Experiences in the South Coast Air Basin (Jean Mazur, FHWA; Jessica Kirchner and Jonathan Nadler, SCAG; Carol Gomez, SCAQMD). Moderator: Karina O’Connor, EPA Region 9

(includes open forum for questions and answers)

1:30  Roundtable Discussion: TCM Policy Guidance for SIP Development (Kurt Karperos, California ARB; Jean Mazur, FHWA; Karina O’Connor, EPA Region 9). Moderator: Mike Brady, Caltrans

(includes open forum for suggestions, questions and answers)

2:45  Closing Comments and Observations (Deb Niemeier)

3:00  Workshop Ends