



**SANDAG**

Military Installation Resilience Framework  
Appendix D. Sustainable Transportation Strategy  
Development, Strategy List, & Maps

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# Appendix D. Sustainable Transportation Strategy Development, Strategy List, & Maps



# Sustainable Transportation Strategy Development, Strategy List, & Maps

This appendix summarizes the approach used to identify recommended mobility strategies – programs, policies, and projects – that can reduce vehicle miles traveled (VMT) by military personnel and visitors to installations within the three primary corridors. Improving access and multimodal travel options for military personnel and reducing single-occupancy vehicle (SOV) travel to and from study installations will benefit both the Navy and surrounding communities. Providing a robust multimodal transportation system and discouraging reliance on SOVs will help reduce congestion in the communities near the study installations.

A detailed list and map of sustainable transportation strategies identified using the methodology described in this document is included below. The VMT Reduction Toolkit provides a comprehensive list of strategy types that decision makers (i.e., base commanders, community planning liaison officers, adjacent jurisdiction representatives, or others) can use to identify sustainable transportation strategies in the future. As conditions and needs change over time, so may the applicability or effectiveness of the strategies identified in the toolkit.

## Strategy Development Principles

The following principles guided the approach to propose new strategies:

- **Ensure strategies align with or build upon previous planning efforts.** The San Diego Association of Governments (SANDAG), San Diego County Regional Airport Authority, the Port of San Diego, and the cities of San Diego, Coronado, National City, Chula Vista, and Imperial Beach developed comprehensive reports, documents, and plans to enhance transportation throughout the region. Solutions proposed in this *Military Installation Resilience Framework* built upon previous planning efforts.
- **Prioritize closing gaps in the existing network.** Creating a seamless travel experience is key to changing modes. Accordingly, the framework focused on developing a continuous network for bicycles, transit, and pedestrians to and from the installations and major transit centers.
- **Leverage emerging mobility technologies.** With the onset of new and emerging mobility technologies, there is an opportunity to forge new and improved first- and last-mile connections to, from, and within military installations.
- **Implement strategies that enhance alternative mobility options and encourage the use of them.** Providing alternative mobility choices that offer similar convenience and reliability of vehicular travel can entice personnel to choose alternative modes.
- **Ensure current programs and services are communicated to military personnel.** The San Diego region has many of the components needed to develop a successful transportation demand management (TDM) program. Enhanced dissemination of this information to military personnel can increase the success of existing TDM services.

## Strategy Categories

Mobility strategies that reduce VMT focus on reducing SOV trips. Specific strategies identified in this study are organized into the following categories:

- **Active Transportation/Shared-use Mobility** includes strategies to install and/or expand bicycle and pedestrian infrastructure, bicycle resources and education, and micromobility services. Shared, on-demand transportation services provide convenient and personalized travel options, particularly for first- and last-mile connections between major transit stations and military installations.
- **Transit** includes strategies to implement fixed-route shuttle services; modifications to existing or planned transit services; enhancements to existing bus frequencies; improvements to bus stops, bus speeds, and reliability; and new services such as microtransit pilot programs.
- **Transportation Demand Management** includes programs and services that encourage transportation alternatives, reduce reliance on SOVs, and reduce VMT and greenhouse gas emissions.<sup>1</sup> TDM strategies include carshare and vanpool programs, commute benefit programs, parking management programs (e.g., parking pricing and electric vehicle parking), congestion management (e.g., telework, congestion pricing), and mobility management (e.g., expanding existing mobility programs and ride-matching services).

Land use and development strategies, such as increased housing densities and/or on-site amenities, can also reduce VMT. SANDAG does not have jurisdiction over land use; however, staff coordinate with local jurisdictions to ensure land use planning is consistent with regional goals related to land use, housing, and climate change mitigation. In the SANDAG *2021 Regional Plan*,<sup>2</sup> housing and job centers are located in existing urbanized areas instead of more dispersed development patterns. The Sustainable Communities Strategy for the *2021 Regional Plan* concentrates future growth for housing and jobs in the region within areas called Mobility Hubs, which are designed to fulfill a variety of travel needs while strengthening a community's sense of place by concentrating destinations and travel choices within communities.<sup>3</sup> Specific land use strategies were not identified as part of this framework because the focus was to identify mobility-related strategies for reducing VMT and congestion along the three primary corridors. Additional information pertaining to these types of strategies are included in the VMT Reduction Toolkit (Appendix E).

## Methodology for Identifying Strategies

Strategies derive from a review of existing documents and plans, including the sustainable transportation strategies listed in the *2021 Regional Plan* and the *Military Multimodal Access Strategy*.<sup>4</sup> Strategies were also informed by stakeholder engagement with Navy representatives, the SANDAG Military Working Group, and through the Military Travel

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<sup>1</sup> SANDAG. 2019. Mobility Management Guidebook. Available at [https://www.icommutersd.com/docs/default-source/planning/mobility-management-guidebook\\_final\\_7-17-19.pdf?sfvrsn=372f6a60\\_2](https://www.icommutersd.com/docs/default-source/planning/mobility-management-guidebook_final_7-17-19.pdf?sfvrsn=372f6a60_2).

<sup>2</sup> SANDAG. "2021 Regional Plan." 2023, <https://www.sandag.org/regional-plan/2021-regional-plan>.

<sup>3</sup> SANDAG. "Sustainable Growth & Development." 2023, <https://www.sandag.org/regional-plan/sustainable-growth-and-development>.

<sup>4</sup> SANDAG. 2019. Military Multimodal Access Strategy. Available at <https://docslib.org/doc/1340363/military-multimodal-access-strategy-final-report>.

Behavior Assessment.<sup>5</sup> The approach to identify specific strategies for each strategy type is summarized herein.

## Active Transportation/Shared-use Mobility

### *Active Transportation*

The approach for identifying active transportation strategies builds upon the previous active transportation planning efforts of SANDAG and the cities of San Diego, Chula Vista, National City, Imperial Beach, and Coronado, as well as the sustainable transportation strategies in the *2021 Regional Plan*.

The project team first identified appropriate bikesheds and walksheds that were adjacent to military installations where various active transportation strategies could be considered. Bikeshed and walkshed distances are defined as 1 mile for walking (i.e., a 20-minute walk) and 3 miles for biking (i.e., a 10-minute bike ride). These are consistent with the Federal Transit Administration's *Manual on Pedestrian and Bicycle Connections to Transit*,<sup>6</sup> and they are reasonable distances for pedestrian or bicycle travel. For each bike/walkshed that is adjacent to the study area installations, the *San Diego Regional Bike Plan*<sup>7</sup> and active transportation plans from the surrounding cities were reviewed, and existing and planned bicycle and pedestrian facilities were documented.

For bicycle strategies within each 3 mile bikeshed, the project team identified locations where gaps in existing or planned networks could be closed, areas where existing or planned bicycle facilities could extend to installation entrances, or locations where bicycle facilities could be upgraded. Bicycle facility types (i.e., Class I, Class II, Class III, Class IV) were proposed based on roadway characteristics (e.g., vehicle speeds and rights-of-way) and the presence of adjacent bikeway facilities. Neighborhood streets were prioritized for bikeways because they typically see low-speed traffic and have lower traffic volumes compared to arterial roadways.

For pedestrian strategies, the project team conducted a desktop review using Google Street View on roadways within a 1-mile radius of installation entrances. This framework recommends a study to assess the feasibility of pedestrian enhancements (e.g., new or enhanced sidewalks and pedestrian crossings) within a 1-mile walkshed of installation entrances.

### *Shared-use Mobility*

Shared, on-demand transportation services provide convenient and personalized travel options, particularly for first- and last-mile connections between major transit stations and installation entrances. To identify micromobility strategies, the project team took the following steps:

1. Reviewed the *2021 Regional Plan* sections related to micromobility (Flexible Fleets).
2. Identified flexible fleet strategies near installations with limited transit access that are within 3 miles of installation gates and:
  - Provide direct access to individual installations.

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<sup>5</sup> SANDAG. 2023. Military Travel Behavior Assessment.

<sup>6</sup> Federal Transit Administration. 2017. Manual on Pedestrian and Bicycle Connections to Transit. Available at <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/64496/ftareportno0111.pdf>.

<sup>7</sup> SANDAG. 2010. Riding to 2050, San Diego Regional Bike Plan. Available at <https://www.sandag.org/-/media/SANDAG/Documents/PDF/projects-and-programs/bikeways-and-walkways/regional-bike-plan/san-diego-regional-bike-plan-riding-to-2050.pdf>.

- Enhance first- and last-mile connections between existing and planned transit services to study installations.
- Provide access to transit in areas with high concentrations of Navy residents.

## Transit

Each study installation is either served by transit directly at an installation entrance, or it has transit routes that travel along roadways near installation entrances. This effort focused on improving transit access to and from the installations through route modifications, addition of stops, or connection improvements to major transit stations via micromobility, bicycle infrastructure, sidewalk upgrades, or microtransit pilots. To identify transit strategies, the project team took the following steps:

- Reviewed existing and planned transit routes and stop locations using current San Diego Metropolitan Transit System (MTS) service maps and the *2021 Regional Plan*.
- Identified bus and/or shuttle routes that can be extended or modified to serve military installations, and prioritized routes that could serve multiple installations based on areas with high concentrations of residents that work at two or more installations.
- Identified shuttle stops that can be moved or added to improve transit connectivity to military installations.
- Identified trip planning strategies (i.e., real-time traveler information at stops) to enhance the overall transit user experience.
- Identified transit speed/reliability improvement strategies (e.g., queue jumps, transit signal prioritization) along congested roadways near installation entrances based on areas with high congestion during commute periods.

## Transportation Demand Management

Operated by SANDAG, the Sustainable Transportation Services (STS) program (formerly i-Commute) is the TDM program for the San Diego region. Within the STS program there are several services and tools, including carpool, vanpool, and telework, among others. Several STS programs are currently used by military personnel. Programs that are either currently in use or would be most applicable and/or effective for reducing SOV trips to and from study installations fall into three categories: parking management, mobility management, and congestion management.

To identify potential TDM strategies for study installations, the project team focused on understanding the perception of existing programs, expanding the success of current programs, and introducing new programs that encourage flexible transportation options. The project team took the following steps:

- Performed a detailed review of existing TDM programs and policies.
- Conducted virtual interviews with SANDAG's account executive to the military to understand the success and barriers for specific programs and to understand potential fatal flaws of programs not currently in place.
- Reviewed survey data from the STS program to identify program preferences.
- Examined travel times to identify recommendations to overcome barriers to success.

## Strategy Evaluation

Based on the methods described above, the project team evaluated these mobility strategies to understand overall implementation considerations. This was accomplished by evaluating strategies against the following criteria: approximate implementation timeframes, public appetite for implementation, level of coordination between stakeholders, approximate costs, and potential strategy partners. Based on the assessment against these criteria, the project team determined whether to recommend each strategy for future consideration. Evaluation criteria ratings are described in detail in this section. A recommended implementation timeframe was also determined for each strategy based on the criteria.

Two unique strategies — establishing a congestion pricing program and charging fees for parking on base — were determined to be infeasible at this time; therefore, they were not recommended.

Strategy rankings for all criteria were based on project characteristics and input received at the time this study was conducted. As conditions and needs change over time, project rankings for individual criteria may also change.

### Timeframe for Implementation

Based on the ratings given to the criteria, the following implementation feasibility timeframes (immediate, near- and mid-term, and long term) were identified for the strategies listed in Table D-1:

- Immediate: by 2025
- Near- and Mid-term: between 2026 and 2035
- Long-term: between 2036 and 2050

Parameters for each timeframe were guided by the timelines established in the *2021 Regional Plan*. Specific timeframes for implementation were determined by strategy type and feasibility, and they are described in the following sections.

#### *Immediate Strategies*

Projects recommended for immediate implementation are those with a combination of a high stakeholder appetite for implementation, low cost, and with varying levels of coordination. This includes projects to expand the existing US Navy Transportation Incentive Program<sup>8</sup> in coordination with Department of the Navy Fringe Benefit Program implemented by Department of Defense Instruction 1000.27, implement telework and/or flexible work hours, and construct several bicycle facility improvements.

#### *Near- and Mid-term Strategies*

Projects recommended for near- or mid-term implementation are those with a combination of medium or high stakeholder appetite for implementation, medium or high level of coordination, and medium or medium-high costs. This includes projects to expand the existing SANDAG Guaranteed Ride Home program to be more equitable, identify remote parking facilities, and identify microtransit pilot programs. Explore the potential for these

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<sup>8</sup> U.S. Navy. 2023. Transportation Incentive Program. Available at <https://tips.navy.mil/cas/login?service=https%3A%2F%2Ftips.navy.mil%2F>.

programs to be folded into the US Navy Transportation Incentive Program <sup>9</sup> in coordination with Department of the Navy Fringe Benefit Program implemented by Department of Defense Instruction 1000.27.

### *Long-term Strategies*

Only one project, a Tier 1 Commuter Rail Station at Naval Base San Diego, was recommended for long-term implementation. This project is anticipated to require a high level of coordination and a substantially higher cost than other strategies.

## **Public Appetite for Implementation**

All strategies were ranked with a low, medium, or high rating based on feedback provided by study partners. Public appetite for implementation ratings are as follows:

- **Low:** Study partners indicated a project was either undesirable or there would be little interest from the Navy and/or local stakeholders to implement it.
- **Medium:** Study partners indicated a moderate amount of interest in implementing a project.
- **High:** Study partners indicated a high amount of interest in implementing a project. This rating was also given to projects that would enhance programs already in place.

## **Level of Coordination**

All strategies were rated with a low, medium, or high rating based on the number of stakeholders (e.g., public agencies, property owners, or others) that would be involved based on the strategy location, scale, and complexity. These potential partners are identified in the following section. Ratings for level of coordination are as follows:

- **Low:** One stakeholder
- **Medium:** Two stakeholders
- **High:** Three or more stakeholders

## **Approximate Cost**

All strategies were rated with a low, medium, medium-high, or high rating for potential costs based on the type of strategy proposed. The potential costs for identified strategies are provided below in Table D-1. Ratings for construction costs are as follows:

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<sup>9</sup> U.S. Navy. 2023. Transportation Incentive Program. Available at <https://tips.navy.mil/cas/login?service=https%3A%2F%2Ftips.navy.mil%2F>.

- **Low (\$):** Sidewalks, striping, Class II or III bike facilities, parking meter installations, some military incentive programs
- **Medium (\$\$):** Class I bike facilities, queue jumps, transit signal priority, some micromobility strategies, some operational adjustments, some military incentive programs
- **Medium-high (\$\$\$):** Bus route expansions, micromobility programs, air quality improvement programs
- **High (\$\$\$\$):** Rail stations

### **Potential Strategy Partners**

Potential partners were identified based on each strategy type, location, and anticipated environmental clearance and/or regulatory requirements. Potential strategy partners include the Navy, Department of Defense, SANDAG, California Department of Transportation (Caltrans), MTS, San Diego County, and the cities of San Diego, Chula Vista, National City, Imperial Beach, and Coronado.