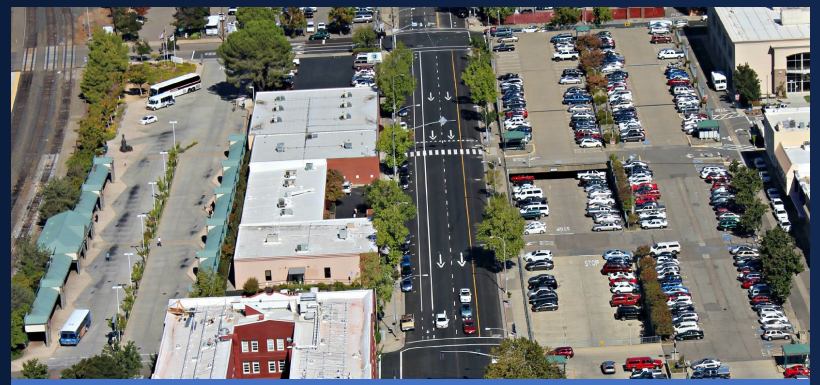


LOCAL DEVELOPMENT REVIEW

TRANSPORTATION DEMAND MANAGEMENT TOOLBOX

Caltrans

Introduction

- With the passage of SB 743 (Steinberg, 2013), vehicle level of service (LOS) is replaced with vehicle miles traveled (VMT) as the primary transportation impact analysis metric under the new California Environmental Quality Act (CEQA) guidelines. In the 2017 Transportation Analysis Technical Advisory on Evaluating Transportation Impacts in CEQA, the Governor's Office of Planning and Research (OPR) recommends lead agencies consider transportation demand management strategies as mitigation measures for reducing VMT.
- The Caltrans Transportation Impact Study Guide (TISG) recommends TDM strategies for reducing project VMT. In addition, off-site mitigation measures may include programmatic methods that implement mitigation in advance of and in anticipation of transportation impacts generated by land use projects or plans.
- In short, Transportation Demand Management (TDM) is a set of tools that increases the efficiency of the transportation system by providing options for users other than driving alone, or by shifting travel away from peak periods.

Background

- The *Caltrans 2020-2024 Strategic Plan*, Goal: Enhance and Connect the Multimodal Transportation Network recommends use of operational strategies and incentives to reduce VMT through increased high occupancy modes, active transportation, and other **Transportation Demand Management (TDM)** methods.
- The *Smart Mobility Framework Guide 2020* recommends a smart mobility approach focused on improving the reliability of the transportation system through both traditional system management strategies as well as managing the demand for vehicle travel. Transportation system reliability can be improved by providing convenient and efficient alternatives to driving.
- *California Transportation Plan (CTP) 2050* states, **Travel Demand Management (TDM)** strategies that expand nonauto options can reduce the number of vehicles on the road, lowering the wear and tear on our roadways by 2050.

How To Use This Guide

Name of strategy

Strategy description

Potential of GHG reduction from CAPCOA document

Strategy category

Case studies of strategy

References

Land Use

Increase Residential Density

Description

Increased densities affect the distance people travel and provide greater options for the mode of travel they choose. Increasing residential density results in shorter and fewer trips by single-occupancy vehicles.

GHG Mitigation Potential

30%

Up to 30.0% of GHG emissions from project VMT in the study area

Case Studies/More Info

- Transportation Research Board's Driving and the Built Environment: https://onlinepubs.trb.org/Onlinepubs/sr/sr298.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm81.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf

Go Back to Table of Contents

7

Land Use

Increase Residential Density (Continued)

LDR coordinator should work with the lead agency to determine if this is a viable strategy at the General Plan or RTP level. This measure is most accurately quantified when applied to larger developments and/or developments where the density is somewhat similar to the surrounding neighborhood. Neighborhoods should include different types of housing to support a variety of household sizes, age ranges, and incomes.

A recent study released by the Arizona Department of Transportation demonstrates that higher-density, mixed land-use patterns reduce dependency on driving. The study found that higher density and mixed-used developments designed to be walkable and accessible to regional transit could significantly reduce residents' VMT.

Simply increasing residential density may be less effective in reducing VMT, but when paired with improving access to destinations (e.g., schools, shops, and other public services) and alternative modes of transportation (e.g., walking and biking), significant VMT reduction can be achieved.

Detailed explanation of how to implement in LDR review and comment.

Images in the Appendix section contain links to the guide and can be clicked.

Table of Contents

Table of Contents

Land Use

Increase Residential Density

Description

Increased densities affect the distance people travel and provide greater options for the mode of travel they choose. Increasing residential density results in shorter and fewer trips by single-occupancy vehicles.

Case Studies/More Info

- Transportation Research Board's Driving and the Built Environment: https://onlinepubs.trb.org/Onlinepubs/sr/sr298.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm81.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission (GHG) Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=84

Go Back to Table of Contents

Increase Residential Density (Continued)

LDR coordinators should work with the lead agency to determine if this is a viable strategy at the General Plan or Regional Transportation Plan (RTP) level. This measure is most accurately quantified when applied to larger developments and/or developments where the density is somewhat similar to the surrounding neighborhoods. (Neighborhoods should include different types of housing to support a variety of household sizes, age ranges, and incomes).

Simply increasing residential density may be less effective in reducing VMT, but when paired with TDM strategy *Improve Access to Destinations* (e.g., schools, shops, and other public services) and alternative modes of transportation (e.g., walking, transit, and biking), significant VMT reduction can be achieved.

A recent study released by the Arizona Department of Transportation demonstrates that higher-density, mixed land-use patterns reduce dependency on driving. The study found that higher density and mixed-used developments designed to be walkable and accessible to regional transit could significantly reduce VMT.

Go Back to Table of Contents

Increase Job Density

Description

Increased densities affect the distance people travel and provide greater options for the mode of travel they choose. Increasing job density results in shorter and fewer trips by single-occupancy vehicles.

Case Studies/More Info

- Impacts of Employment Density on Passenger Vehicle Use and Greenhouse Gas Emissions: https://ww2.arb.ca.gov/sites/default/files/2020-06/Impacts_of_Employment_Density_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief_0.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=87

Go Back to Table of Contents

Increase Job Density (Continued)

LDR coordinators should work with the lead agency to determine if this is a viable strategy at the General Plan or RTP level. Increased job density may increase nearby housing prices if there is a housing imbalance. Jurisdictions should consider the jobs-housing balance and consider measures to reduce displacement and increase affordable housing. Pairing this with TDM strategy *Increase Residential Density*, the cumulative densification from these measures can result in a highly walkable and bikeable area, yielding increased co-benefits in VMT reductions, improved public health, and social equity.

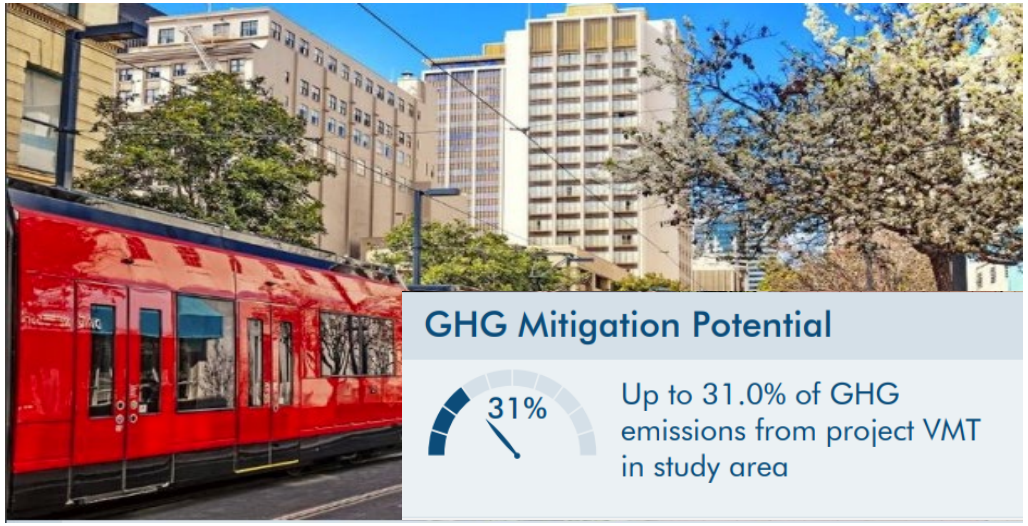
Policies to increase job densities include zoning ordinances to allow more building floor space on each parcel and reductions in parking requirements. In most cases, these policies are coordinated with a combination of infrastructure investments and/or financial incentives that, for example, promote increased accessibility by public transportation and development around transit stations.

Go Back to Table of Contents

Provide Transit-Oriented Development

Description

TOD refers to projects built in compact, walkable areas that have easy access to public transit, ideally in a location with a mix of uses, including housing, retail offices, and community facilities. Project site residents, employees, and visitors would have easy access to high-quality public transit, thereby encouraging transit ridership and reducing the number of single occupancy vehicle trips.



Case Studies/More Info

- TOD and Affordable housing: https://rcdhousing.org/wp-content/uploads/2019/02/RCD-ABAG-transit-study.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm45.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=90

Go Back to Table of Contents

Provide Transit-Oriented Development (Continued)

To qualify as TOD, the development must be a residential or office project that is within a 10-minute walk (0.5 mile) of a high frequency transit station (either rail, or bus rapid transit with headways less than 15 minutes). Ideally, the distance should be no more than 0.25 to 0.3 of a mile but could be up to 0.5 mile if the walking route to station can be accessed by pedestrian-friendly routes. LDR coordinators should recommend the incorporation of bike and pedestrian access into the larger network to increase the likelihood of transit use.

TOD is a promising urban planning strategy for long-term sustainability, equity, livability, and prosperity. Developing TOD in suburban areas could help increase transit ridership and reduce VMT on the regional scale. Many studies have shown that residents in TODs tend to own fewer cars and drive fewer miles. Some other benefits of TOD include improved mobility choices for all people; increase public safety; increased disposable income by reducing driving costs; and revitalized aging downtowns and declining urban neighborhoods (FTA, 2023).

Go Back to Table of Contents

Integrate Affordable and Below Market Rate Housing

Description

BMR housing provides greater opportunity for lower income families to live closer to job centers and achieve a jobs/housing match near transit. It is also an important strategy to address the limited availability of affordable housing that might force residents to live far away from jobs or school, requiring longer commutes.

Case Studies/More Info

- Caltrans SB 743 Mitigation Playbook: https://dot.ca.gov/-/media/dot-media/programs/sustainability/documents/vmt-mitigation-playbook-07-2022.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/aff_acc_hou.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=94
- OPR's Technical Advisory on Evaluating Transportation Impact in CEQA: http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf

Go Back to Table of Contents

Integrate Affordable and Below Market Rate Housing (Continued)

Based on the OPR's Technical Advisory on Evaluating Transportation Impact in CEQA, adding affordable housing to infill locations generally improves jobs-housing match, in turn shortens commutes and reduces VMT. A project consisting of a high percentage of affordable housing may be a basis for the lead agency to find a less-than-significant impact on VMT. LDR coordinators should encourage housing projects to include affordable housing units because it aligns with state's housing and VMT reduction goals.

Affordable housing can reduce VMT by providing housing options for lower-income households who have lower car ownership rates than moderate-income households. This can lead to increased use of public transit, walking, and biking. Additionally, compact and affordable housing can be located near transit stops or high-quality transit corridors, further reducing the need for car travel.

Go Back to Table of Contents

Improve Street Connectivity

Description

This measure accounts for the VMT reduction achieved by a project that is designed with a higher density of vehicle intersections compared to the average intersection density in the U.S. Increased vehicle intersection density is a proxy for street connectivity improvements, which help to facilitate a greater number of shorter trips.

Case Studies/More Info

- Impacts of Network Connectivity on Passenger Vehicle Use and Greenhouse Gas Emissions: https://ww2.arb.ca.gov/sites/default/files/2020-06/Impacts_of_Network_Connectivity_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=144

Go Back to Table of Contents

Improve Street Connectivity (Continued)

Projects that increase intersection density would be building a new street network in a subdivision or retrofitting an existing street network to improve connectivity. Benefits come mainly from the reduction of traffic on arterial streets, which reduces congestion and allows for safer use of nonmotorized transportation. Multiple active modes routing options allow vulnerable road users to choose based on perceived safety, comfort, speed, and other factors. LDR coordinators should recommend this with TDM strategy *Pedestrian Network Improvement*.

Improved street connectivity can reduce VMT by providing more direct routes for travel, reducing travel distances and VMT. Greater connectivity could encourage residents to walk or bike instead of drive.

Go Back to Table of Contents

Locate Project in Area with High Destination Accessibility

Description

Destination accessibility is measured in terms of the number of jobs or other attractions that are reachable within a given travel time or travel distance and tends to be highest at central locations and lowest at peripheral ones. When destinations are nearby, the travel time between them is less, thus increasing the potential for people to walk and bike to those destinations and, therefore, reducing the vehicle miles traveled (VMT).

GHG Mitigation Potential

Not Available

Case Studies/More Info

- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm84.htm
- Evaluating Accessibility for Transport Planning Measuring People's Ability to Reach Desired Goods and Activities: https://www.vtpi.org/access.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=66

Go Back to Table of Contents

Locate Project in Area with High Destination Accessibility (Continued)

Locating a project in an area with high destination accessibility can reduce VMT by providing more opportunities for walking, biking, and transit. Destination accessibility refers to ease with which people can reach their desired destinations. It is a measure of how well a transportation system connects people to the places they want to go. A high destination accessibility means that there are many destinations within a short distance and that there are good transportation options for reaching those destinations.

LDR coordinators should review the surrounding area of the project and determine locations where accessibility is increased. Lower proximity to locations of interest will encourage people to drive less. As an implementation consideration, projects should consider accessibility by people of all functional abilities and incorporate design principles such as Universal Design (UD). UD is a design approach that aims to create products, environments, and system that can be used by as many people as possible. The goal of UD is to create inclusive and accessible spaces.

Go Back to Table of Contents

Improve Destination Accessibility in Underserved Areas

Description

This measure accounts for the VMT reduction that would be achieved by constructing job centers or other attractions (e.g., schools, supermarkets, and health care services) for residents in underserved areas (e.g., food deserts). When destinations are nearby, the travel time between them is less, thus increasing the potential for people to walk and bike to those destinations, reducing VMT.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm84.htm
- Evaluating Accessibility for Transport Planning Measuring People's Ability to Reach Desired Goods and Activities: https://www.vtpi.org/access.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=66

Go Back to Table of Contents

Improve Destination Accessibility in Underserved Areas (Continued)

This strategy will work best when implemented at the General Plan level. LDR coordinators should consider recommending during General Plan review and comment phase more opportunities for walking, biking, and using public transit. In addition, locating many destinations (such as shops, restaurants, and services) within a short distance while there are good transportation options will be very effective in reducing the need for people to drive.

At the project level, LDR coordinators should review the surrounding area of the project and determine how accessibility can be increased. Lower proximity to locations of interest will encourage people to drive less. As an implementation consideration, projects should consider accessibility by people of all functional abilities and incorporate design principles such as Universal Design.

Go Back to Table of Contents

Orient Project Toward Transit, bike, or Pedestrian Facility

Description

This measure requires projects to minimize setback distance between the project and planned or existing transit, bike, or pedestrian corridors. A project that is designed around an existing or planned transit, bike, or pedestrian corridor encourages sustainable mode use.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- Toward an Active CA: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/f0020350-activeca-final-plan-2017-05-18-a11y.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=66

Go Back to Table of Contents

Orient Project Toward Transit, bike, or Pedestrian Facility (Continued)

Orienting a project towards transit, bike, or pedestrian facilities can reduce VMT by providing more opportunities for people to use these modes of transportation instead of driving. Transit-oriented developments are an example of this strategy. Other examples include projects that have bike lanes or pedestrian paths.

LDR coordinators should recommend this strategy in tandem with other multimodal strategies that encourage active transportation and transit use. As an implementation consideration, projects should consider accessibility by people of all functional abilities and incorporate design principles such as Universal Design.

Go Back to Table of Contents

Locate Project near Bike Path/Bike Lane

Description

This measure requires projects to be located within 0.5-mile bicycling distance to an existing Class I or IV path or Class II bike lane. A project that is designed around an existing or planned bike facility encourages sustainable mode use. The project design should include a comparable network that connects the project uses to the existing off-site facilities that connect to work/retail destinations.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- I-710 Corridor Bike Path Project: https://www.metro.net/projects/710bikepath
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm93.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=66

Go Back to Table of Contents

Locate Project near Bike Path/Bike Lane (Continued)

LDR coordinators can recommend this strategy if there are existing or planned bike facilities near the project site. This strategy is most effective when applied in combination with other design elements that encourage bike use (i.e., bike parking, showers, etc.). Some examples of projects located near bike paths or bike lanes include residential developments, office buildings, and mixed-use developments that are designed to encourage the use of bikes. These projects might include features such as bike storage facilities and bike-sharing programs.

Go Back to Table of Contents

Trip Reduction Programs

Implement Commute Trip Reduction Program

Description

Commute trip reduction (CTR) program with employers. CTR programs discourage single occupancy vehicle trips and encourage alternative modes of transportation such as carpooling, taking transit, walking, and biking, thereby reducing VMT and GHG emissions.

Case Studies/More Info

- How Washington State Convinced Big Companies to Dramatically Reduce Drive-Along Commutes: https://www.bloomberg.com/news/articles/2015-04-06/washington-state-s-commute-trip-reduction-program-is-a-model-for-the-nation
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm9.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=97

Go Back to Table of Contents

Implement Commute Trip Reduction Program (Continued)

LDR coordinators should carefully review the project to determine if this is a viable strategy as it is effective in reducing VMT for commute trips. Commute trip reduction (CTR) program works best when implemented along with other strategies that encourage walking, biking, and taking transit. Design of CTR programs needs to ensure equitable access and benefits to all employees.

Some examples of CTR include parking cash-out programs, providing tax benefits for those who use qualified alternative commuting modes, points-based reward programs, social incentives, reduced fare transit pass programs, alternative work schedules, bike amenities, and transit marketing programs.

Go Back to Table of Contents

Implement Commute Trip Reduction Marketing

Description

This measure will implement a marketing strategy to promote the project site employer's CTR program. Information sharing and marketing promote and educate employees about their travel choices to the employment location beyond driving such as carpooling, taking transit, walking, and biking, thereby reducing VMT.

Case Studies/More Info

- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm9.htm
- Seattle's CTR Strategic Plan 2019-2023: https://www.seattle.gov/documents/Departments/SDOT/TransportationOptionsProgram/CTR_Final_Plan_20190822.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=103

Go Back to Table of Contents

Implement Commute Trip Reduction Marketing (Continued)

LDR coordinators need to determine if CTR strategy is applicable for a project. If it is, then recommending CTR marketing can improve the CTR strategy's effectiveness.

The following features (or similar alternatives) of the marketing strategy are essential for its effectiveness:

- Onsite or online commuter information services;
- Employee transportation coordinators;
- Onsite or online transit pass sales; and
- Guaranteed ride home service.

Go Back to Table of Contents

Provide Ridesharing Program

Description

This measure will implement a ridesharing program and may establish a permanent transportation management association with funding requirements for employers. Ridesharing encourages carpooled vehicle trips in place of single-occupied vehicle trips, thereby reducing the number of trips, VMT.

Case Studies/More Info

- Rural Health Information Hub: Ridesharing Models: https://www.ruralhealthinfo.org/toolkits/transportation/2/models-to-improve-access/ridesharing-models
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm34.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=106

Go Back to Table of Contents

Provide Ridesharing Program (Continued)

LDR coordinators may provide comments to promote ride-sharing as appropriate in responses to a General Plan's circulation element or a project, which the lead agency could condition or encourage.

Ridesharing programs work by matching people who are traveling in the same direction and at the same time so they can share a ride. Participants usually sign up and provide information about their commute, such as their origin, destination, and preferred departure time. Some programs also provide incentive for carpooling, such as preferred parking or financial rewards.

Programs should include all onsite workers, such as contractors, interns, and service workers. Because ridesharing is vehicle based, and some employees may not be in areas with feasible rideshare networks, design of programs need to ensure equitable benefits to those with and without access to rideshare opportunities.

Go Back to Table of Contents

Implement Subsidized or Discounted Transit Program

Description

This measure will provide subsidized or discounted, or free transit passes for employees and/or residents. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT.

Case Studies/More Info

- Metro LIFE Transit Subsidy Program: https://www.metro.net/projects/life/
- Kings Area Rural Transit Fares: https://www.kartbus.org/fares/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm112.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=109

Go Back to Table of Contents

Implement Subsidized or Discounted Transit Program (Continued)

Subsidized or discounted transit programs work by providing financial assistance to people who use public transportation. These programs can be run by employers, government agencies, or transit providers. Participants usually sign up and provide information about their transit use, such as the routes they take and how often they use transit. Some programs also provide incentives for using transit, such as rewards for frequent use or bonuses for switching from driving to transit.

LDR coordinators should recommend this strategy to be implemented along with other strategies that encourage transit (e.g., transit stops, bike parking). Comments to transit discounts could be appropriate in responses to a General Plan or specific development project that is accessible either within 1 mile of high-quality transit service (rail or bus with headways of less than 15 minutes), 0.5 mile of local or less frequent transit service, or along a designated shuttle route providing last-mile connections to rail service.

Go Back to Table of Contents

Provide End-of-Trip Bike Facilities

Description

This measure will install and maintain end-of-trip bike facilities, which encourage commuting by bike, thereby reducing VMT.

Case Studies/More Info

- Active Transportation End-of-Trip Facility Guide Dalhousie University, Canada: https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/sustainability/resources/publications-and-plans/transportation/Active%20Transportation%20End%20of%20Trip%20Guide%202017.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm2.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=114

Go Back to Table of Contents

Provide End-of-Trip Bike Facilities (Continued)

End-of-trip bike facilities are amenities provided at the destination of a bike trip to make it more convenient for people to bike. End-of-trip facilities include bike parking, bike lockers, showers, and personal lockers. These facilities can be provided by employers, government agencies, or building owners. They are usually located near the entrance of a building or in a designated area.

LDR coordinators should recommend this strategy if there are bike facilities near the project. This strategy is most effective when implemented along with other strategies that promote biking to work. Best practice is to include an onsite bike repair station and post signage on or near secure parking and personal lockers with information about how to reserve or obtain access to these amenities.

Go Back to Table of Contents

Provide Employer-Sponsored Vanpool

Description

This measure will implement an employer-sponsored vanpool service. Vanpooling is a flexible form of public transportation that provides groups of 5 to 15 people with a cost-effective and convenient rideshare option for commuting. The mode shift from long-distance, single-occupied vehicles to shared vehicles reduces overall commute VMT.

Case Studies/More Info

- Metro Vanpool Program: https://www.metro.net/riding/vanpool/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm34.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=118

Go Back to Table of Contents

Provide Employer-Sponsored Vanpool (Continued)

LDR coordinators can recommend this strategy to reduce VMT for work trips. Vanpools are generally more successful with the largest of employers, as large employee counts create the best opportunities for employees to find a suitable number of travel companions to form a vanpool. When implementing a vanpool service, best practice is to subsidize the cost for employees that have a similar origin and destination and provide priority parking for employees that vanpool.

Employer-sponsored vanpool programs work by providing a shared ride for employees who live and work near each other. These programs can be run by employers or in partnership with a vanpool provider. Participants usually sign up and provide information about their commute, such as their origin, destination, and preferred departure time. The program then matches them with other participants who have similar commutes and provides them with a van to share.

Go Back to Table of Contents

Price Workplace Parking

Description

This measure will price onsite parking at workplaces. Because free employee parking is a common benefit, charging employees to park onsite increases the cost of choosing to drive to work. This is expected to reduce single-occupancy vehicle commute trips, resulting in decreased VMT.

Case Studies/More Info

- Impact of Parking Pricing on Vehicle Use: https://ww2.arb.ca.gov/sites/default/files/2020-06/Impacts_of_Parking_Pricing_Based_on_a_Review_of_the_Empirical_Literature_Policy_Brief.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm26.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=123

Go Back to Table of Contents

Price Workplace Parking (Continued)

LDR coordinators can recommend this strategy when other transportation options are available, convenient, and have competitive travel times, and that there is not alternative free parking available nearby (such as on-street). This measure is substantially less effective in environments that do not have other modes transportation available or where unrestricted street parking or other offsite parking is available nearby and has adequate capacity to accommodate project-related vehicle parking demand. The amount by which pricing workplace parking reduces VMT can vary depending on the specific implementation.

Go Back to Table of Contents

Implement Employee Parking Cash-Out

Description

This measure will require project employers to offer employee parking cash-out. Cash-out is when employers provide employees with a choice of forgoing their current subsidized/free parking for a cash payment equivalent to or greater than the cost of the parking space. This encourages employees to use other modes of travel instead of single occupancy vehicles. This mode shift results in people driving less and thereby reduces VMT.

Case Studies/More Info

- California's Parking Cash-out Program: https://ww2.arb.ca.gov/sites/default/files/2021-11/CA_Parking_Cash-Out_Program_An_Informational_Guide_For_Employers_2021.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=127

Go Back to Table of Contents

Implement Employee Parking Cash-Out (Continued)

Parking cash-out programs work by offering employees who receive free or subsidized parking from their employer the option to cash out their parking space and receive a cash payment instead. This gives employees the choice to keep their parking space at work or to accept a cash payment and give up the parking space. The intent of these programs is to reduce vehicle commute trips by encouraging employees to choose alternative modes of transportation such as transit, bike, walk, or carpool to work. LDR coordinators can recommend this strategy along with other commute trip reduction strategies for increased VMT reduction.

Go Back to Table of Contents

Provide Community-Based Travel Planning

Description

This measure will target residences in the plan/community with community-based travel planning (CBTP). CBTP is a residential based approach to outreach that provides households with customized information, incentives, and support to encourage the use of transportation alternatives in place of single occupancy vehicles, thereby reducing household VMT.

Case Studies/More Info

- OPR's Technical Advisory on Evaluating Transportation Impact in CEQA: http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=185

Go Back to Table of Contents

Provide Community-Based Travel Planning (Continued)

Community-based travel planning can reduce VMT by bringing local residents, community organizations, and transportation agencies together to improve mobility options. These community-led plans identify the most important transportation challenges in neighborhoods and develop strategies to overcome them.

By involving the community in the planning process, these plans can help develop more effective and sustainable transportation solutions that meet the needs of local residents.

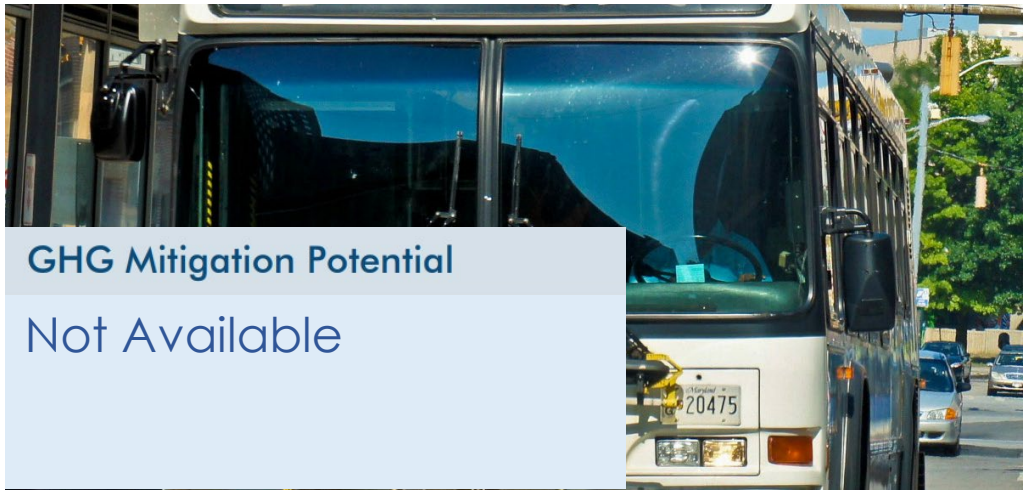
LDR coordinators can recommend this strategy during the General Plan update phase. Outreach materials may need to be in multiple languages to address diverse linguistic communities. This strategy involves teams of trained travel advisors visiting all households within a targeted geographic area, having tailored conversations about residents' travel needs, and educating residents about the various transportation options available to them.

Go Back to Table of Contents

Provide First and Last Mile TNC Incentives

Description

This measure requires a first-last mile partnership between a municipality/transit agency and a transportation network company (TNC) for subsidized, shared TNC rides to or from the local transit station within a specific geographic area. This measure encourages a shift to transit mode for longer trips.



GHG Mitigation Potential

Not Available

Case Studies/More Info

- Inglewood's First and Last Mile Plan: http://media.metro.net/projects_studies/FLM/images/board_report_Inglewood_FLM_2019-01.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=67

Go Back to Table of Contents

Provide First and Last Mile TNC Incentives (Continued)

First and last mile TNC incentives can reduce VMT by providing more convenient and affordable access to public transit for commuters. By offering incentives for commuters to use TNCs for the first and last mile of their journey, these programs can help reduce the number of single-occupancy vehicle trips and encourage more people to use public transit.

Some examples of first and last mile TNC incentives include partnership between transit agencies and TNC (e.g., bike share system); on-demand micro-transit services; integrated fare payment (e.g., combination pass for bike share and transit).

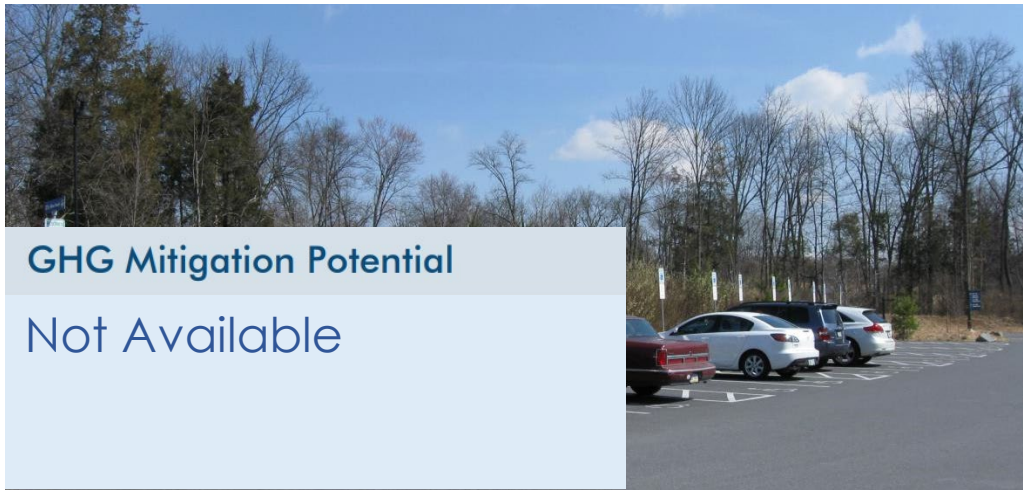
LDR coordinators should determine if this strategy is applicable at a General Plan level. Consider providing inclusive mechanisms so people without bank accounts, credit cards, or smart phones can access the incentives.

Go Back to Table of Contents

Implement Preferential Parking Permit Program

Description

This measure requires projects provide preferential parking in terms of free or reduced parking fees, priority parking, or reserved parking in convenient locations (such as near public transportation or building entrances) for commuters who carpool, vanpool, ride-share or use sustainably fueled vehicles. Projects should also provide wide parking spaces to accommodate vanpool vehicles.



GHG Mitigation Potential

Not Available

Case Studies/More Info

- VTA Preferential Parking: https://www.vta.org/cdt/parking-design-home-page/preferential-parking

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=67

Go Back to Table of Contents

Implement Preferential Parking Permit Program (Continued)

Preferential parking permit programs can help manage parking demand in areas with limited parking availability. By providing permit to residents or employees in designated areas, the goal of these programs is to reduce the number of vehicles searching for parking in areas with high parking demand. These programs can help to ensure that parking is available for those who need it most. Other benefits of preferential parking permit programs include reducing congestion and improving air quality.

The City of Pittsburg has a preferential residential permit parking program that enables residents of qualifying areas to purchase permits that allow them and their guests to park on the street during time periods that parking is otherwise restricted. The City of Berkeley has a program where residents in certain areas of the city can apply for a permit to exempt them for the 2-hour time limit in designated preferential parking zones.

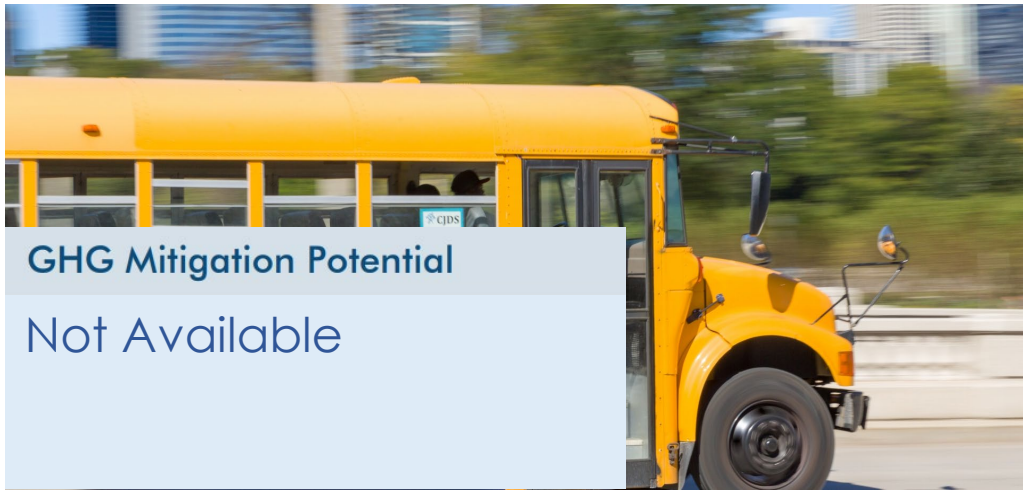
LDR coordinators can recommend this strategy where parking near the project is limited.

Go Back to Table of Contents

Implement School Bus Program

Description

This measure will provide school bus service transporting students to a school project. A school bus service can reduce the number of private vehicle trips to drop-off or pick-up students, thereby reducing VMT and associated GHG emissions, as well as onsite air pollution emissions, especially if the bus is zero emissions. Best practices include concentrating service for students who live further away from schools, providing service both before and after school, and encouraging parents to utilize the service.



GHG Mitigation Potential

Not Available

Case Studies/More Info

- School Bus Incentive Program: https://ww2.arb.ca.gov/sites/default/files/2019-09/fy1920fundingplan-appe.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm36.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=67

Go Back to Table of Contents

Implement School Bus Program (Continued)

School bus programs can reduce VMT by providing a safe and efficient way for students to travel to and from school. By using school buses, families can reduce the number of single-occupancy vehicle trips they make.

School bus programs can vary in their design and implementation. Some programs may be run by school districts, while others may be operated by private companies or public transportation agencies.

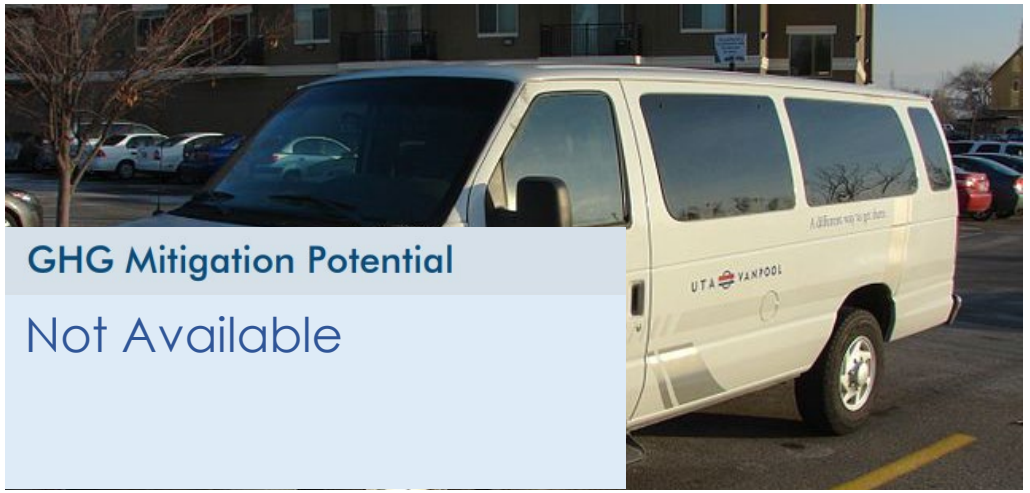
LDR coordinators can recommend this strategy for any school project. Best practices include concentrating service for students who live further away from schools, providing service both before and after school, and encouraging parents to utilize the service. This measure is more effective at schools that draw students from a larger enrollment area, such as high schools or private schools.

Go Back to Table of Contents

Implement a School Pool Program

Description

This measure requires projects create a ridesharing program for school children. Most school districts provide bussing services to public schools only. School pool helps match parents to transport students to private schools, or to schools where students cannot walk or bike but do not meet the requirements for bussing.



GHG Mitigation Potential

Not Available

Case Studies/More Info

- Marin County School Pool Program: http://www.saferoutestoschools.org/schoolpool_guide.html
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm36.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=68

Go Back to Table of Contents

Implement a School Pool Program (Continued)

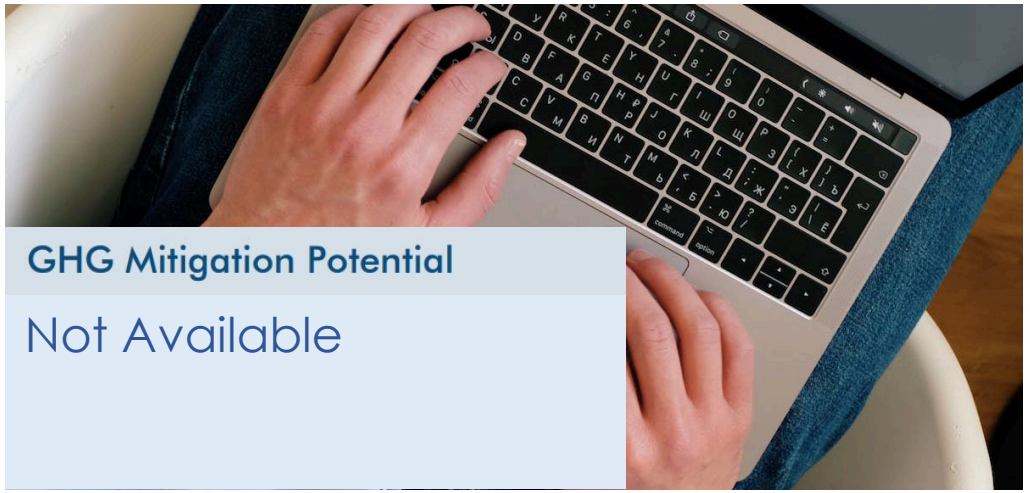
School pool programs are designed to introduce and encourage families and students to carpool, walk, bike together, and take the bus to school. There are many benefits to school pool programs in addition to VMT reduction such as providing a sense of community and support for families. These programs work by connecting families in a neighborhood or school district to share in the responsibilities of getting their children to school and back. This can save time and money for families and provide a convenient and reliable transportation option for students. LDR coordinators should recommend school projects to implement this strategy whenever possible.

Go Back to Table of Contents

Implement Telecommute and/or Alternative Work Schedule Program

Description

This measure requires projects to permit employee telecommuting and/or alternative work schedules and monitor employee involvement to ensure forecasted participation matches observed participation. This measure certainly reduces commute-related VMT.



GHG Mitigation Potential

Not Available

Case Studies/More Info

- Policy Brief on the Impacts of Telecommuting Based on a Review of the Empirical Literature: https://ww3.arb.ca.gov/cc/sb375/policies/telecommuting/telecommuting_brief120313.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm43.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=68

Go Back to Table of Contents

Implement Telecommute and/or Alternative Work Schedule Program (Continued)

Telecommuting allows employees to work form home or other locations, reducing or eliminating the need for commuting. This can significantly reduce the number of work-related car trips; it is one of the most cost-effective strategies in reducing VMT. Other benefits of telecommuting in addition to reduced commuting time and costs, include increased flexibility (giving employees more control over their work schedule and environment), increased productivity, reduced environmental impacts, and reduced office costs.

Alternative work schedules, such as compressed workweeks or flextime, can also help reduce VMT by allowing employees to adjust their work hours to avoid peak traffic times or to better coordinate with public transportation schedules.

Disclaimer: Some businesses are not conducive to telecommuting, such as biotech, warehouse logistics, in person patient care, mining, construction, etc. When possible, for positions that can be adapted for telecommuting, offer it as an option for employees.

Go Back to Table of Contents

Parking or Road Pricing/ Management

Limit Residential Parking Supply

Description

Limiting the amount of parking available creates scarcity and adds additional time and inconvenience to trips made by private auto, thus disincentivizing driving as a mode of travel. Reducing the convenience of driving results in a shift to other modes and decreased VMT.

Case Studies/More Info

- Parking Reduction Report for City of El Paso: http://legacy.elpasotexas.gov/muni_clerk/_documents/City%20Plan%20Commission/01-25-18/ITEM%2012%20Parking%20Reduction%20Report-Final.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm28.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=136

Go Back to Table of Contents

Limit Residential Parking Supply (Continued)

Limiting the residential parking supply can be an effective strategy for reducing VMT. By reducing the amount of parking available at a residential project or site, this measure creates scarcity and adds additional time and inconvenience to driving. This can result in a shift to other modes of transportation, such as public transit, walking, and biking.

LDR coordinators can recommend limiting parking where transit is adjacent to the project, significantly reducing parking where transit is within ¼ mile. When limiting parking supply, a best practice is to do so at sites that are located near high quality alternative modes of travel (such as a rail station, frequent bus line, or in a higher density area with multiple walkable locations nearby).

Go Back to Table of Contents

Unbundle Residential Parking Costs from Property Cost

Description

This measure will unbundle, or separate, a residential project's parking costs from property costs, requiring those who wish to purchase parking spaces to do so at an additional cost. On the assumption that parking costs are passed through to the vehicle owners/drivers utilizing the parking spaces, this measure results in decreased vehicle ownership and, therefore, a reduction in VMT.

Case Studies/More Info

- Unbundling Parking Costs is a Top Way to Promote Transportation Options: https://mobilitylab.org/research-document/unbundling-parking-costs-is-a-top-way-to-promote-transportation-options/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm26.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=140

Go Back to Table of Contents

Unbundle Residential Parking Costs from Property Cost (Continued)

Unbundling residential parking costs from property costs can be an effective strategy for reducing VMT. Unbundling means separating the cost of parking from the cost of renting or owning a home, allowing residents to pay for parking only if they need it. This can discourage vehicle ownership and reduce driving.

LDR coordinators can recommend this strategy when there is limited parking. This strategy rewards those who choose alternative modes of transportation. This strategy is most effective when coupled with other strategies that encourage active modes of travel and transit. The unbundling of parking costs help decrease housing costs for individuals who do not own personal vehicles.

Go Back to Table of Contents

Implement Market Price Public Parking (On-Street)

Description

This measure will price all on-street parking in a given community, with a focus on parking near central business districts, employment centers, and retail centers. Increasing the cost of parking increases the total cost of driving to a location, incentivizing shifts to other modes and thus decreasing total VMT to and from the priced areas.

Case Studies/More Info

- Contemporary Approaches to Parking Pricing: A primer: https://ops.fhwa.dot.gov/publications/fhwahop12026/fhwahop12026.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm26.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=188

Go Back to Table of Contents

Implement Market Price Public Parking (On-Street) (Continued)

Implementing market pricing of public parking can be an effective strategy for reducing VMT by increasing existing parking prices that is currently offered for free. This would encourage people to use alternative modes of transportation such as public transit, walking, and biking. LDR coordinators can recommend this strategy be implemented at the General Plan level.

Go Back to Table of Contents

Implement Area or Cordon Pricing

Description

The pricing scheme will set a cordon (boundary) around a specified area to charge a toll to enter the area by vehicle. The cordon location is usually the boundary of a central business district or urban center but could also apply to substantial development projects with limited points of access. The toll price can be based on a fixed schedule or be dynamic, responding to real-time congestion levels. It is critical to have an existing, high quality transit infrastructure for the implementation of this strategy to reach a significant level of effectiveness. The pricing signals will only cause mode shifts if alternative modes of travel are available and reliable.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- Seattle Congestion Pricing Study: https://www.seattle.gov/Documents/Departments/SDOT/About/SeattleCongestionPricingStudy_SummaryReport_20190520.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm35.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=69

Go Back to Table of Contents

Implement Area or Cordon Pricing (Continued)

Area or cordon pricing, also known as congestion pricing, can be an effective strategy for reducing VMT. This measure involves charging drivers who enter or drive within a specific area, such as downtown or city center. By increasing the cost of driving in these areas, cordon pricing can reduce vehicle travel and encourage switching to other modes of transportation, such as taking transit, walking, and biking.

This strategy should be recommended at the General Plan level. LDR coordinators can work with lead agency to determine if area or cordon pricing could be an option (this will likely require voter approval). It is critical to have an existing, high quality transit infrastructure for the implementation of this strategy to reach a significant level of effectiveness. This measure should provide an exception for low-income residents or workers within the pricing zone.

Go Back to Table of Contents

Replace Traffic Controls with Roundabout

Description

This measure requires projects install a roundabout as a traffic control device to smooth traffic flow, reduce idling, eliminate bottlenecks, and manage speed. In some cases, roundabouts can improve traffic flow and reduce emissions. The emission reduction depends heavily on what the roundabout is compared to (e.g., uncontrolled intersection, stop sign, traffic signal). Design roundabout so cyclists have the option to join traffic or bypass the roundabout with an adjacent path.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- IIHS Roundabout: https://www.iihs.org/topics/roundabouts
- FHWA Roundabout: https://safety.fhwa.dot.gov/intersection/roundabouts/fhwasa15071.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=69
- Smart Mobility Implementation Guide: https://transportationplanning.onramp.dot.ca.gov/downloads/transportationplanning/files/activetranstreets/smart%20mobility%20framework/Final%20SMF%20Implementation%20Guide%2002282022.pdf

Go Back to Table of Contents

Replace Traffic Controls with Roundabout (Continued)

The installation of roundabout is utilized to improve traffic flows and safety by reducing conflict points. Roundabouts may be considered for installation in conjunction with other traffic calming improvements when the following conditions are present:

- At the termination of a controlled access highway ramp to an arterial or collector road;
- At the junction of two arterial roadways or an arterial roadway and collector road; and
- At offset intersections or intersections with multiple roadways.

Go Back to Table of Contents

Required Project Contributions to Transportation Infrastructure Improvement

Description

This measure requires projects contribute to traffic-flow improvements or other multi-modal infrastructure projects that reduce emissions and are not considered as substantially growth inducing. The local transportation agency should be consulted for specific needs. Larger projects may be required to contribute a proportionate share to the development and/or continuation of a regional transit system. Contributions may consist of dedicated right-of-way, capital improvements, or easements.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- NACTO Street Design: https://nacto.org/
- Caltrans Complete Streets: https://dot.ca.gov/programs/transportation-planning/division-of-transportation-planning/active-transportation-and-complete-streets

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=69

Go Back to Table of Contents

Required Project Contributions to Transportation Infrastructure Improvement (Continued)

Required project contributions to transportation infrastructure improvements can reduce VMT by supporting infill developments, reducing average length of vehicle trips, and increasing use of more sustainable modes including carpooling, biking, walking, and taking transit. A multimodal assessment can add insights as to what kinds of pedestrian, bike, and transit improvements can be made to enhance the travel environment.

LDR coordinators can recommend this strategy to any project to contribute to local or regional VMT exchange or banking programs.

Go Back to Table of Contents

Install Park-and-Ride Lots

Description

This measure requires projects install park-and-ride lots near transit stops and high occupancy vehicle lanes. Park-and-ride lots also facilitate car- and vanpooling. Parking lots can also incorporate cool pavements, tree canopy, or solar photovoltaic shade canopies to reduce the urban heat island effect as well as evaporative emissions from parked vehicles and dedicated electric vehicle parking spots and/or charging infrastructure.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- Caltrans Park and Ride: https://dot.ca.gov/programs/traffic-operations/park-ride

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=69

Go Back to Table of Contents

Install Park-and-Ride Lots (Continued)

Park-and-ride lots are strategically located near roads widely used by commuters and are often near transit stations. These lots are convenient places to meet rideshare partners or switch transportation modes to public transportation. A network of park-and-ride lots can reduce the number single occupant vehicles and encourage transit use and ride-sharing.

LDR coordinators can recommend this strategy along with other incentives such as transit subsidy and vanpool to increase the likelihood of park-and-ride usage.

Go Back to Table of Contents

Designate Zero Emissions Delivery Zones

Description

This measure requires the municipality to designate certain curbside locations as commercial loading zones exclusively available for zero-emission commercial delivery vehicles. Doing so replaces tailpipe diesel emissions from last-mile delivery vehicles as well as heavy duty drayage trucks moving goods with less emissions-intensive electric vehicles and potentially micromobility for food and parcel delivery. Locations should be prioritized based on land use density and existing exposure from air pollution.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- Zero Emission Delivery Zones: https://www.wri.org/research/zero-emission-delivery-zones-us-cities

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=70

Go Back to Table of Contents

Designate Zero Emissions Delivery Zones (Continued)

A zero-emission delivery zone is an area in which only zero-emission vehicles have unrestricted access. These zones are designated to reduce air pollution from urban freight and delivery activity. This would reduce GHG and incentivize the use zero-emission vehicles.

LDR coordinators can recommend this strategy at the General Plan level. This strategy will be most effective in congested regions and where parking is limited.

Go Back to Table of Contents

Neighborhood Design

Provide Pedestrian Network Improvement

Description

Providing sidewalks and an enhanced pedestrian network encourages people to walk instead of drive. This mode shift results in a reduction in VMT.

Case Studies/More Info

- Quantifying Reductions in VMT from New Pedestrian Facilities: https://ww3.arb.ca.gov/cc/capandtrade/auctionproceeds/pedestrian_facilities_technical_041519.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm92.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=147
- ADA Standards for Accessible Design: https://www.ada.gov/2010ADAstandards_index.htm

Go Back to Table of Contents

Provide Pedestrian Network Improvement (Continued)

Improving the pedestrian network in an area can reduce VMT by making it easier and more convenient for people to walk instead of drive. Best practice features include high-visibility crosswalks, pedestrian hybrid beacons, other pedestrian signals, mid-block crossing walks, pedestrian refuge islands, speed tables, bulb-outs (curb extensions), curb ramps, signage, pavement markings, pedestrian only connections, landscaping, and other improvements to pedestrian safety.

LDR coordinators should always recommend projects to include pedestrian improvements that comply with ADA standards. When improving sidewalks, a best practice is to ensure they are contiguous and link externally with existing and planned pedestrian facilities. Barriers to pedestrian access and interconnectivity, such as walls, landscaping buffers, slopes, and unprotected crossings should be minimized.

Go Back to Table of Contents

Construct or Improve Bike Facility

Description

This measure will construct or improve a single bike lane facility (only Class I, II, or IV) that connects to a larger existing bikeway network. Providing bike infrastructure helps to improve biking conditions within an area. This encourages a mode shift on the roadway parallel to the bike facility from vehicles to bikes, displacing VMT

Case Studies/More Info

- NACTO's Urban Bikeway Design: https://nacto.org/publication/urban-bikeway-design-guide/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm93.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=151

Go Back to Table of Contents

Construct or Improve Bike Facility (Continued)

Constructing or improving bike facilities can reduce VMT by making it easier and more convenient for people to bike instead of drive. Bike infrastructure helps improve biking conditions within an area and encourages a mode shift from driving to biking. Some examples of bike facilities include bike lanes, bike paths, and bike boulevards. This strategy should be grouped with other bike improvements to be the most effective.

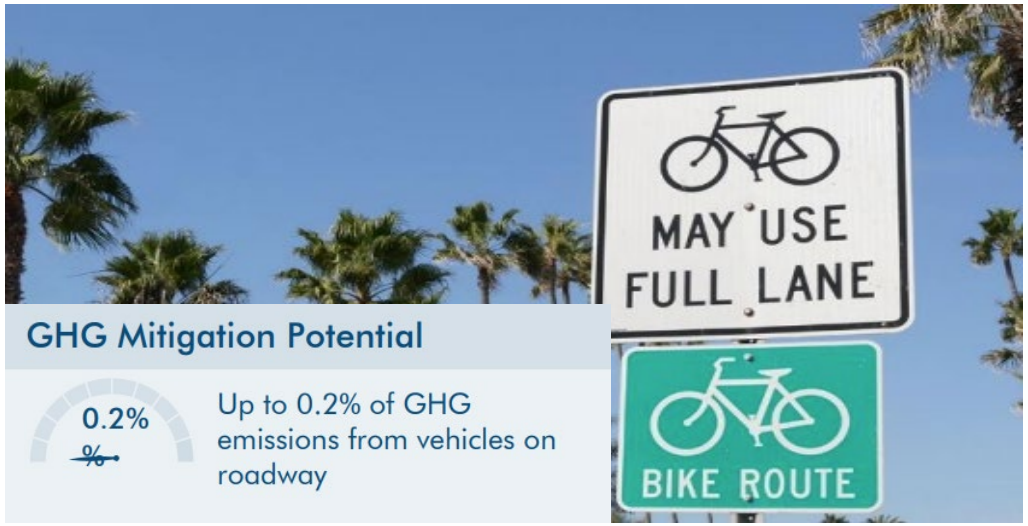
LDR coordinators should review surrounding complete street projects and determine how mitigation from this project could fill existing gaps. Prioritize low-income and underserved areas and communities with lower rates of vehicle ownership or fewer transit options. Make sure that the bike facility connects to a larger existing bikeway network that accesses destinations visited by low-income or underserved communities.

Go Back to Table of Contents

Construct or Improve Bike Boulevard

Description

Construct or improve a single bike boulevard that connects to a larger existing bikeway network. bike boulevards are a designation within Class III Bikeway that create safe, low-stress connections for people biking and walking on streets. This encourages a mode shift from vehicles to bikes, displacing VMT.



Case Studies/More Info

- NACTO's Bike Boulevard: https://nacto.org/publication/urban-bikeway-design-guide/bike-boulevards/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm93.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=156

Go Back to Table of Contents

Construct or Improve Bike Boulevard (Continued)

Constructing or improving bike boulevards can reduce VMT by making it easier and more convenient for people to bike instead of drive. Bike boulevards use signs, pavement markings, and speed and volume management measures to discourage through trip by motor vehicles.

LDR coordinators can recommend this strategy at the General Plan/Community level. Prioritize low-income and underserved areas and communities with lower rates of vehicle ownership or fewer transit options. Make sure that the bike boulevard connects to a larger existing bikeway network that accesses destinations visited by low-income or underserved communities.

Go Back to Table of Contents

Expand Bikeway Network

Description

This measure will increase the length of a city or community bikeway network. A bike network is an interconnected system of bike lanes, bike paths, bike routes, and cycle tracks. Providing bike infrastructure with markings and signage on appropriately sized roads with vehicle traffic traveling at safe speeds helps to improve biking conditions (e.g., safety and convenience). In addition, expanded bikeway networks can increase access to and from transit hubs, thereby expanding the "catchment area" of the transit stop or station and increasing ridership. This encourages a mode shift from vehicles to bikes, displacing VMT.

Case Studies/More Info

- NACTO's Urban Bikeway Design: https://nacto.org/publication/urban-bikeway-design-guide/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm93.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=160

Go Back to Table of Contents

Expand Bikeway Network (Continued)

LDR coordinators should recommend this strategy with other bike facility improvements. Expanding bikeway networks can incentivize more bike use and decrease motor vehicle use, which have health benefits and can thus improve community resilience. Prioritize low-income and underserved areas and communities with lower rates of vehicle ownership or fewer transit options. Make sure that destinations visited by low-income or underserved communities are served by the network. Increasing the length of a bike network within a plan/community is also important.

Go Back to Table of Contents

Implement Conventional Carshare Program

Description

This measure will increase carshare access in the user's community by deploying conventional carshare vehicles. Carsharing offers people convenient access to a vehicle for personal or commuting purposes. This helps encourage transportation alternatives and reduces vehicle ownership, thereby reduce overall VMT.

Case Studies/More Info

- Metro Rideshare/Shared Mobility: https://www.metro.net/riding/rideshare/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm34.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=164

Go Back to Table of Contents

Implement Conventional Carshare Program (Continued)

This strategy should be implemented at the city-level to be most effective.

Ride-sharing programs are most effective when implemented along with other strategies such as:

- Designating a certain percentage of parking spaces for ride sharing vehicles;
- Designating adequate passenger loading and unloading and waiting areas for ride-sharing vehicles; and
- Providing a web site or message board for coordinating rides.

Go Back to Table of Contents

Implement Electric Carshare Program

Description

This measure will increase carshare access in the user's community by deploying electric carshare vehicles. Carsharing offers people convenient access to a vehicle for personal or commuting purposes. This helps encourage transportation alternatives and reduces vehicle ownership, thereby lower overall VMT.

Case Studies/More Info

- Metro Rideshare/Shared Mobility: https://www.metro.net/riding/rideshare/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm34.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=168

Go Back to Table of Contents

Implement Electric Carshare Program (Continued)

This strategy should be implemented at the city-level to be most effective.

Similar to conventional carsharing, electric carsharing programs are most effective when implemented along with other strategies such as:

- Designating a certain percentage of parking spaces for ride sharing vehicles;
- Designating adequate passenger loading and unloading and waiting areas for ride-sharing vehicles; and
- Providing a web site or message board for coordinating rides.

Go Back to Table of Contents

Implement Pedal (Non-Electric) Bikeshare Program

Description

This measure will establish a bikeshare program. Bikeshare programs provide users with on-demand access to bikes for short term rentals. This encourages a mode shift from vehicles to bikes, displacing VMT.

Case Studies/More Info

- Metro Bike Share: https://bikeshare.metro.net/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm126.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=173

Go Back to Table of Contents

Implement Pedal (Non-Electric) Bikeshare Program (Continued)

Pedal bikeshare program can help reduce VMT by providing an alternative mode of transportation for people to use instead of driving. Bikes are especially useful for reducing short trips. Other benefits of pedal bikeshare are improving human health and decreasing traffic congestion, especially in large urban areas.

The number of bike-share kiosks throughout the project area should vary depending on the density of the project and surrounding area. Paris' bikeshare program places a station every few blocks throughout the city (approximately 28 bike stations/square mile). Bike-station density should increase around commercial and transit hubs. LDR coordinators should review the surrounding bike infrastructure and determine if this strategy is viable. This strategy should be implemented at a city or regional level.

Go Back to Table of Contents

Implement Electric Bikeshare Program

Description

This measure will establish an electric bikeshare program. Electric bikeshare programs provide users with on-demand access to electric pedal assist bikes for short-term rentals. This encourages a mode shift from vehicles to electric bikes, displacing VMT.

Case Studies/More Info

- Metro Bike Share: https://bikeshare.metro.net/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm126.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=177

Go Back to Table of Contents

Implement Electric Bikeshare Program (Continued)

An electric bikeshare program is a system that provides users with on-demand access to electric pedal assist bikes for short-term rentals. Electric pedal assisted bikes are equipped with a motor making it easier for people to ride longer distances or up hill.

The number of bike-share kiosks throughout the project area should vary depending on the density of the project and surrounding area. Paris' bikeshare program places a station every few blocks throughout the city (approximately 28 bike stations/square mile). Bike-station density should increase around commercial and transit hubs. LDR coordinators should review the surrounding bike infrastructure and determine if this strategy is viable. This strategy should be implemented at a city or regional level.

Go Back to Table of Contents

Implement Scootershare Program

Description

This measure will establish a scootershare program. Scootershare programs provide users with on-demand access to electric scooters for short-term rentals. This encourages a mode shift from vehicles to scooters, displacing VMT.

Case Studies/More Info

- CARB Report: https://ww2.arb.ca.gov/sites/default/files/auction-proceeds/sharedmobility_technical_052920.pdf
- UC ITS Scootershare Research: https://www.ucits.org/research-project/2020-05/

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=181

Go Back to Table of Contents

Implement Scootershare Program (Continued)

Similar to bikeshare program, scootershare is most effective when implemented in areas where facilities are available. Best practice is to discount scootershare membership and dedicate scootershare parking to encourage use of the service. Consider also including space on the vehicle to store personal items while traveling, such as a basket.

Scootershare programs have several benefits in addition to reducing VMT. They are fun, cheap, and convenient way to travel short distances in urban areas. They also promote an active, healthier lifestyle and reduce short-trip car use, reduce emissions, traffic congestions and parking demands.

Go Back to Table of Contents

Provide Bike Parking

Description

This measure requires projects provide short-term and long-term bike parking facilities to meet peak season maximum demand. Parking can be provided in designated areas or added within rights-of-way, including by replacing parking spaces with bike parking corrals. Ensure that bike parking can be accessed by all, not just project employees or residents.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- NATCO's Bike Parking: https://nacto.org/publication/transit-street-design-guide/station-stop-elements/stop-elements/bike-parking/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm93.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=66

Go Back to Table of Contents

Provide Bike Parking (Continued)

Providing bike parking can reduce VMT by making biking a more attractive mode of transportation. When people have a safe and convenient place to park their bikes, they may be more likely to choose biking over driving for short trips. Providing bike parking can also help support local businesses by making it easier for people to access them.

LDR coordinators should recommend this strategy when there are bike lanes near the project. This strategy should be implemented with other strategies that improve biking conditions.

Go Back to Table of Contents

Provide Traffic Calming Measures

Description

This measure requires projects to include pedestrian/bike safety and traffic calming measures above jurisdictional requirements. Roadways should also be designed to reduce motor vehicle speeds and encourage pedestrian and bike trips with traffic calming features. Traffic calming features may include marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, and others. Providing traffic calming measures encourages people to walk or bike instead of using a vehicle.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- San Francisco Municipal Transportation Agency Residential Traffic Calming Program: https://www.sfmta.com/getting-around/walk/residential-traffic-calming-program
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm4.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=67

Go Back to Table of Contents

Provide Traffic Calming Measures (Continued)

Traffic calming measures are designed to reduce vehicle speeds and improve safety for pedestrians and cyclists. While traffic calming measures do not directly reduce VMT, by making streets safer and more comfortable for pedestrians and cyclists, they can encourage more people to walk and bike instead of drive for short trips.

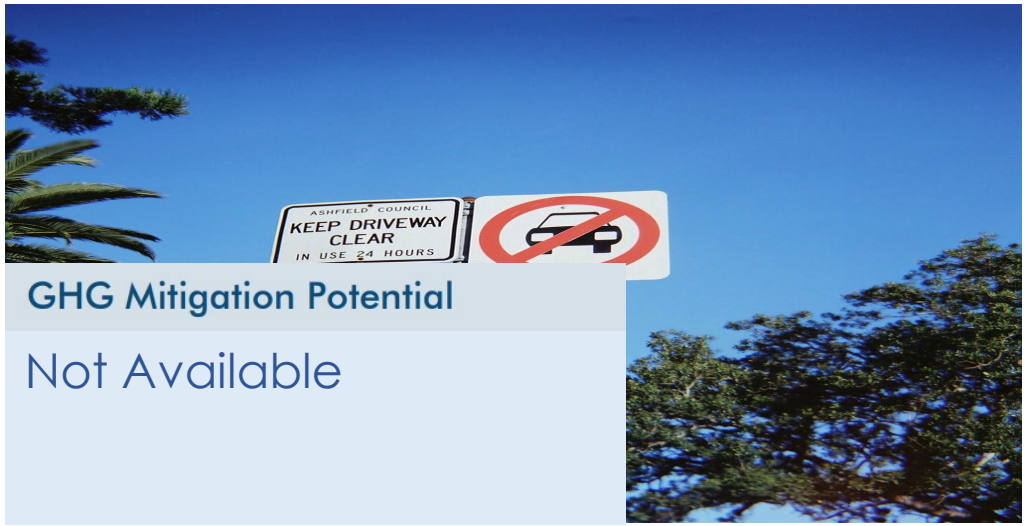
LDR coordinators can recommend traffic calming measures in their comments in responses to General Plans, Specific Plans and individual development projects. Percent VMT of reduction increases as more intersections and streets have traffic calming improvements.

Go Back to Table of Contents

Create Urban Non-Motorized Zones

Description

The measure requires projects to convert a percentage of its roadway miles to transit malls, linear parks, or other non-motorized zones. These features encourage non-motorized travel and thus a reduction in vehicle miles traveled.



GHG Mitigation Potential

Not Available

Case Studies/More Info

- No Cars in Downtown San Francisco, The Spine of SF is Now Car-Free: https://www.citylab.com/transportation/2020/01/market-street-car-free-san-francisco-bike-lanes-transit/605674/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm25.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=67

Go Back to Table of Contents

Create Urban Non-Motorized Zones (Continued)

Urban non-motorized zones can reduce VMT by encouraging transit and alternative transportation and/or reducing the number of vehicle trips.

Some cities around the world that have implemented urban non-motorized zones include Madrid, Spain; Milan, Italy; Dublin, Ireland. These cities have implemented various measures such as expanding car-free zones, improving public transit and bike lanes, and implementing financial incentives to encourage walking and biking.

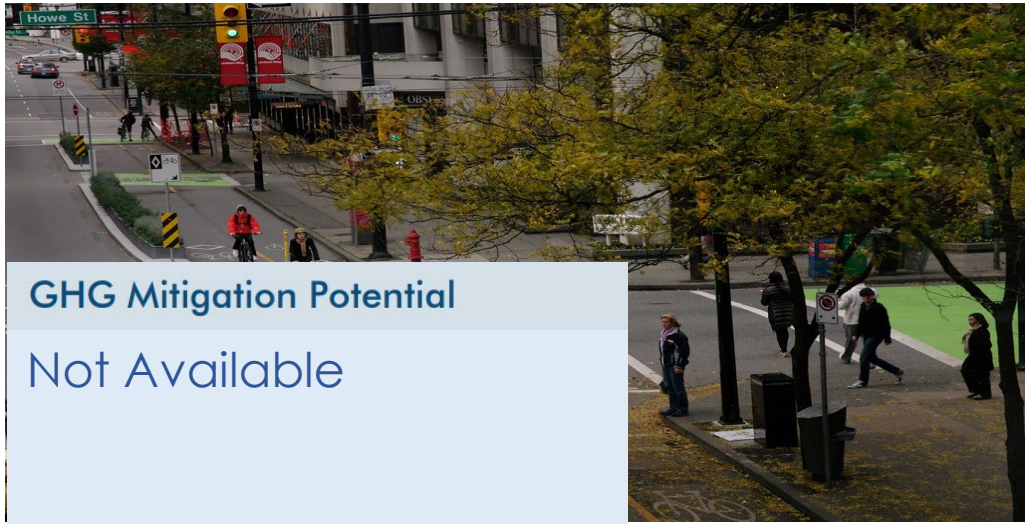
This strategy is a comprehensive method to reduce driving and encourage other modes of travel. LDR coordinators need to make sure alternative modes of transportation facilities are available. This strategy only applies at a General Plan level.

Go Back to Table of Contents

Dedicate Land for Bike Trails

Description

This measure requires projects to provide for, contribute to, or dedicate land for the provision of off-site bike trails linking the project to designated bike commuting routes in accordance with an adopted citywide or countywide bikeway plan. Existing desire paths can make good locations, as it represents a community-identified transportation need.



GHG Mitigation Potential

Not Available

Case Studies/More Info

- VTA Bike Superhighway Implementation Plan: https://www.vta.org/sites/default/files/2021-09/Bike%20superhighway%20Implementation%20plan%28print%29.pdf

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=67

Go Back to Table of Contents

Dedicate Land for Bike Trails (Continued)

LDR coordinators can recommend this strategy at General Plan, or citywide or countywide bikeway plan level. Existing desired bike paths can make good locations, as it represents a community-identified transportation need.

Go Back to Table of Contents

Transit

Extend Transit Network Coverage or Hours

Description

Expand the local transit network by either adding or modifying existing transit service or extending the operation hours to enhance the service near the project site. Starting services earlier in the morning and/or extending services to late-night hours can accommodate the commuting times of alternative-shift workers. This will encourage the use of transit and therefore reduce VMT.

Case Studies/More Info

- NACTO's Transit Street Design Guide: https://nacto.org/publication/transit-street-design-guide/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm47.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=192

Go Back to Table of Contents

Extend Transit Network Coverage or Hours (Continued)

Extending transit network coverage or hours can reduce VMT by making transit use more convenient. Starting transit services earlier in the morning and/or extending services to late-night hours can accommodate the commuting times of alternative-shift workers.

LDR coordinators should recommend this strategy at the General Plan level. Transit improvement strategies alone are not enough. Please recommend this strategy along with other strategies to improve multimodal travel and reduce the attractiveness of driving. This measure increases access to social, educational, and employment opportunities. Expansion of transit networks needs to ensure equitable access by all communities to the transit system.

Go Back to Table of Contents

Increase Transit Service Frequency

Description

This measure will increase transit frequency on one or more transit lines serving the plan/community. Increased transit frequency reduces waiting and overall travel times, which improves the user experience and increases the attractiveness of transit service. This results in a mode shift from single occupancy vehicles to transit, which reduces VMT.

Case Studies/More Info

- Innovative Solutions Meet the Needs of California's Rural Transit Riders: https://www.metro-magazine.com/accessibility/article/211801/innovative-solutions-meet-the-needs-of-californias-rural-transit-riders
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm112.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=196

Go Back to Table of Contents

Increase Transit Service Frequency (Continued)

Increasing transit service frequency can reduce waiting and overall travel times, which improves the user experience and increases the attractiveness of taking transit.

LDR coordinators should recommend this strategy along with other improvements to transit. Strategies that reduce the attractiveness of vehicle travel should be implemented in combination to attract a larger shift to transit ridership. Research has found this strategy is most effective in areas of low transit service. This measure increases access to social, educational, and employment opportunities. Expansion of transit service needs to ensure equitable access by all communities to the transit system.

Go Back to Table of Contents

Implement Transit-Supportive Roadway Treatments

Description

This measure will implement transit-supportive treatments on the transit routes serving the plan/community. Transit-supportive treatments incorporate a mix of roadway infrastructure improvements and/or traffic signal modifications to improve transit travel times and reliability. This results in a mode shift from single occupancy vehicles to transit, which reduces VMT.

Case Studies/More Info

- How to Improve Transit Operations in Rural Communities: https://www.nationalexpresstransit.com/blog/how-to-improve-transit-operations-in-rural-communities/
- NACTO Transit Design: https://nacto.org/publication/transit-street-design-guide/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm112.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=202

Go Back to Table of Contents

Implement Transit-Supportive Roadway Treatments (Continued)

Implementing transit-supportive treatments can improve transit travel times and reliability. Transit-supportive treatments incorporate a mix of roadway infrastructure improvements and/or traffic signal modifications.

Other transit-supportive roadway treatments can include intersections treatments such as transit signal priority, special signal phasing, queue jump lanes and signals, bypass lanes, and curb extensions. Roadway segment treatments can include exclusive or shared transit lanes.

LDR coordinators should provide comments re: transit access could be appropriate in responses to Regional Transportation Plans, General Plans, and transit station projects. Consider appropriate treatments to minimize conflicts. Improved transit investments should be equitably distributed prioritizing areas with transit deficiencies in underserved communities.

Go Back to Table of Contents

Provide Bus Rapid Transit

Description

This measure will convert an existing bus route to a bus rapid transit (BRT) system. BRT can increase the transit mode share in a community due to improved travel times, service frequencies, and the unique components of the BRT system. This mode shift reduces VMT.

Case Studies/More Info

- Meet the Rural Region that Opted for VelociBuses Over Highway Expansion: https://usa.streetsblog.org/2013/02/14/meet-the-rural-region-that-opted-for-velocibuses-over-highway-expansion/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm120.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=206

Go Back to Table of Contents

Provide Bus Rapid Transit (Continued)

BRT includes the following additional components compared to traditional bus service: exclusive right-of-way (e.g., busways, queue jumping lanes) at congested intersections, increased limited-stop service (e.g., express service), intelligent transportation technology (e.g., transit signal priority, automatic vehicle location systems), advanced technology vehicles (e.g., articulated buses, low-floor buses), enhanced station design, efficient fare-payment smart cards or smartphone apps, branding of the system, and use of vehicle guidance systems.

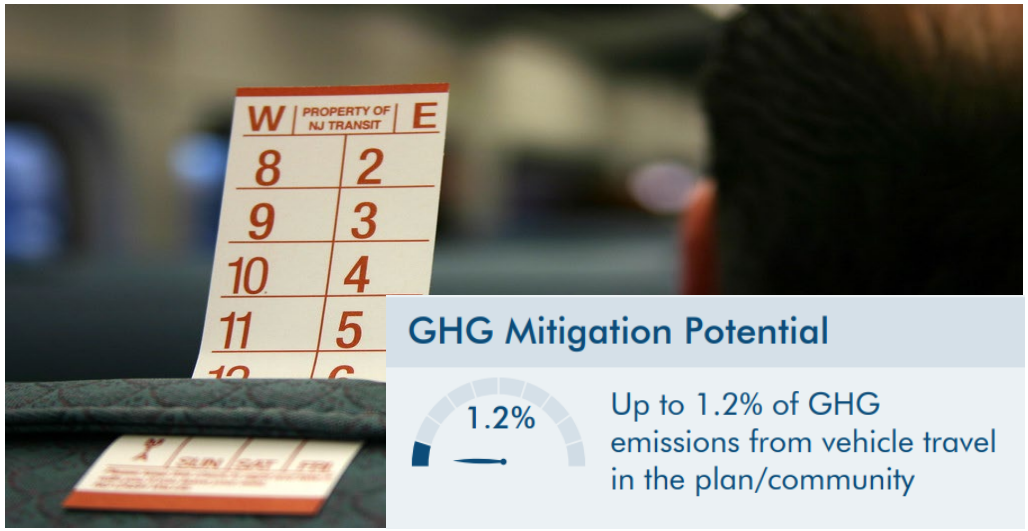
LDR coordinators can submit comments to establish BRT in responses to Regional Transportation Plans and General Plans reviews. Please work with lead agency and regional transit agencies. Transit facilities can have conflicts with cyclists. Consider appropriate BRT components to minimize conflicts. Improved transit investments should be equitably distributed, prioritizing areas with transit deficiencies in underserved communities.

Go Back to Table of Contents

Reduce Transit Fares

Description

This measure will reduce transit fares on the transit lines serving the plan/community. A reduction in transit fares creates incentives to shift travel to transit from single-occupancy vehicles and other traveling modes, which reduces VMT.



Case Studies/More Info

- Kings Area Rural Transit Fares: https://www.kartbus.org/fares/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm112.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=213

Go Back to Table of Contents

Reduce Transit Fares (Continued)

LDR coordinators can submit comments to transit discounts in responses to a General Plan or specific development project. This strategy should be implemented along with other strategies that encourage transit use to be the most effective (e.g., transit stops and bike parking). Transit fare reduction programs should first prioritize routes with higher-volume potential in underserved communities and those most reliant on transit for travel (e.g., students, persons with disabilities, and seniors).

Go Back to Table of Contents

Provide Real-Time Transit Information

Description

This measure requires projects provide real-time bus/train/ferry arrival time, travel time, alternative routings, or other transit information via electronic message signs, dedicated monitor or interactive electronic displays, websites, or mobile apps. This makes transit service more convenient and may result in a mode shift from auto to transit, which reduces VMT.

Case Studies/More Info

- AC Transit Real-time Information: https://www.actransit.org/actransit-realtime

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=68

Go Back to Table of Contents

Provide Real-Time Transit Information (Continued)

Real-time transit information systems provide transit riders with up-to-the-minute information on bus arrivals via the internet, phone, and display boards at key bus stops. The information is based on real-time bus locations using GPS rather than a set schedule of arrival and departure. Access to real-time travel information reduces actual and perceived wait times and increases the reliability of transit, which can encourage a mode shift to transit and reduce VMT.

LDR coordinators can recommend this strategy with other transit improvements to achieve the greatest increase in transit ridership.

Go Back to Table of Contents

Provide Shuttles (Gas or Electric)

Description

This measure will provide local shuttle service through coordination with the local transit operator or private contractor. The shuttles will provide service to and from commercial centers to nearby transit centers to help with first and last mile connectivity, thereby incentivizing a shift from private vehicles to transit.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- CARTS: Regional Transportation for Rural Areas of Bastrop: http://www.ridecarts.com/
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm34.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=68

Go Back to Table of Contents

Provide Shuttles (Gas or Electric) (Continued)

Shuttles can be used to transport people to and from transit stations, employment centers, and other destinations, reducing the need for individuals to drive their own vehicles.

LDR coordinators can recommend this strategy when transit is not available. Shuttles that serve only the project residents and/or employees may be seen as increasing gentrification and exclusionary. Consider allowing all people to use the shuttle, regardless of status. Note that this measure can also be implemented at the Project/Site scale by a large employer as part of a Trip Reduction Program.

Go Back to Table of Contents

Provide On-Demand Microtransit

Description

This measure will provide small-scale, on-demand public transit services that can offer fixed routes and schedules or flexible routes and on-demand scheduling (e.g., Metro Micro) through coordination with the local transit operator or private contractor. Microtransit aims to offer shorter wait times and improved reliability compared to the bus and rail system to further incentivize alternative transportation modes that are less emissions-intensive than private vehicle trips.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- APTA Microtransit: https://www.apta.com/research-technical-resources/mobility-innovation-hub/microtransit/
- Placer Microtransit: https://www.placer.ca.gov/8137/Microtransit-technology-coming-to-dial-a

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=68

Go Back to Table of Contents

Provide On-Demand Microtransit (Continued)

On-demand microtransit can reduce VMT by pooling passengers and providing a flexible and convenient alternative to single-occupancy vehicles. By eliminating the need for individuals to drive their own vehicles, they can save money by eliminating the cost of owning a vehicle and parking.

LDR coordinators can recommend this strategy where there's a lack of transit system. On-demand rides can be booked using smartphone applications or call centers. Note that this measure may also be applicable at the Project/Site scale for a large employer as part of a Trip Reduction Program.

Go Back to Table of Contents

Improve Transit Access, Safety, and Comfort

Description

This measure requires projects improve transit access and safety through sidewalk/crosswalk safety enhancements, bus shelter improvements, improved lighting, and other features. Work with the community to determine barriers to use, most desired improvements, and other access challenges.

GHG Mitigation Potential

Not Available

Case Studies/More Info

- Modesto Downtown Transit Center Improvements Project: https://www.modestoareaexpress.com/338/Downtown-Transit-Center-Improvements-Pro
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm47.htm
- NACTO Transit: https://nacto.org/publication/transit-street-design-guide/station-stop-elements/

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=69

Go Back to Table of Contents

Improve Transit Access, Safety, and Comfort (Continued)

Improving transit access, safety, and comfort can reduce VMT by making transit a more attractive option travelers.

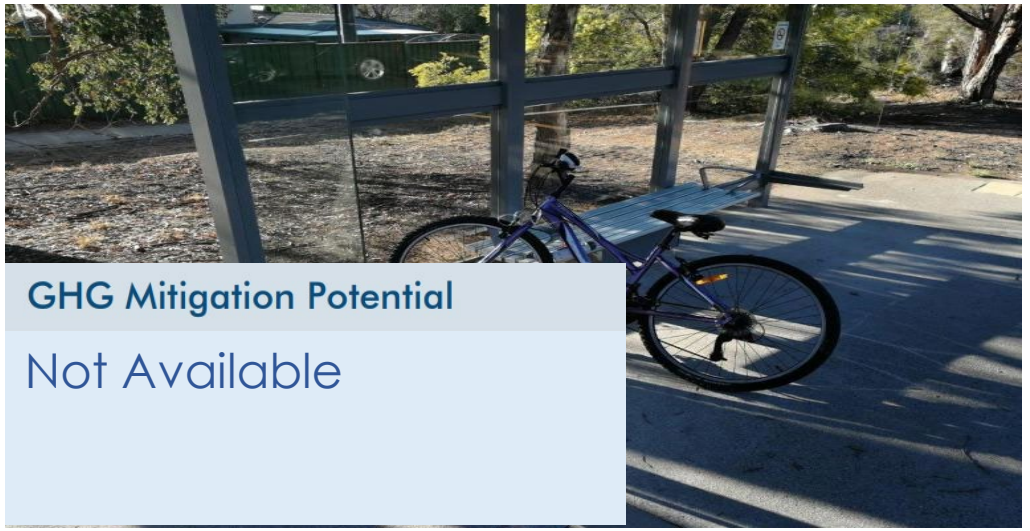
LDR coordinators should recommend this strategy along with other transit, pedestrian, and bike facility improvements.

Go Back to Table of Contents

Provide Bike Parking Near Transit

Description

This measure requires the project to provide short-term and long-term bike parking near rail stations, transit stops, and freeway access points where there are commuter or rapid bus lines. Include locations for shared micromobility devices as well as higher-security parking for personal bikes.



GHG Mitigation Potential

Not Available

Case Studies/More Info

- bike and Transit Integration: A PRACTICAL TRANSIT AGENCY GUIDE TO bike INTEGRATION AND EQUITABLE MOBILITY: https://www.apta.com/wp-content/uploads/Standards_Documents/APTA-SUDS-UD-RP-009-18.pdf
- VTPI TDM Encyclopedia: https://www.vtpi.org/tdm/tdm2.htm

References

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reduction: https://www.caleemod.com/documents/handbook/full_handbook.pdf#page=69

Go Back to Table of Contents

Provide Bike Parking Near Transit (Continued)

Providing bike parking near transit can reduce VMT by making it easier for people to combine biking and transit for their trips. When people can easily and securely park their bikes at transit stations, they are more likely to choose to bike to transit instead of drive. LDR coordinators should recommend this strategy with other transit improvement strategies.

Go Back to Table of Contents

Appendix

TDM Strategies from Other Resources

Caltrans Complete Streets Toolbox

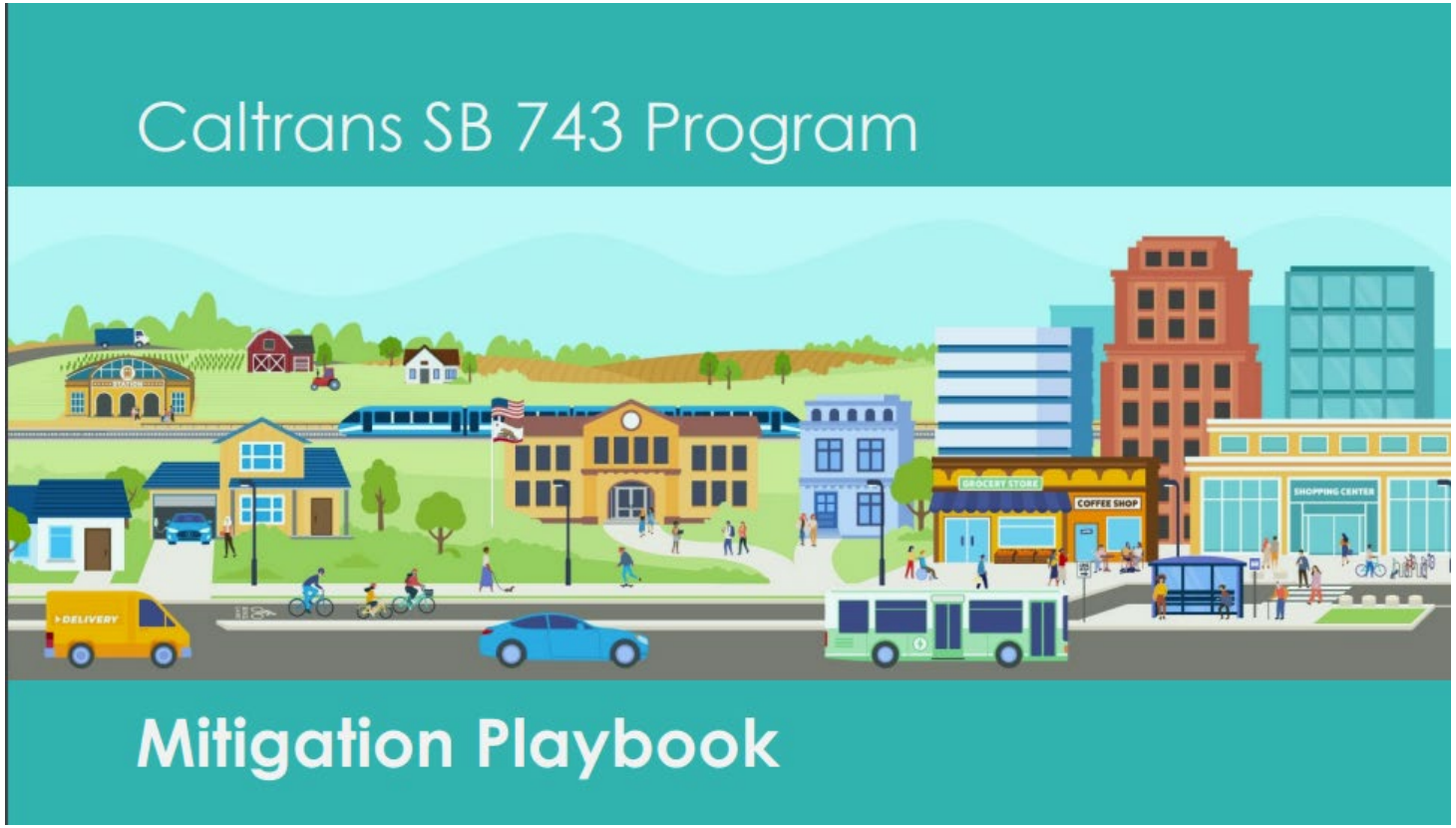
The Toolbox is developed in coordination with a diverse group of stakeholders within Caltrans. The Toolbox translates complex statewide policies into concepts and practices for project delivery purposes aimed at more effective Complete Streets implementation.

Smart Mobility Framework Implementation Guide

The Smart Mobility Framework (SMF) Implementation Guide and Mapping Application provides step by step and clear direction on how to implement place-based Smart Mobility strategies. This guide is a step beyond the SMF Guide 2020 with more specific place-based strategies and decision-making processes. This Guide complements other Caltrans manuals and toolboxes and provides the overarching structure and framework necessary to coordinate the work of multiple programs supporting the Smart Mobility principles within the Department.

Caltrans SB 743 Implementation Playbook

This guide, developed by the Caltrans SB 743 Program, describes various quantifiable mitigation methods for VMT induced by highway capacity projects.

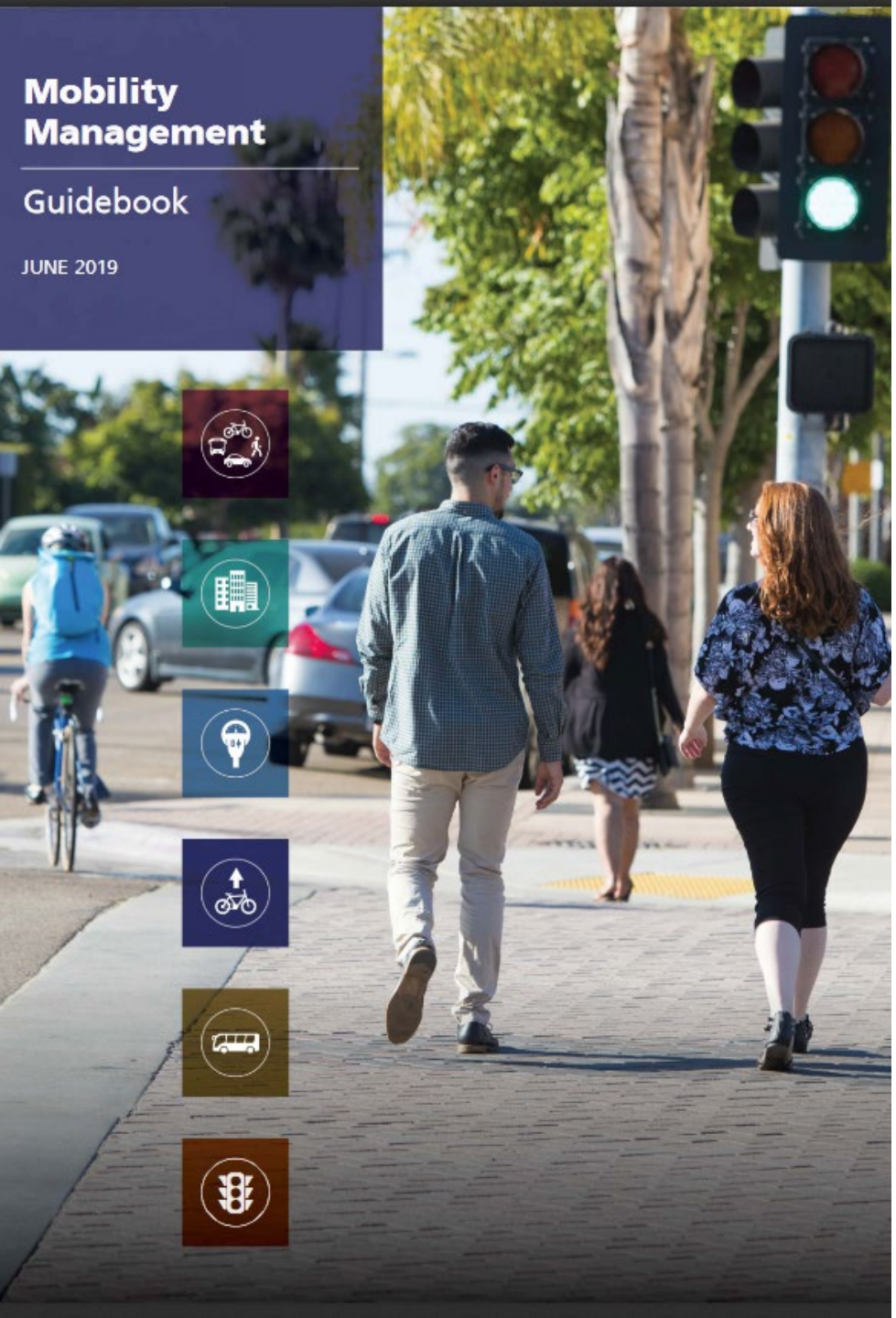


City of San Francisco's TDM Strategies

The Program is designed to work with developers to provide more on-site amenities that will encourage smarter travel options so people can get around more easily without a car. These choices are better for the environment, help reduce the amount of congestion that new projects contribute to, help to reduce risks to pedestrians and cyclists, and improve the overall efficiency of our transportation network.

The intent is to "shift" more typical car dependent travel practices by providing a series of development-focused TDM measures.

The TDM measures are grouped into eight categories: Active Transportation, Car-Share, Delivery, Family, High Occupancy Vehicles, Information & Communications, Land Use, and Parking Management.



SANDAG's TDM Handbook

Description

- SANDAG has developed the Mobility Management Toolbox (Toolbox). The Toolbox will help local jurisdictions and developers evaluate and implement mobility management strategies at the project and community level. The Toolbox is intended to serve as a key resource as jurisdictions implement SB 743 and to support CAP implementation and monitoring.
- The Toolbox in its entirety consists of the following resources: Mobility Management Guidebook; VMT Reduction Calculator Tool; Calculator Design Document; Recommendations for Application; User Training Videos

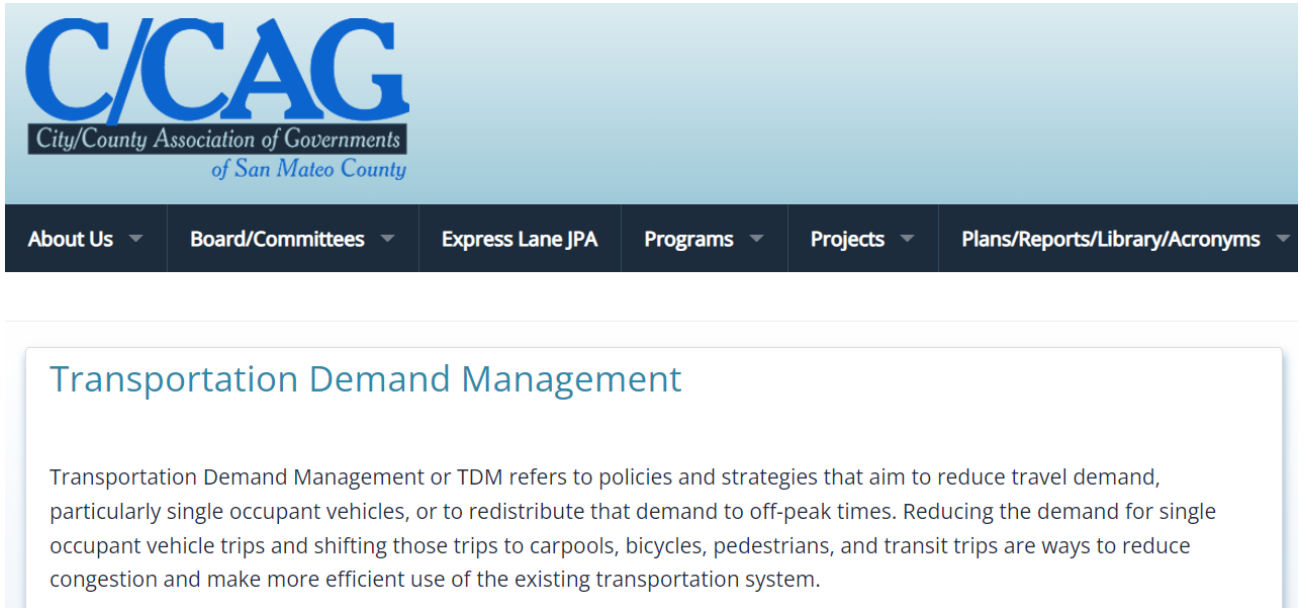
SACOG Innovative Mobility Program

The Innovative Mobility Program designs and launches projects and programs that increase transportation options and reduce vehicle miles traveled (VMT) to make options like biking, walking, and taking transit the easy choice for all types of trips. The program builds cutting-edge programming that utilizes existing infrastructure, leverages disruption and new technology, and adapts to rapidly changing markets and social environments. Work typically takes the form of grant opportunities for member jurisdictions and participatory programs.

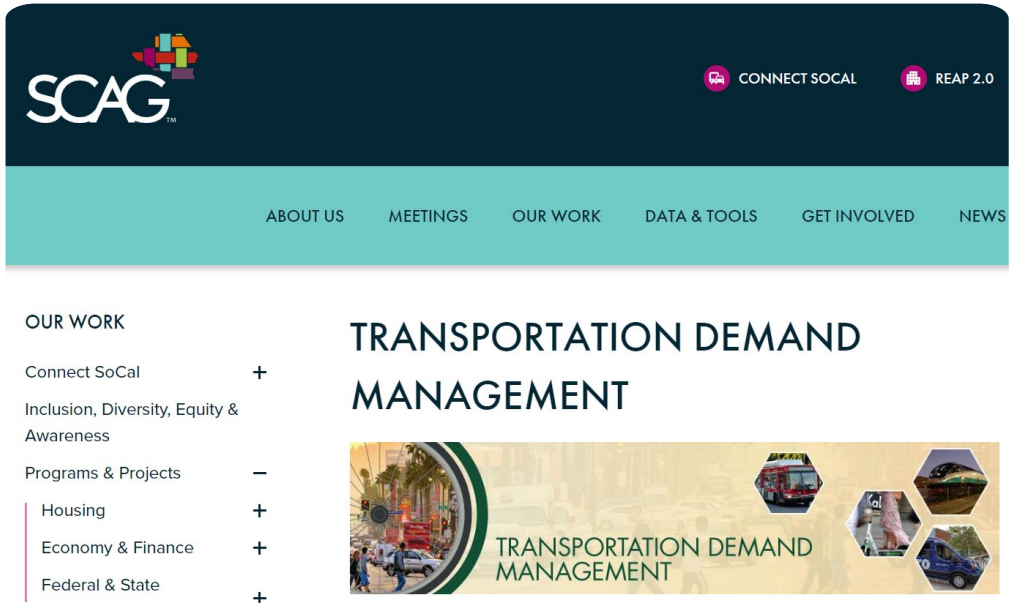
San Mateo C/CAG

In 2000, C/CAG adopted a policy that provided guidelines for analyzing the impacts of land use decisions made by local jurisdictions. This policy is implemented during the environmental review process and applies to developments that generate 100+ peak-hour trips on the Congestion Management Program (CMP) roadway network.

The policy requires that the TDM plan include strategies that have the capacity to fully reduce the demand for new peak-hour trips; thus, the guidelines also provides a menu of TDM measures and corresponding trip reduction credits.



SCAG TDM

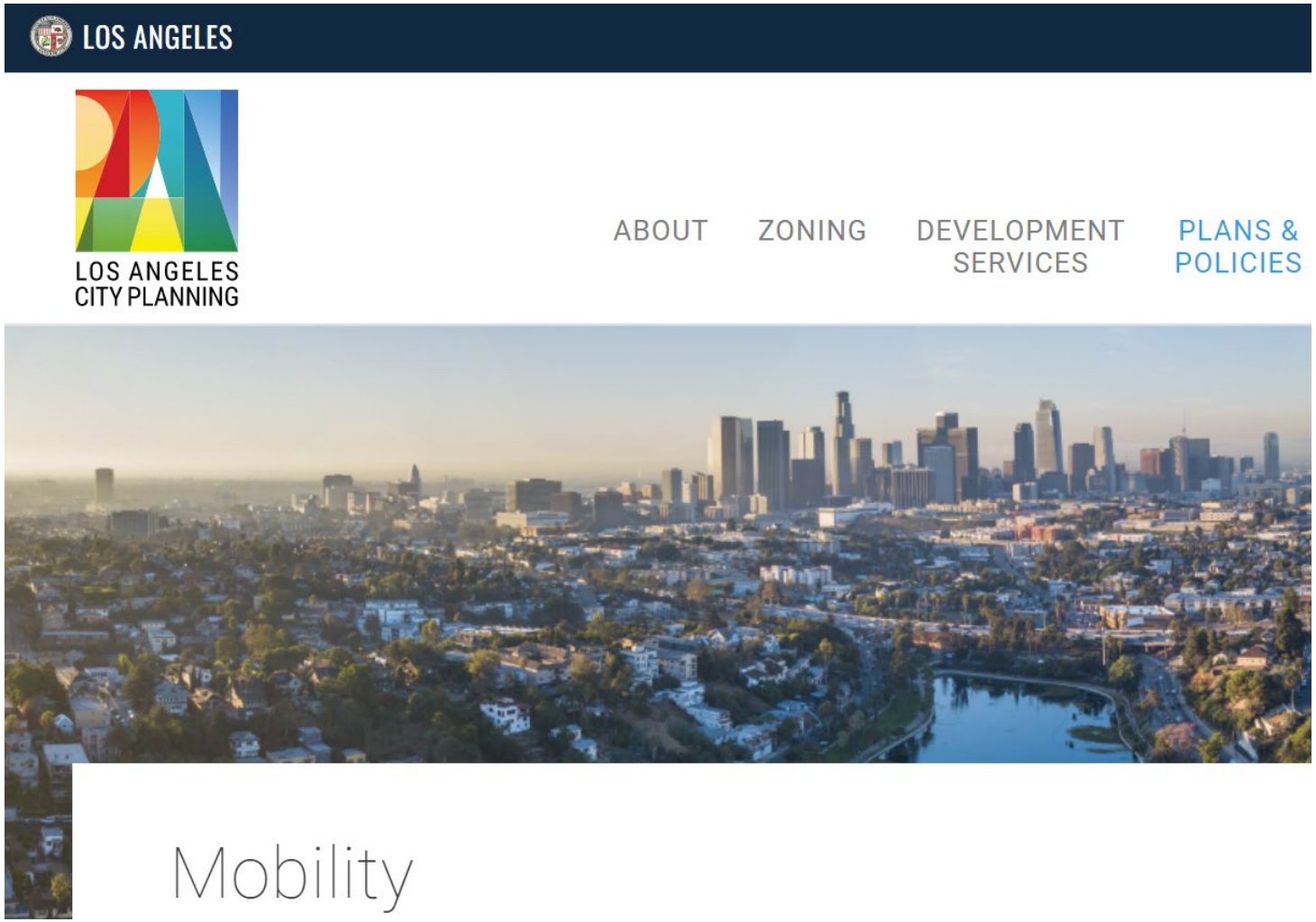


SCAG has set out to deliver a long-range Transportation Demand Management (TDM) Strategic Plan for the Region that provides an objective-driven, performance-based planning framework for identifying TDM strategies and programs that increase the efficiency of the transportation system through alternative modes of travel.

LA TDM Program

Los Angeles City Planning and Los Angeles Department of Transportation are working to update the City's Transportation Demand Management (TDM) Program to meet transportation demand in a sustainable way. The proposed update would require certain new development projects to implement strategies such as supporting transit, telecommuting, walking, carshare, neighborhood shuttles, and other strategies that reduce vehicle trips.

Today, more mobility options are available than ever before through an expanding transit system and new services, such as bike share, car share, on-demand transit, real time information, and smart technologies. An update to the City's original TDM ordinance from 1993 complements the efforts to implement the Mobility Plan 2035 and provide access for all Angelenos, clean environments, and healthy communities. With the goal of reducing drive-alone trips and Vehicle Miles Traveled (VMT), updating the TDM Program is part of a larger State-mandated effort to improve air quality and reduce greenhouse gas emissions by promoting more sustainable transportation options.



Calstate TDM Manual

The California State University (CSU) system is comprised of 23 campuses located throughout the state in settings ranging from urban to rural. As the type of locale and number of students vary by campus, the transportation needs at one campus may be very different from another campus. As such, this Transportation Demand Management (TDM) manual seeks to address the unique transportation needs of different campuses and provide a system-wide framework for implementing sustainable transportation programs. This manual contains a set of goals, criteria, and best practices to guide the provision of programs, tools, and strategies that encourage students, faculty and staff to commute to and from campus via bus/rail transit, carpools, vanpools, bicycling and walking to lessen reliance upon single-occupant vehicle (SOV) travel and reduce vehicle trips to campuses. A wide range of measures are discussed in order to reflect the unique needs of different locations and campus environments and touch on several subjects including parking, transit services, on-campus land uses, and programs such as carpooling and vanpooling.

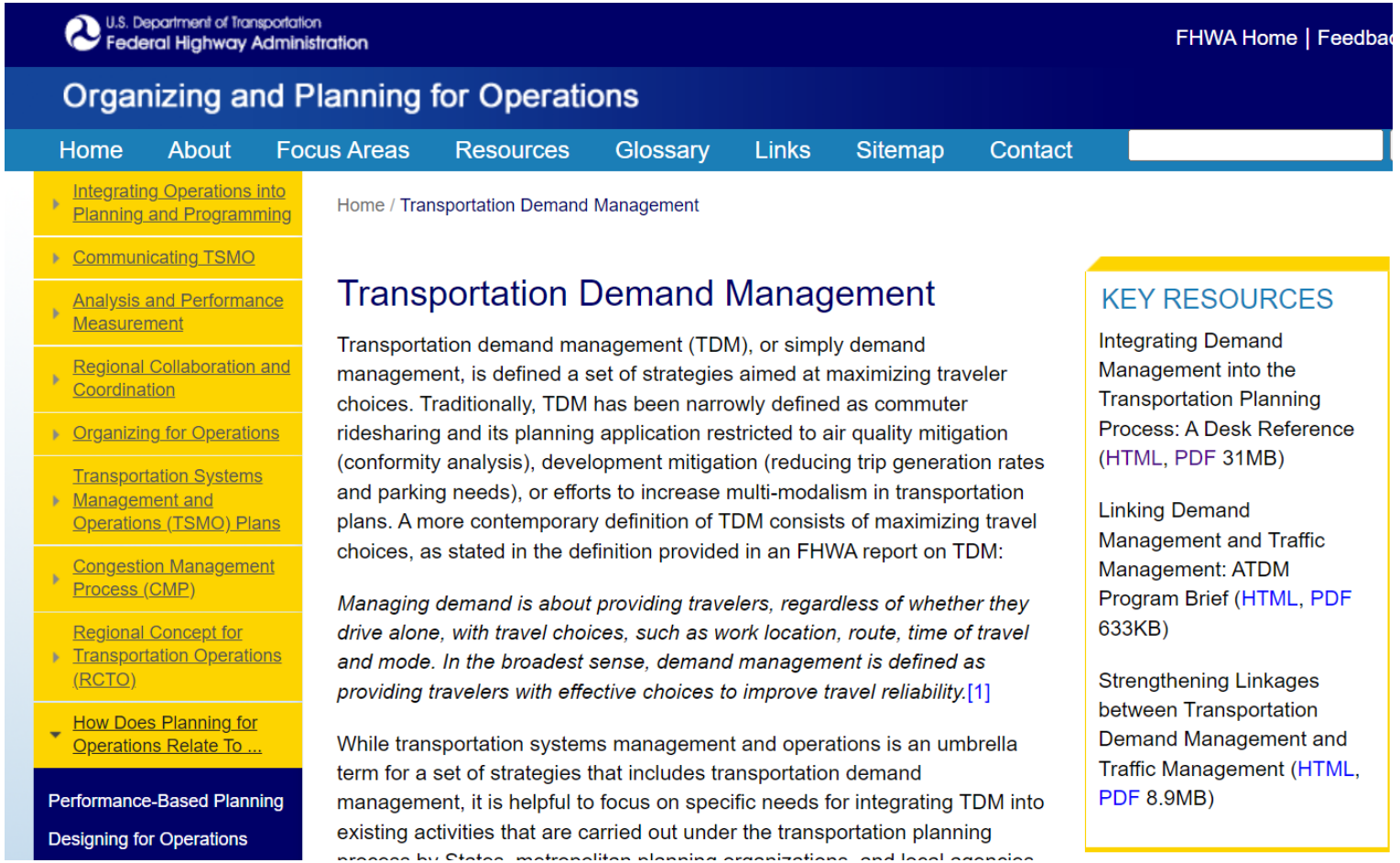
California State University

TRANSPORTATION DEMAND MANAGEMENT MANUAL

Final Report

FHWA TDM Toolbox

FHWA TDM Manual



TRB TDM

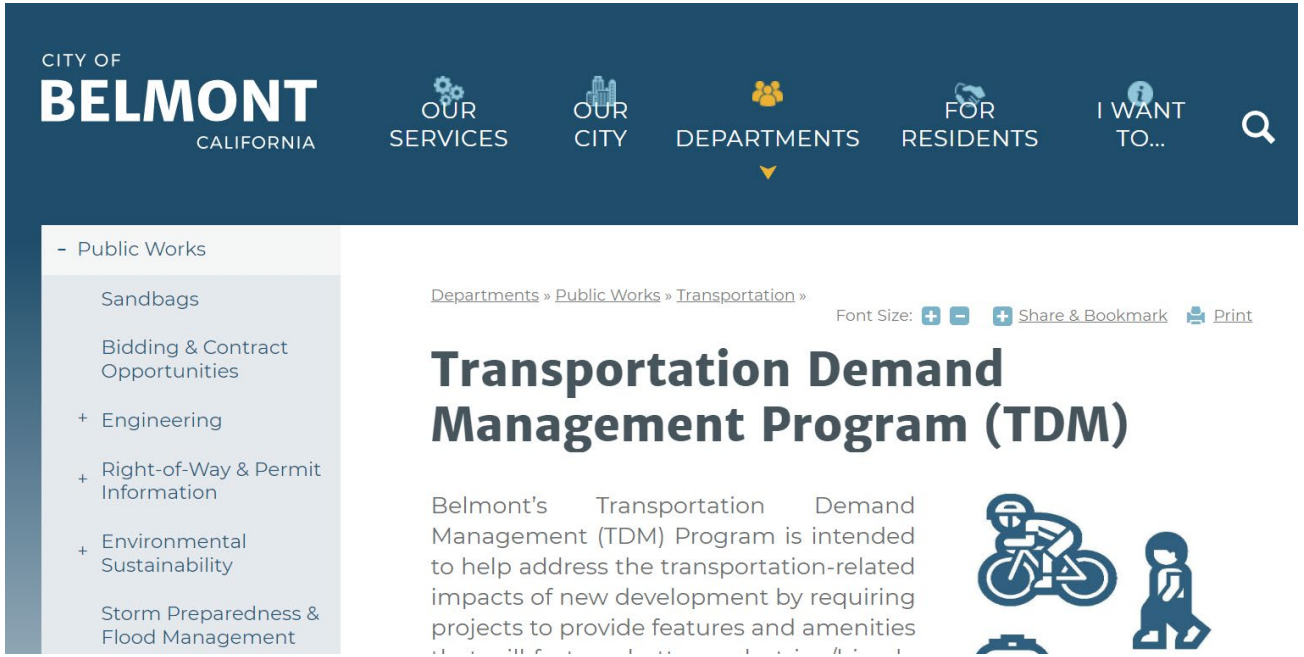
Transportation Demand Management (TDM)

Transportation Research Board Standing Committee (AEP60)

Home Events Research Committee Documents Current Members About Get Involved

City of Belmont TDM Program

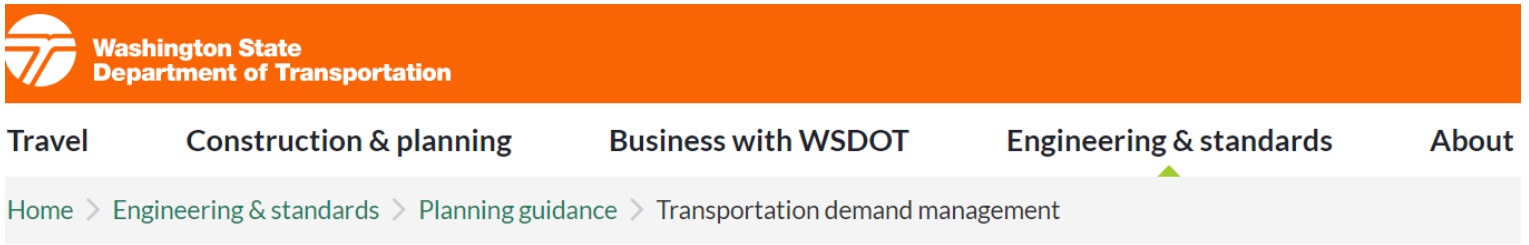
Belmont's Transportation Demand Management (TDM) Program is intended to help address the transportation-related impacts of new development by requiring projects to provide features and amenities that will foster a better pedestrian/bike environment, support transit, and make it easier and more appealing for residents, employees, and visitors to use alternatives to driving or driving alone.



San Joaquin COG TDM Action Plan

The San Joaquin Council of Governments (SJCOG) along with the Sacramento Area Council of Governments (SACOG) has been awarded a Partnership Planning Grant through the California Department of Transportation to develop a Transportation Demand Management (TDM) Interregional Action Plan. The grant will focus on the work-based commute between the San Joaquin and the Sacramento regions along the SR 99 and I-5 corridors examining barriers relating to carpooling, vanpooling, transit, biking and walking. The study will develop a uniform vision and a set of TDM strategies that may include information and education, incentives, physical changes, technology, and pricing. The result will be an Interregional TDM Action Plan that will be coordinated and implemented between the two regions to improve transportation system operations. The goal is to make transportation options convenient, accessible and safe for commuters.

Washington DOT TDM



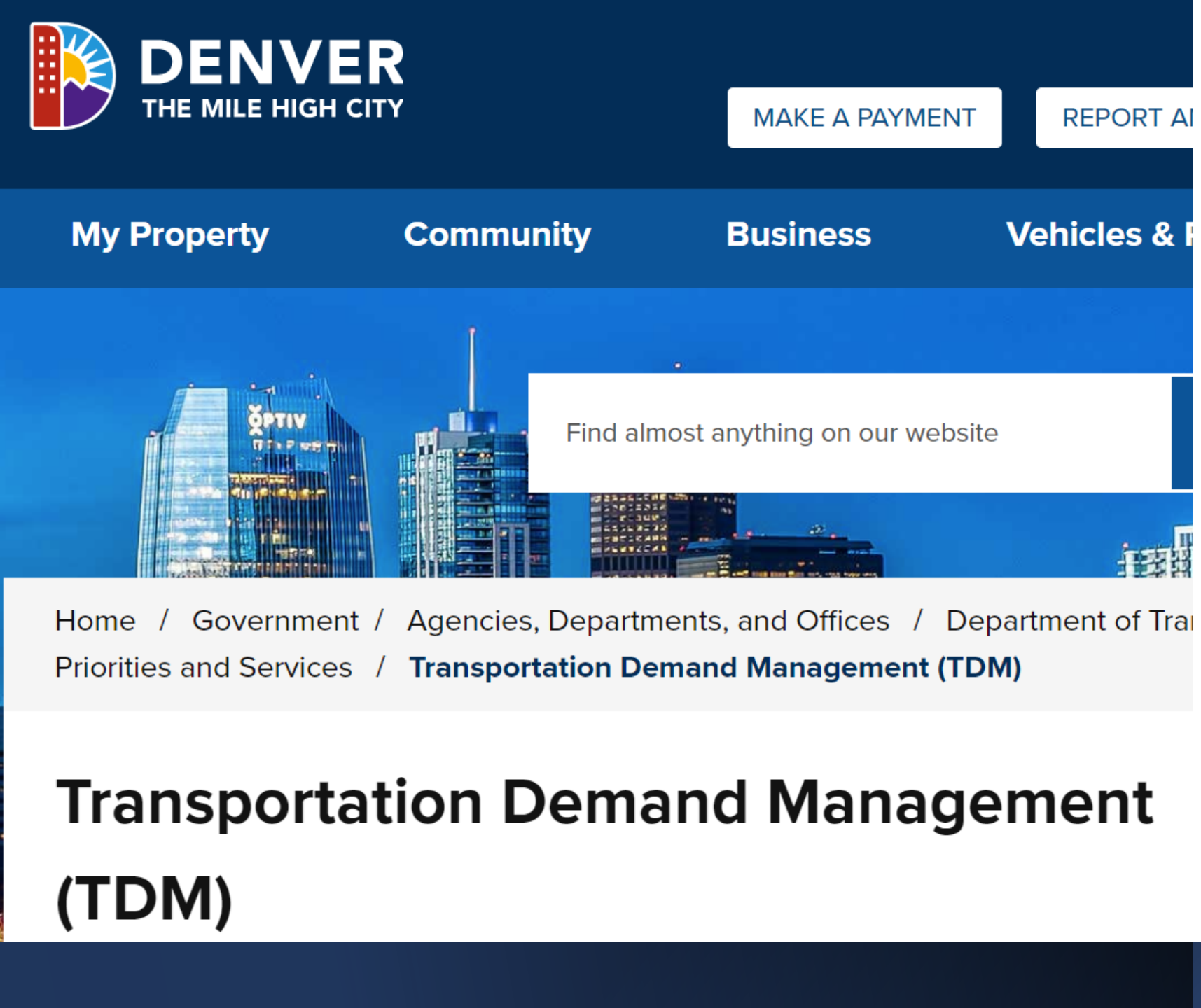
Transportation demand management

Find information about transportation demand management, and learn about how to incorporate it into your projects and programs.

Transportation demand management (TDM) describes programs and projects that aim to provide more competitive transportation options to driving alone, reduce trips and improve traffic congestion without building more roads.

These projects use techniques like education, rewards and disincentives to:

- Reduce the need for vehicle trips.
- Reduce the distance of trips (e.g. shop close to home, home delivery).
- Shift to more efficient transportation modes, like transit and other forms of ridesharing.



Denver TDM Program

Denver's Departments of Transportation & Infrastructure (DOTI) and Community Planning and Development (CPD) have adopted new rules that make developers partners in furthering Denver's mobility goals by providing residents and employees with choices in how they move about the city. The regulations require new developments to implement measures known as Transportation Demand Management (TDM) strategies that expand people's travel options and create attractive alternatives to driving.

Portland TDM

Home / Transportation / Transportation Planning

Transportation Demand Management Plan Commercial/Mixed Use Zones

Information

TDM requirements for Residential Use development:

Under Title 33, a development in a commercial/ mixed use or multi-dwelling zones that includes a building with more than 10 new dwelling units and is close to transit is required to have a Transportation Demand Management (TDM) Plan approved prior to the issuance of a building permit.

COLORADO
Department of Transportation

How to Create a TDM Plan

This guidance document will:

- Provide an overview of Transportation Demand Management (TDM) plans and why they are important,
- Suggest questions to help your team conduct an initial brainstorm about the future of how people move around the space, and
- Walk through a step-by-step process of how to determine which TDM strategies will be most effective for your project and how to organize these into a TDM Plan.

What is Transportation Demand Management?

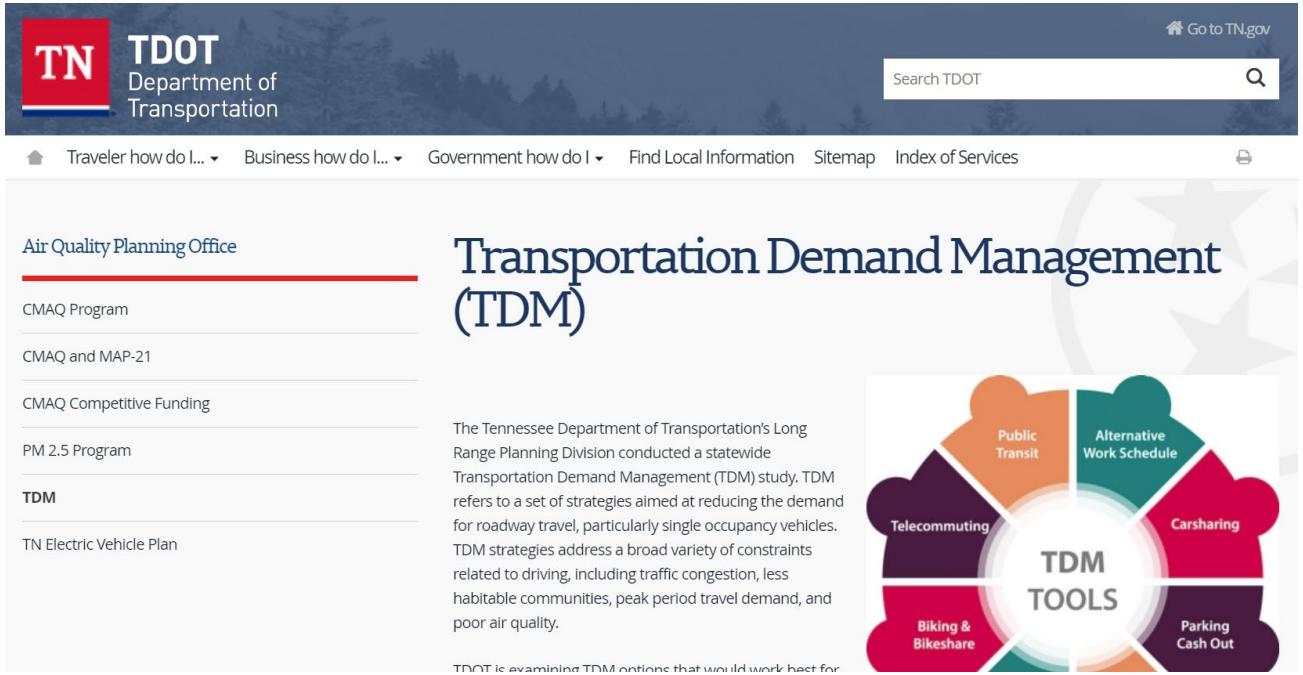
Transportation Demand Management (TDM) is the application of strategies and policies to reduce motor vehicle travel demand or to redistribute this demand in space or in time.

Initial

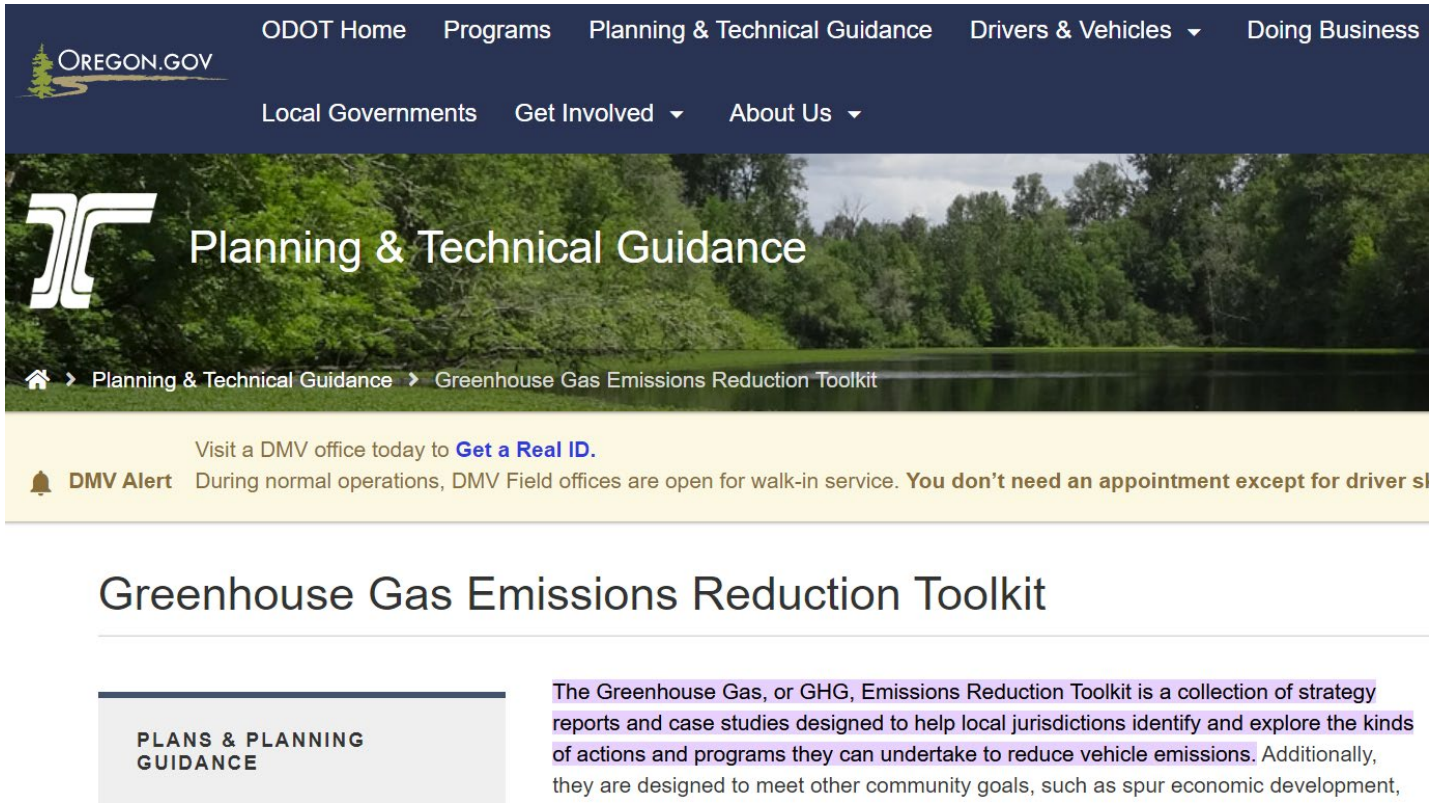
Colorado DOT TDM Plan

Tennessee DOT TDM

The Tennessee Department of Transportation's Long Range Planning Division conducted a statewide Transportation Demand Management (TDM) study. TDM refers to a set of strategies aimed at reducing the demand for roadway travel, particularly single occupancy vehicles. TDM strategies address a broad variety of constraints related to driving, including traffic congestion, less habitable communities, peak period travel demand, and poor air quality.

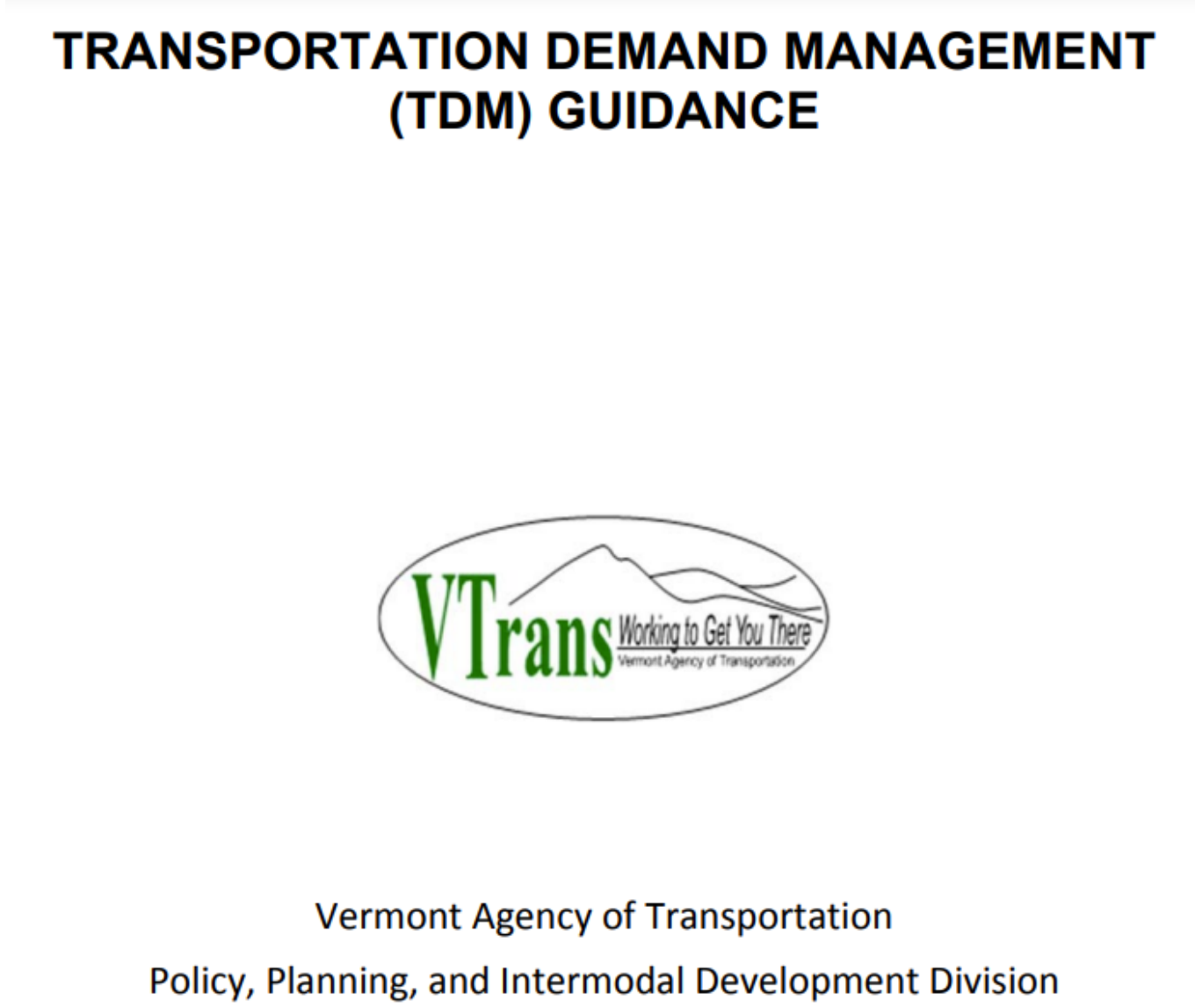


Oregon DOT Greenhouse Gas Emissions Reduction Toolkit

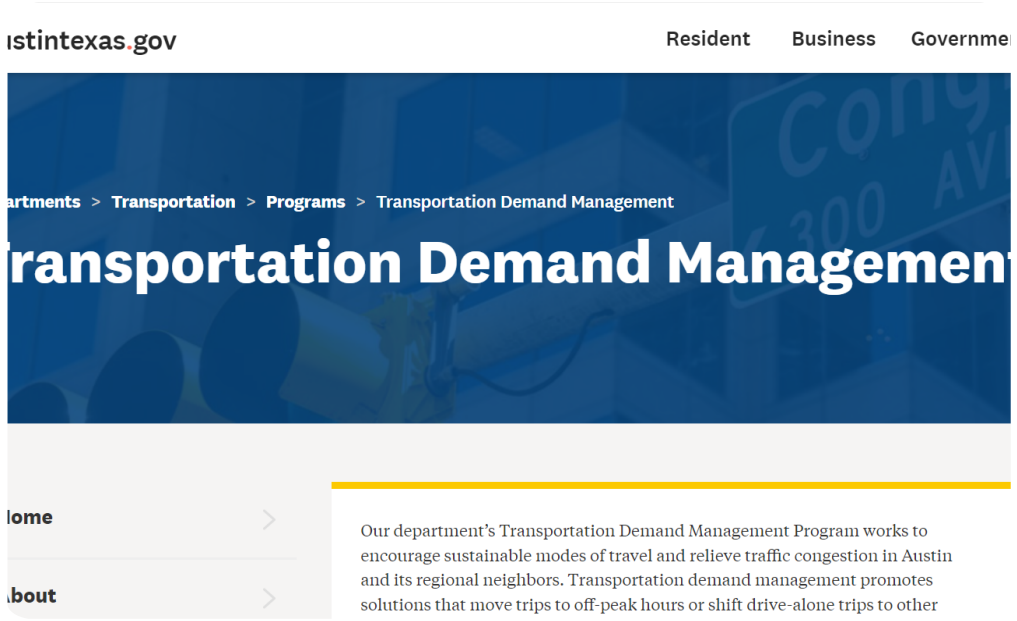


Vermont Agency of Transportation TDM Guide

The purpose of this Transportation Demand Management (TDM) Guidance document is to provide guidance on how to estimate vehicle trip reductions from TDM measures implemented for new developments. These estimates may inform adjustments to any impact or mitigation fee paid under Act 250 and/or Act 145 proportional to traffic generated by the site.



City of Austin TDM

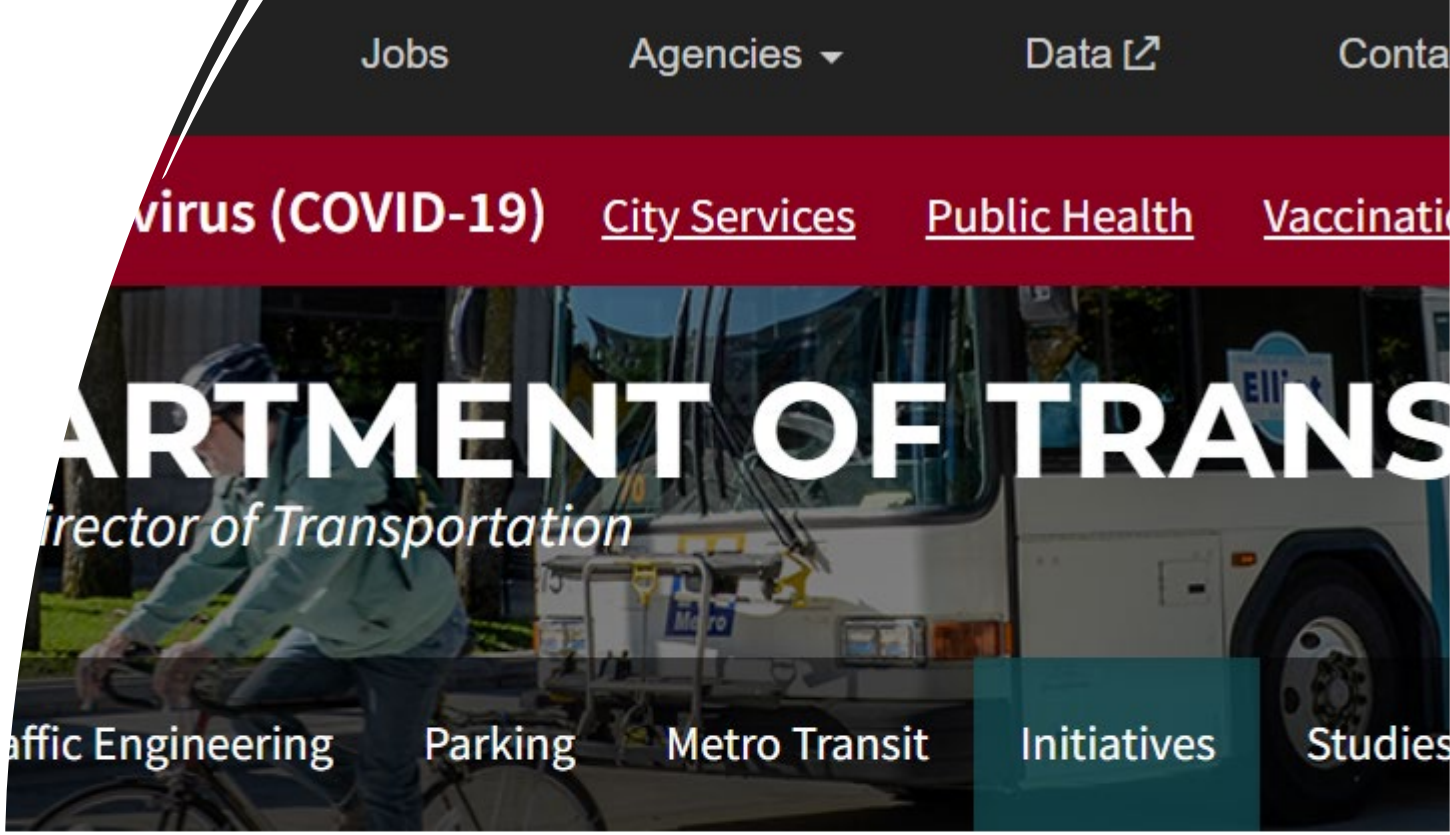


Our department's Transportation Demand Management Program works to encourage sustainable modes of travel and relieve traffic congestion in Austin and its regional neighbors. Transportation demand management promotes solutions that move trips to off-peak hours or shift drive-alone trips to other forms such as public transit, walking, biking, teleworking, carpooling, and vanpooling.

City of Madison TDM

The City of Madison is working to make this imagined community a reality through our new and improved Transportation Demand Management (TDM) policy.

TDM is supported in the Imagine Madison Comprehensive Plan and the Madison Sustainability Plan. TDM is defined in the Madison General Ordinances as measures including "carpooling, vanpooling, public transit, bicycling, walking, telecommuting, and work schedules that reduce individual vehicle trips and promote alternatives to single occupant vehicle use especially at peak commuting times."

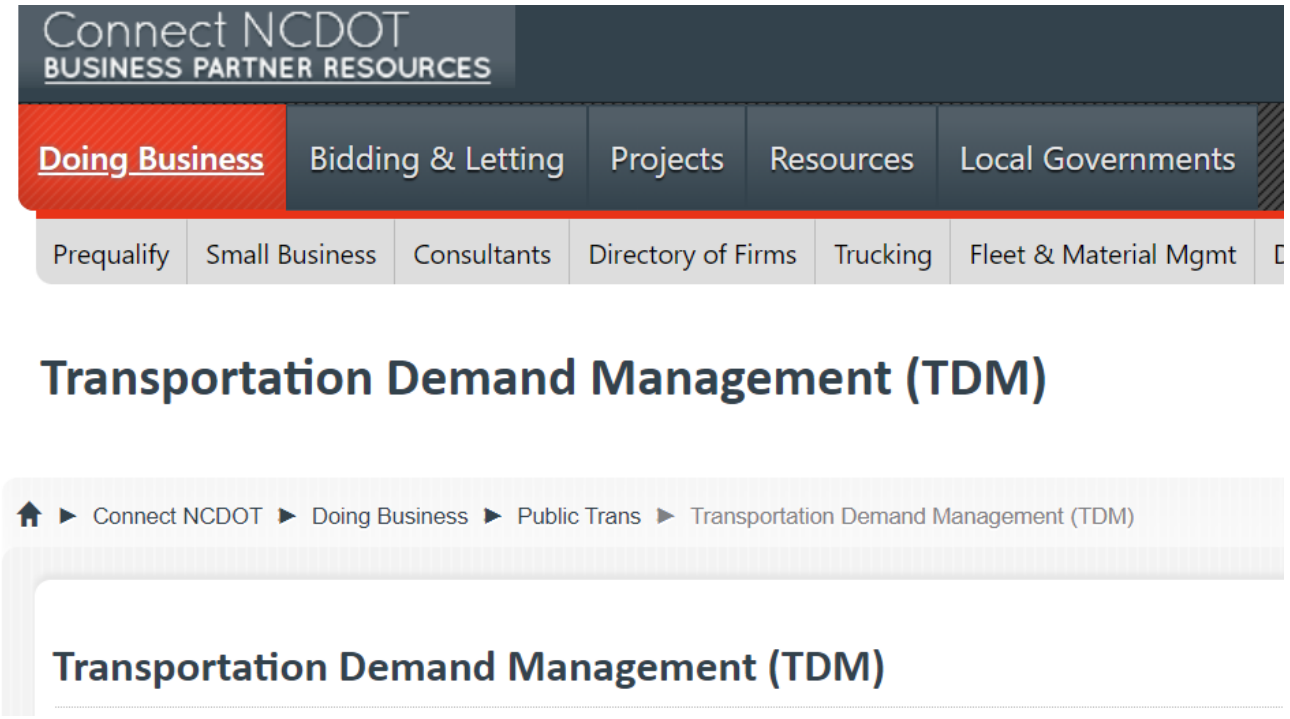


itiatives / Transportation Demand Management

Demand Management

North Carolina DOT TDM

The NCDOT Integrated Mobility Division (IMD) funds TDM programs to continue supporting the provisions of the Ambient Air Quality Improvement Act of 1999, Senate Bill 953, which addressed concerns over ground level ozone pollution from motor vehicles and the need to deal with increasing vehicle miles traveled (VMT) and NOx emissions. The bill established a goal of reducing the growth of commuter VMT in the state by 25 percent from 2000 until 2009 and that goal was achieved. Continuing strides have been made in the years following this achievement.



GVF We Are TDM

WEARETDM.COM
Transportation Demand Management

ABOUT | TDM PROJECTS | COMMUTE OPTIONS | NATIONAL TDM WEEK | NATIONAL BIKE MONTH

GVF works to integrate TDM into local and regional transportation projects to enhance mobility and improve infrastructure throughout the Greater Philadelphia area.

Lower Merion Township TDM Policy

Learn More

Fort Washington Office Park Transportation Demand Management Plan

Learn More

More TDM Links

- SF TDM measures: https://default.sfplanning.org/transportation/tdm/TDM_Measures.pdf
- SANDAG TDM handbook: https://www.icommutesd.com/docs/default-source/planning/mobility-management-guidebook_final_7-17-19.pdf?sfvrsn=2
- City of Pasadena TDM: https://www.cityofpasadena.net/transportation/community-mobility/transportation-demand-management/
- SACOG TDM: https://www.sacog.org/innovative-mobility-program-0
- San Mateo TDM: https://ccag.ca.gov/programs/transportation-programs/transportation-demand-management/
- SCAG TDM: https://scag.ca.gov/transportation-demand-management
- LA TDM: https://planning.lacity.org/plans-policies/initiatives-policies/mobility
- San Jose: https://www.movesanjose.org/transportation-demand-management-tdm-and-congestion-management-fees/
- Cal state university: https://www.calstate.edu/csu-system/doing-business-with-the-csu/capital-planning-design-construction/Documents/CSU%20Systemwide%20TDM%20Manual.pdf
- Hayward TDM: https://www.hayward2040generalplan.com/goal/M8

More TDM Links

- Alameda CTC: https://www.alamedactc.org/transportation-demand-management-strategy
- City of Oakland: https://www.oaklandca.gov/topics/park-oakland
- FHWA TDM: https://ops.fhwa.dot.gov/tdm/ref_material.htm
- TRB TDM: https://aep60trb.wixsite.com/aep60
- US DOT TDM: https://ops.fhwa.dot.gov/plan4ops/trans_demand.htm
- Smart growth America: https://smartgrowthamerica.org/resources/transportation-demand-management-in-southeast-michigan/
- FHWA: https://ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf
- Belmont TDM: https://www.belmont.gov/departments/public-works/transportation/tdm-transportation-demand-management-program
- SJCOG TDM: https://www.sjcog.org/219/Interregional-TDM-Action-Plan
- Washington DOT: https://wsdot.wa.gov/engineering-standards/planning-guidance/transportation-demand-management

More TDM Links

- Denver TDM: https://denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Department-of-Transportation-and-Infrastructure/Programs-Services/Transportation-Demand-Management
- Portland TDM: https://www.portland.gov/transportation/planning/transportation-demand-management-plans-commercial-mixed-use-zones
- Colorado TDM: https://www.codot.gov/programs/innovativemobility/assets/cdot-how-to-create-a-tdm-plan.pdf
- City of Norwalk: https://portal.ct.gov/-/media/DOT/documents/dpolicy/NorwalkTranspMgmtPlanDOT01020336/NorwalkTMPChapter22TransportationDemandManagementpdf.pdf
- TDOT TDM: https://www.tn.gov/tdot/long-range-planning-home/air-quality-planning/transportation-demand-management-tdm.html
- Oregon TDM: https://www.oregon.gov/odot/Planning/Documents/SR-Transportation-Demand-Management.pdf
- District Columbia TDM: https://ddot.dc.gov/sites/default/files/dc/sites/ddot/publication/attachments/tdm-final-report.pdf

More TDM Links

- Vermont TDM: https://vtrans.vermont.gov/sites/aot/files/planning/documents/trafficresearch/VTrans%20TDM%20Guidance%20Feb%202017.pdf
- Austin TDM: https://www.austintexas.gov/sites/default/files/files/Auditor/Audit_Reports/Special_Request_Transportation_Demand_Management_September_2022.pdf
- North Front Range: https://nfrmpo.org/tdm/
- NJTPA: https://www.njtpa.org/NJTPA/media/Documents/Planning/Plans-Guidance/Planning%20for%202050/draft%20final/G-TDM-Mobility-Plan.pdf
- City of Bloomington: https://bloomington.in.gov/transportation/tdm
- RVMPO: https://rvmpo.org/images/plans-and-programs/RTP/updated-March-2013/RVMPO_TDM_Guide_2012.pdf
- City of Madison: https://www.cityofmadison.com/transportation/initiatives/transportation-demand-management
- Triangle TDM: https://www.tjcog.org/sites/default/files/uploads/TDM/draft_updated_tdm_plan.pdf

More TDM Links

- iCommute TDM: https://www.icommutesd.com/documents/TDMStudy_May2012_webversion_000.pdf
- MAPC: http://www.mapc.org/wp-content/uploads/2017/10/TDM-FINAL-REPORT-7_15_0.pdf
- HRTPO TDM: https://www.hrtpo.org/page/transportation-demand-management/
- SPC TDM: https://www.spcregion.org/wp-content/uploads/2020/03/SPC_TDM_Strategic_Action_Plan_FINAL.pdf
- Honolulu TDM: https://www.honolulu.gov/completestreets/tdm.html
- City of Santa Monica: https://www.santamonica.gov/process-explainers/how-to-submit-a-developer-tdm-plan
- North Carolina: https://connect.ncdot.gov/business/Transit/Pages/TDM.aspx
- Grand Valley metro TDM: https://www.gvmc.org/tdm
- RVARC TDM: https://rvarc.org/wp-content/uploads/2016/10/TDM-Six-Year-Plan_Finalv2.pdf

More TDM Links

- City of Bellevue: https://bellevuewa.gov/city-government/departments/transportation/planning/transit-commuting/transportation-demand-management
- Alameda CTC: https://www.alamedactc.org/wp-content/uploads/2018/12/ALAMEDA-TDM-Strategy_final.pdf
- OHSU TDM: https://www.ohsu.edu/sites/default/files/2019-07/OHSU_TDM_Plan_web.pdf
- Arlington TDM: https://www.arlingtonva.us/Government/Projects/Plans-Studies/Transportation-Plans-Studies/Transportation-Demand-Management-Strategic-Plan
- Tufts university TDM: https://sustainability.tufts.edu/wp-content/uploads/TDM-Report-April-2015.pdf
- University of Montana TDM: https://www.umt.edu/sustainability/about/UMM-PTDM-Plan_Draft3.pdf
- City of Portland TDM: https://www.portlandmaine.gov/721/TDM-Parking

More TDM Links

- MTCB TDM: https://mtcb.colorado.gov/sites/mtcb/files/Draft%20MtCB%20TDM%20Strategy_August%202022_0.pdf
- Delaware TDM: https://www.connect-beyond.com/docs/CONNECT_Beyond_Transportation_Demand_Management_Strategies_Final.pdf
- MAPC TDM: https://content.civicplus.com/api/assets/a5eaed49-f453-4bc1-91ef-d82cdf608351
- Tempe TDM: https://www.tempe.gov/government/engineering-and-transportation/transportation/transportation-demand-management
- City of Lauderdale: https://www.fortlauderdale.gov/home/showpublisheddocument/58436/637535025186200000
- University of Illinois: https://fs.illinois.edu/services/more-services/tdm
- Nelson & Nyggard: https://nelsonnygaard.com/five-steps-toward-equitable-inclusive-tdm/
- CCRPVT TDM: https://www.ccrpcvt.org/our-work/transportation/transportation-demand-management-park-ride/

More TDM Links

- Georgia Tech TDM: https://space.gatech.edu/sites/default/files/images/Parking_and_Transportation_Demand_Management_Immediacy_Plan_Report.pdf
- BGMPO TDM: https://bgmpo.org/Portals/0/BGMPO/Documents/Plans/BGMPO%20TDM%20Program%20-%20Final.pdf?ver=XXwMrTbGNtKxnHaKd-NJWA%3D%3D
- Party city TDM: https://www.parkcity.org/home/showdocument?id=41938
- UK TDM: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/972414/DfT-Travel-Demand-Management-Toolkit-March-2021-accessible.pdf
- Lououn County: https://www.loudoun.gov/DocumentCenter/View/86272/Loudoun-Transportation-Demand-Management-Plan?bidId=
- NCTCOG TDM: https://www.nctcog.org/trans/manage/tdm

More TDM Links

- UNC TDM: https://move.unc.edu/about/publications/transportation-management-plan/
- Carlsbad TDM: https://www.carlsbadca.gov/home/showpublisheddocument/310/637425981338370000
- City of Monterey TDM: https://monterey.org/city_hall/public_works/engineering/traffic_engineering/transportation_planning/transportation_demand_management.php#outer-175
- San Mateo County TDM: https://www.smcta.com/projects-programs/transportation-demand-management
- GVF TDM: https://www.wearetdm.com/
- City of Boston TDM: https://www.boston.gov/departments/transportation/transportation-demand-management-tdm-point-system

Acronyms

Acronym	Meaning
CAPCOA	California Air Pollution Control Officers Association
CEQA	California Environmental Quality Act
CTP	California Transportation Plan
GHG	Greenhouse Gas Emission
LDR	Local Development Review
LOS	Level of Service
OPR	Governor's Office of Planning and Research
RTP	Regional Transportation Plan
TDM	Transportation Demand Management
TOD	Transit Oriented Development
VMT	Vehicle Miles Traveled
VTPI	Victoria Transport Policy Institute