



**SANDAG**

Military Installation Resilience Framework  
Appendix E. Vehicle Miles Traveled Reduction Toolkit

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# Vehicle Miles Traveled Reduction Toolkit

This Vehicle Miles Traveled (VMT) Reduction Toolkit is intended to assist base commanders, community planning liaison officers, adjacent jurisdictions, and other decision-making bodies with identifying and implementing VMT-reducing programs, policies, and projects. It summarizes which VMT reduction strategies would be most effective based on the following characteristics:

- Level of Transit Service
- Bicycle and Pedestrian Infrastructure
- Personnel Travel Behavior

The toolkit includes a comprehensive set of strategy types (Table E-1) that could be implemented at study installations. A unique set of programs, policies, and projects recommended for implementation at specific locations is included in Appendix D. Sustainable Transportation Strategy Development, Strategy List, & Maps.

## Strategy Determination

Strategy types in this toolkit were identified from a review of the VMT reduction strategies provided in the SANDAG *2021 Regional Plan*,<sup>1</sup> the *Military Multimodal Access Strategy*,<sup>2</sup> and the *Military Travel Behavior Assessment*.<sup>3</sup> Additionally, strategy types were informed through conversations with Navy representatives and the San Diego Association of Governments (SANDAG) Military Working Group.

The following strategies were determined infeasible at this time; therefore, they are not included in the toolkit:

- Establishing a congestion pricing program.
- Charging fees for parking on base.
- Establishing a parking cash-out program.
- Establishing an air quality improvement council.
- Setting daily trip cap regulations.
- Charging transportation network company (TNC) riders service fees.

As conditions and needs shift over time, the feasibility of these strategies may change.

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<sup>1</sup> SANDAG. 2021. 2021 Regional Plan. Available at <https://www.sandag.org/regional-plan/2021-regional-plan>.

<sup>2</sup> SANDAG. 2019. Military Multimodal Access Strategy. Available at <https://www.sandag.org/-/media/SANDAG/Documents/PDF/meetings-and-events/working-groups/military/military-multimodal-access-strategy.pdf>.

<sup>3</sup> SANDAG. 2023. Military Travel Behavior Assessment.

## VMT Reduction Strategies

The toolkit lists potential VMT reduction strategies, and identifies characteristics that maximize strategy effectiveness. VMT reduction strategies are organized into the following four categories:

- 1. Active Transportation/Shared-use Mobility** includes installing and expanding bicycle and pedestrian infrastructure, bicycle resources and education, and micromobility services.
- 2. 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 transit services like microtransit pilot programs.
- 3. Transportation Demand Management (TDM)** includes programs and services that encourage transportation alternatives, reduce reliance on the private automobile for travel, and reduce VMT and greenhouse gas emissions. TDM strategies include carshare and vanpool programs, commute benefit programs, parking management programs (e.g., electric vehicle parking), congestion management (e.g., telework), and mobility management (e.g., expanding existing mobility programs and ride-matching services).
- 4. Land Use and Development** includes tools like increasing housing density and improving on-site amenities (e.g., retail, restaurants) by building mixed-use developments.

### Ideal Conditions for Implementation

VMT reduction strategies can be applied as standalone projects on or near an installation, a base-wide program or policy, or improvements along a corridor or in an adjacent neighborhood.

An individual VMT reduction strategy is most effective when applied at the appropriate scale or to target specific types of trips. Strategies can apply at the project or site level or at a community or regional level.

When selecting one or more VMT reduction strategies for evaluation, the characteristics of the installation and of the adjacent communities (described in the following sections) should be considered. Table E-1 identifies the ideal conditions for VMT reduction strategy implementation based on each of the following characteristics.

#### *Level of Transit Service*

Each installation in the study area is either served by transit directly at an entrance or has transit routes that travel along roadways near an entrance. The level of transit service available to each base affects the appropriateness of certain TDM strategies and are described as follows:

- **Low transit service areas** have only one or two routes, and headways are often 30 minutes or more. Transit service is infrequent or nonexistent during off-peak and evening hours.
- **High transit service areas** are served by multiple transit routes, often with headways of 15 minutes or less during peak periods. For an individual site, high proximity to transit

typically means being located less than 0.5 miles from a rail transit station or directly on a high-frequency bus route.

### *Bicycle and Pedestrian Infrastructure*

The presence of and proximity to bikeways and pedestrian infrastructure is another factor to consider in strategy selection. Characteristics of bicycle and pedestrian infrastructure are as follows:

- **Bicycle travel** is more feasible if an installation is located along a Class II bikeway (striped bike path) or a Class IV separated bikeway (cycle track). The density of bicycle infrastructure can be measured as the miles of bike paths and bike lanes per square mile.
- The **pedestrian environment** is determined by components such as the ratio of sidewalk coverage (linear miles of sidewalks to street network miles), sidewalk width, and the presence of crosswalks. The pedestrian environment is also influenced by traffic speeds, building accessibility to pedestrians, and amenities, such as wayfinding, street trees, and street furniture (e.g., benches).

### *Personnel Travel Behavior*

Most trips made to each installation are by single-occupancy vehicle (SOV) and carpools. As most trips to installations are SOV, the effectiveness of a strategy depends on the nature of those trips. Commuters that travel shorter distances to installations will benefit from different TDM solutions than those with longer commute distances.

Table E-1. VMT Reduction Toolkit

Tool	Description	Ideal Conditions for Implementation		
		Level of Transit Service	Bike and Pedestrian Infrastructure Present	Personnel Travel Behavior
<i>Active Transportation/Shared-use Mobility</i>				
<b>Install/Expand Bicycle/Pedestrian Infrastructure at Major Transit Facilities</b>	Provide commuter rail/light rail/Next Generation (Next Gen) Rapid station active transportation catchment areas outside of Mobility Hubs. Includes filling gaps in pedestrian and bicycling networks.	High	Yes	Installations with higher populations of personnel who commute from shorter distances
<b>Install/Expand General and Secured Bicycle Parking</b>	Install bicycle parking at key military installation destinations and provide maps and information on how and where to park bicycles. Bicycle parking should meet or exceed industry standards.	High	Yes	Installations with higher populations of personnel who commute from shorter distances
<b>Provide Bicycle Resources/Education</b>	Provide an online bicycle map of on-base facilities that indicate the location and type of bicycle facility.	High	Yes	Installations with higher populations of personnel who commute from shorter distances
<b>Increase/Upgrade Bicycle Parking at Installations</b>	Prioritize indoor bicycle lockers and outdoor bicycle facility improvements that are adjacent to or within installations.	High	Yes	Installations with higher populations of personnel who commute via transit or from shorter distances via auto
<b>Install/Expand Micromobility Services at Each Installation (e-bike, e-scooter) and Establish Geofencing</b>	Procure micromobility services with mobility vendors to strategically place shared-use services within installation sites.	High	Yes	All commuters
<b>Establish Bicycle Focus Groups</b>	Create a focus group to identify how current users interact with the bicycle network within and surrounding the bases; understand why they bike; and what resources should be invested in to get others to bike as well. It is recommended that this group meet quarterly with representatives from each base, and the participants be paid or otherwise incentivized for their services.	Low or High	Yes	Installations with higher populations of personnel who commute from shorter distances
<b>Conduct Walkability Assessment</b>	Conduct 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.	Low or High	Yes	All installations
<i>Transit</i>				
<b>Add a Naval Installation Microtransit Service</b>	Provide an on-demand circulating shuttle that provides service between all (or select) military installations. The exact service plan would need to be developed in a coordinated effort between Navy personnel.	Low	Yes	All installations
<b>Establish a Long-haul, Fixed-route Coach Service</b>	Create a long-haul, fixed route (scheduled) coach service for long-distance commuters (greater than 20 miles) with established pick-up points and that offers free WiFi and restroom services. Participants would be given specific identification cards to ensure security measures are met.	Low	No	Installations with higher populations of personnel who commute from further distances
<b>Provide Transit Service Frequency Enhancements</b>	Increase the frequency of transit services operations.	Low or High	N/A	All installations
<b>Increase/Expand Transit Services</b>	Increase the amount of transit service that serves installations either through the addition of new stations/stops or the extension of existing services.	Low or High	N/A	All installations

Tool	Description	Ideal Conditions for Implementation		
		Level of Transit Service	Bike and Pedestrian Infrastructure Present	Personnel Travel Behavior
<b>Implement Intersection Improvements for Transit</b>	Install queue jumps — lanes that allow transit vehicles to bypass vehicles — at signalized intersections along congested roadway corridors. Queue jumps are often paired with transit signal prioritization technology that allow buses to communicate with traffic signals, expediting their passage through congested intersections.	Low or High	N/A	All installations regardless of typical commute distances or modes
<b>Improve Transit Stops</b>	Ensure rail/bus stops within a 1-mile radius of each installation is equipped with shelters, benches, signage/wayfinding, and traveler information (preferably real-time).	Low or High	N/A	All installations
<i>Transportation Demand Management</i>				
<b>Expand Carpool/Vanpool Priority Parking</b>	Increase reserved parking spaces for registered carpool/vanpool vehicles in highly desirable locations (e.g., in front of building entrances).	High	N/A	Installations with higher populations of personnel who commute from further distances
<b>Provide Electric Vehicle Parking</b>	Provide designated electric vehicle parking spaces with charging stations.	High	Yes	All installations
<b>Identify and Operate Remote Parking Facilities</b>	Introduce remote parking facilities (off-site) with shuttles to and from installations.	High	N/A	Installations with higher populations of personnel who commute from further distances
<b>Limit Parking Supply Expansion</b>	Reduce expansion of on-site parking facilities that induce parking demand at installation sites.	High	Yes	All installations
<b>Eliminate Rank-based Parking Distribution</b>	Remove free parking to any individual (no matter the rank) as it encourages the use of SOVs, and it creates more trips to and from the base. Permits for free parking should be replaced with additional incentives to use transit and/or active transportation.	Low or High	Yes or No	All installations
<b>Increase SANDAG Vanpool Program Incentives</b>	Increase the current subsidy (up to \$400 per month) in addition to the Transportation Incentive Program (TIP) benefit (\$270 per month).	Low	Yes	Installations with higher populations of personnel who commute from further distances
<b>Maximize Telework Options/Flexible Work Hours</b>	Modify existing Department of Defense telework and flex schedule policies, as needed, to maximize telework opportunities.	Low or High	N/A	All installations
<b>Establish a "Smart Trips" Program</b>	Select a proportion of military personnel to participate in a "Smart Trips" program that offers a package of transportation incentives to reduce SOV trips. The goal is to understand what methods/incentives work and what does not work to test the market.	High	Yes	All installations
<b>Expand the Transportation Incentive Program</b>	Active Duty, Civilian Navy, and Marine Corps personnel and general service civilians are eligible for the TIP program, which covers vanpools and all San Diego County transit systems (up to \$270 per month). Participants can apply for free online with the government Common Access Card (CAC) ID. Expanding the TIP would include shared-use mobility services, emergency Guaranteed Ride Home (GRH) services, and other qualified programs. This would need to be coordinated with Department of the Navy Fringe Benefit Program implemented by Department of Defense Instruction 1000.27.	Low or High	N/A	All installations

Tool	Description	Ideal Conditions for Implementation		
		Level of Transit Service	Bike and Pedestrian Infrastructure Present	Personnel Travel Behavior
<b>Expand the Guaranteed Ride Home Program</b>	In the event of a personal emergency or unexpected transportation needs, registered GRH participants can receive a free ride home by taxi, rideshare service, rental car, car share, or transit up to three times per year. Once enrolled in the program, participants can select their preferred mode, submit a ride reimbursement request to SANDAG, and receive a full reimbursement. Rides must originate from the participants' work location and may only be used when getting home or to the location of the participants' parked car. Expansion of the program could involve increasing the number of annual free rides participants can receive.	Low or High	N/A	All installations
<b>Provide a Dedicated Transportation Coordinator and Transportation Ambassadors at Each Installation</b>	The Transportation Coordinator and Ambassador(s) would be existing or new staff members. The Transportation Coordinator is a single point-of-contact who leads the program and guides an Ambassador's efforts. The Ambassador(s) develops and maintains tailored relationships with specific groups, and are a resource(s) patrons/tenants can contact regularly.	Low or High	No	All installations
<b>Develop an Employee Survey</b>	Develop and distribute a survey to all personnel to understand their travel behaviors and preferences and to identify what types of TDM strategies would be most effective in encouraging the use of alternative modes of transportation.	Low or High	Yes or No	All installations
<b>Offer a Micromobility Membership Subsidy (e-bike, e-scooter)</b>	A fully or partially subsidized annual subscription to use for shared-use mobility services.	High	Yes	Installations whose population typically has a shorter commute (1 to 3 miles)
<b>Provide Ride-matching Services</b>	A service that offers both peer-to-peer and enterprise services that match commuters to create carpool groups. This type of service can make carpool and vanpool programs easier to implement and simpler for new users to join.	Low	N/A	Installations whose population typically has a longer commute (more than 5 miles)
<b>Offer a Rideshare to Transit Program (first-/last-mile services)</b>	A subsidized TNC trip that originates from a residence or military installation to a major transit facility/Mobility Hub location.	High	N/A	Installations whose population typically has a longer commute (more than 5 miles)
<b>Hold an Annual Transportation Benefits Competition</b>	An annual competition between bases that measures and compares the amount that each base has improved their mode split and/or decreased their traffic. This can be held during times individual cities or the San Diego region experience increased pollution, and the duration can range between one and four months. This would be beyond those that exist under the iCommute program to further incentivize participation.	Low or High	Yes	All installations
<i>Land Use and Development</i>				
<b>Increase Housing on or near Military Installations</b>	Plan new and/or redeveloped housing near bases (within 3 to 5 miles or less) to allow transit, active transportation, and shared-use mobility resources to be competitive to driving, thereby encouraging the military community to use sustainable modes to travel to and from the base on a daily basis.	Low or High	Yes	All installations

Note:  
N/A = Conditions do not affect the applicability of a specific strategy