VMT THRESHOLDS AND IMPLEMENTATION GUIDELINES

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LSA

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Prepared for:

City of Lemoore
711 W. Cinnamon Drive
Lemoore, California 93245

Prepared by:

LSA Associates, Inc.
1500 Iowa Avenue, Suite 200
Riverside, California 92507
(951) 781-9310

Project No. LMR2201

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EXECUTIVE SUMMARY

Senate Bill (SB) 743, which became effective July 1, 2020, changes the way transportation impacts are determined in California Environmental Quality Act (CEQA) documents. SB 743 replaces the metric for determining transportation impacts using motor vehicle delay and Level of Service (LOS) to Vehicle Miles Traveled (VMT) in CEQA traffic impact studies. As a result of the SB 743 final rulemaking, the City of Lemoore (City) is adopting a set of VMT thresholds to support the shift from a delay-based analysis to VMT. This document provides a detailed discussion on implementing the CEQA VMT metric as applicable to the City of Lemoore. Substantial evidence and explanation on establishing the "Region," VMT screening criteria, and VMT analysis thresholds are also described.

The following is a brief summary of the City's VMT guidelines as adopted by the City. Each topic is discussed in more detail in this report.

- **Definition of 'Region':** Based on Kings County Association of Governments (KCAG) Travel Demand Model (TDM), 95% of trips that start or end in the City of Lemoore are contained within Kings County. Therefore, Kings County has been established as the region for VMT analysis purposes.
- **Standardized Screening Methods:** The guidelines provide multiple screening criteria for both land use and transportation projects. Screening criteria for land use projects include:
    - Local-serving retail projects up to 50,000 square feet (sf).
    - Projects that are consistent with the City's General Plan and generate fewer than 1,000 daily trips or projects that are not consistent with the City's General Plan but generate fewer than 500 daily trips.
    - Residential, Office, Industrial, or mixed-use projects within low-VMT generating areas, and
    - Projects with 100 percent affordable housing units.

  Detailed description about the screening criteria for development projects and transportation projects are described in detail in the guidelines.
- **Appropriate VMT Significance Thresholds for Development Projects, and Community/General Plans:** For all projects (except retail), a significance threshold of 87 percent of the existing regional average of the respective VMT metric will be the threshold. Therefore,
    - For residential projects, 87% of Kings County baseline VMT per capita will be the threshold.
    - For non-residential projects (except retail), 87% of Kings County baseline VMT per employee will be the threshold.
    - For retail projects, a significance threshold of no net increase in VMT will be the metric.
    - For mixed use projects, the VMT thresholds are based on the respective thresholds for the various land use components.
    - Finally, for land use plans, the existing Kings County average baseline VMT per capita, VMT per employee, and VMT per service population will be the thresholds of significance.

- **VMT Mitigation Strategies:** A list of VMT mitigation measures, in the context of the City of Lemoore, have been provided that are applicable to development projects and land use plans that would have a significant VMT impact. Additionally, implementation of a future VMT mitigation bank, VMT mitigation exchange, and/or VMT impact fee are discussed as potential future regional VMT mitigation mechanisms.

The City recommends using the KCAG TDM for VMT analysis purposes for most projects. The KCAG TDM is the regional travel demand model applicable to jurisdictions within Kings County including the City for evaluating project VMT. The appropriate use of the KCAG TDM for VMT calculations is further elaborated in subsequent chapters of this document. However, certain unique land uses may not be able to use KCAG TDM for evaluating a project's VMT impact. For those project's relevant empirical data from other sources should be utilized to evaluate the project VMT. The methodology for evaluating project's VMT for such projects needs to be confirmed with City staff.

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ABBREVIATIONS AND ACRONYMS

ADT	Average Daily Trips
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
City	City of Lemoore
County	Kings County
CO_2e	Carbon Dioxide Equivalent
EIR	Environmental Impact Report
EO	Executive Order
GHG	Greenhouse Gas
GWP	Global Warming Potential
HOT	High-Occupancy Toll
HOV	High-Occupancy Vehicle
HQTA	High-Quality Transit Area
ITE	Institute of Transportation Engineers
KCAG	Kings County Association of Governments
LOS	Level of Service
MPO	Metropolitan Planning Organization
MT	Metric Ton
OPR	Governor's Office of Planning and Research
PRC	Public Resources Code
RTP	Regional Transportation Plan
SB	Senate Bill
SCS	Sustainable Communities Strategy
sf	Square foot/Feet
SOC	Statement of Overriding Considerations
SOI	Sphere of Influence
TA	Technical Advisory
TDM	Travel Demand Model
TPA	Transit Priority Area
VMT	Vehicle Miles Traveled

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1.0 INTRODUCTION

Senate Bill (SB) 743, which became effective July 1, 2020, changes the way transportation impact assessments are conducted in California Environmental Quality Act (CEQA) documents. Most notably, rulemaking in support of SB 743 replaces motor vehicle delay, as measured by Level of Service (LOS), with Vehicle Miles Traveled (VMT) as the metric for use in CEQA transportation impact assessments.

In January 2019, the Natural Resources Agency and the Governor's Office of Planning and Research (OPR) codified SB 743 into the Public Resources Code (PRC) and the *State CEQA Guidelines.*

OPR published a Technical Advisory (TA) in December of 2018, as a resource to guide the assessment of the VMT metric, establish thresholds of significance, and recommends mitigation measures. The laws and rules governing the CEQA process are contained in the CEQA statute (PRC Section 21000 and following), the *State CEQA Guidelines* (California Code of Regulations, Title 14, Section 15000 and following), published court decisions interpreting CEQA, and locally adopted CEQA procedures. The TA is intended as a reference document; it does not have the weight of law. However, any decision to deviate from the TA recommendations must be supported by substantial evidence.

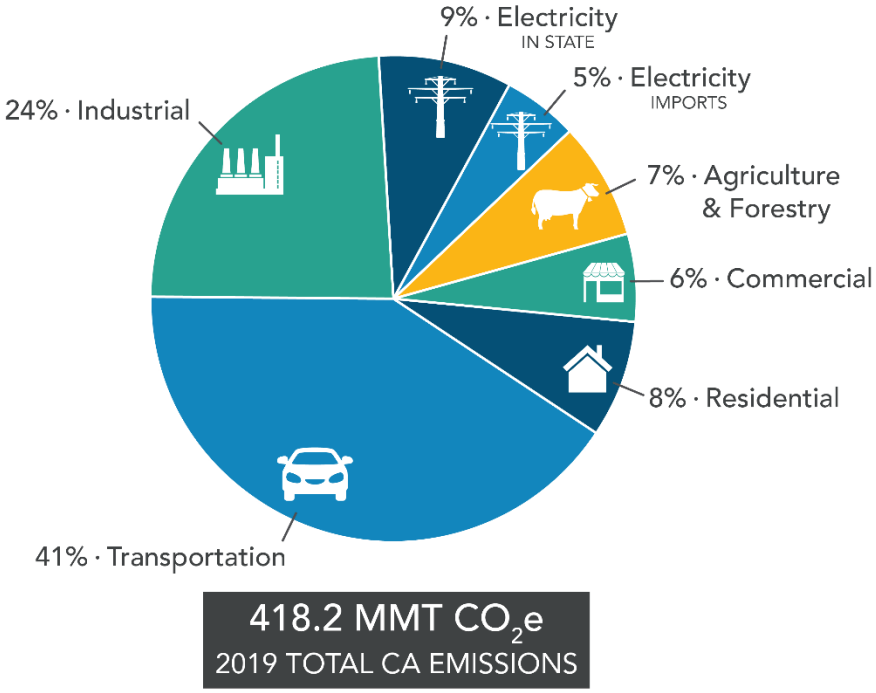
The State of California is committed to reducing greenhouse gas (GHG) emissions and achieving long-term climate change goals. As a means for achieving statewide sustainability and climate goals, California legislation is focused on reducing VMT to achieve statewide climate goals. Over the last 40 years, across the state, VMT has far exceeded that of the state's population increase during the same period. As shown in Figure 1, transportation is the single largest sector contributing to California's GHG emissions. Approximately 41 percent of statewide GHG emissions are generated by the transportation sector, primarily passenger cars and light-duty trucks. State mandates pertaining to GHG emissions include reducing the number of single-occupancy vehicle trips and the length of vehicle trips.

This report establishes the City of Lemoore's (City) VMT thresholds of significance for use in CEQA transportation studies and provides substantial evidence to support those thresholds. The report is organized into the following seven chapters:

- **Chapter 1 – Introduction:** This chapter establishes the purpose and objective of this report.
- **Chapter 2 – Definition of Region:** This chapter describes the comparative geographic baseline of a region for analysis purposes.
- **Chapter 3 –Screening Criteria:** OPR acknowledges that certain projects are either low VMT generators, or, by virtue of their location, would have a less than significant impact. This chapter provides the screening criteria to identify potentially exempt projects.
- **Chapter 4 –VMT Threshold Analysis for Development Projects:** This chapter identifies the VMT thresholds of significance, which would result in a significant CEQA impact. The actual VMT metric (either an efficiency rate or total VMT) is described. The process of VMT analysis is also described in this chapter.
- **Chapter 5 – VMT Threshold Analysis for Transportation Projects:** This chapter describes the methodology used to evaluate significant CEQA impacts associated with transportation projects

in the City of Lemoore. Many non-capacity capital projects may be presumed to have a less than significant impact. Capacity-enhancing transportation projects may produce significant VMT impacts and would therefore be subject to a comprehensive VMT analysis including an induced travel assessment.

- **Chapter 6 – VMT Threshold Analysis for Land Use Plans:** This chapter provides guidance and substantial evidence to support the City's treatment of land use plans and their related CEQA transportation impact analysis requirements.
- **Chapter 7 – VMT Mitigation Strategies:** The discussion provided in this chapter is intended as a reference and guide for use in the identification of feasible VMT mitigation options that may be used to offset project-related VMT impacts. It should be noted that this discussion is not intended to represent a full list of VMT mitigation measures available or feasible to the City. As in previous CEQA practice, it is generally the lead agency who identifies mitigation measures to offset the specific project-related impacts identified in an environmental document.



Source: https://ww2.arb.ca.gov/ghg-inventory-data

Figure 1: 2019 GHG Emissions in California by Economic Sector

2.0 DEFINITION OF REGION: VEHICLE MILES TRAVELED CONTEXT

To quantify a project's impact related to the VMT metric, a geographic context must be established. In the motor vehicle delay-based (LOS) analyses, a project study area is the geographic context for measuring a project's traffic impacts. A project study area is generally determined by the incremental increase in traffic generated by the project and the project's potential to create travel delays in the area. This generally includes intersections and roadway segments where the project would add a prescribed number of peak-hour trips. Lead agencies typically limit the LOS-based project study area boundaries within their jurisdictions.

Delay-based LOS analyses evaluate intersections or segments of roadways and so they consider portions of trips at specific locations and do not take into consideration the effect of entire trip length (from starting location to ending location). Hence, unlike delay-based LOS analyses, VMT produces a regional impact that is not limited by roadway, intersection, or jurisdictional boundaries. OPR acknowledges this in its TA (page 6), which states:

> *"Lead agencies should not truncate any VMT analysis because of jurisdictional or other boundaries, for example, by failing to count the portion of a trip that falls outside the jurisdiction or by discounting the VMT from a trip that crosses a jurisdictional boundary."*

On a daily basis, majority of trips are generated by the residents of the community or by residential land uses. Commute and school trips are typically considered mandatory trips for the residents. Also, based on 2010 – 2012 California Household Travel Surveys (CHTS), commute trips are the longest among trips by residents. Additionally based on CHTS, the majority of trips are commute and shopping trips occurring between residential, office, and retail uses. Therefore, pursuant to the OPR TA, the recommendations for VMT thresholds for the three primary land use types (residential, office, and retail) are based on a comparison to a *regional average.* OPR does not explicitly define the regional average, and instead, recommends:

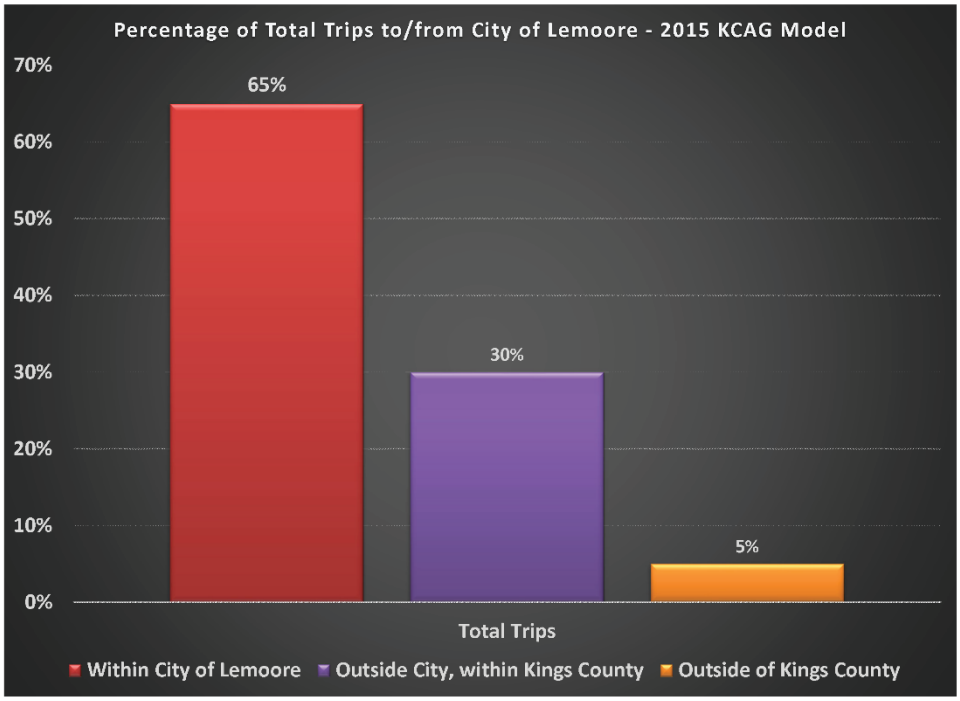
1. *In cases where the region is substantially larger than the geography over which most workers would be expected to live, it might be appropriate to refer to a smaller geography, such as the county, that includes the area over which nearly all workers would be expected to live. (page 16)*
2. *For residential projects in unincorporated county areas, the local agency can compare a residential project's VMT to (1) the region's VMT per capita, or (2) the aggregate population weighted VMT per capita of all cities in the region. (page 15)*

LSA surveyed other large urbanized areas around the state to identify what region has been established for VMT thresholds. In most cases, the county boundary has been identified as the region selected for VMT analysis. Mobility can be studied using a trip-based approach or a tour-based approach. The OPR TA states that "where available, tour-based assessment is ideal because it captures travel behavior more comprehensively. But where tour-based tools or data are not available for all components of an analysis, a trip-based assessment of VMT serves as a reasonable proxy." A regional travel demand model,

whether tour-based or trip-based, is one of the best available tools to estimate VMT. Given the current regional travel demand model is a trip-based model and as described before, project VMT evaluation shall be conducted using a relative comparison (project VMT metrics to the regional VMT metrics), the trip-based model serves as an appropriate tool for VMT evaluation.

Since the Kings County Association of Governments' (KCAG's) Travel Demand Model (TDM) is a trip-based model, a trip-based approach has been followed. LSA used the KCAG TDM to examine the trips into and out of Lemoore. As such, consistent with the OPR TA, only trips having origins or destinations or both within the City were considered. External pass-through trips were not considered.

As illustrated in Figure 2, out of the total trips, about 65 percent trips are contained within the City and its sphere of influence (SOI). Another 30 percent of trips originate or are destined within other jurisdictions in Kings County (County). The remaining 5 percent trips either originate or are destined outside Kings County. Because the majority of the trips (95 percent) are contained within Kings County, the County will be used to define the region.



Source: KCAG TDM (2015 Scenario)

Figure 2: Percentage of Total Trips Having Origins/Destinations within the City of Lemoore and Terminating within the City of Lemoore, within Kings County, or outside the County

The OPR guidance recommends consistency in approach; once a region is established, that region should be used for all subsequent traffic analyses.

It should be recognized the use of the County as the region defines the comparative, or the denominator, in the identification of project-related impact. The numerator is the project's VMT contribution.

3.0 SCREENING CRITERIA

The TA acknowledges that certain activities and projects may result in a reduction of VMT and GHG emissions and may therefore be assumed to produce a less than significant transportation impact. Due to a presumption of less than significant impact by meeting the following described criteria, a variety of projects may be screened out of SB 743-related VMT analysis requirements.

3.1 DEVELOPMENT PROJECTS

For development projects, screening factors may include a project's size, location, proximity to transit, and trip-making potential. One or more of the following project attributes may be presumed to produce a less than significant VMT impact:

- The project is within 0.5 mile (mi) of a transit priority area or a high-quality transit area and is consistent with the Regional Transportation Plan (RTP)/ Sustainable Communities Strategy (SCS), has a floor area ratio (FAR) equal or greater than 0.75, does not provide more parking than what is required by the City's Municipal Code, or does not reduce the number of affordable residential units. In accordance with SB 743, "transit priority areas" are defined as "an area within one-half mile of a major transit stop that is existing or planned, if the planned stop is scheduled to be completed within the planning horizon included in a Transportation Improvement Program. A "major transit stop" means: "a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service of 15 minutes or less during the morning and afternoon peak commute periods." A high-quality transit area or corridor is a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours. (See Pub. Resources Code, § 21099, subds. (a)(7), (b)(1).)

  Currently, the city does not have any high-quality transit area. However, if such areas are established at a future date, this screening criteria would be applicable to projects if they meet the requirements stated above.

- The project includes local-serving retail with a combined area of less than 50,000 square feet (sf). Local-serving retail would include projects that serve the local community and visitors within the City. Local-serving retail projects would include projects such as grocery stores, restaurants, or any other commercial development. Whether a retail project is local-serving or not will be determined at the discretion of the City.
- Redevelopment projects that result in an equal or net reduction in VMT can be considered to have less than significant VMT impact. A net reduction in VMT would occur if the land use proposed by the project would generate less VMT than the existing land use.
- The project includes 100 percent affordable housing units. Affordable housing units consists of low-income households and research has shown that low-income households produce lower VMT compared to a market-rate housing unit[1].

[1] "Income, Location, Efficiency, and VMT: Affordable Housing as a Climate Strategy" by Gregory L. Newmark Ph.D and Peter M. Hass Ph.D, Center for Neighborhood Technology.

- A project consistent with the City's General Plan can be successfully screened if the project would generate fewer than 1,000 average daily trips (ADT), while a project not consistent with the City's General Plan can be screened if the project would generate fewer than 500 ADT. (See section 3.1.1 below.). Consistency with the General Plan is required because the GHG and therefore VMT reduction targets for MPOs were established by CARB and are included in the RTPs. The RTP utilizes the latest version of City's General Plan for analyzing GHG emissions.
- Institutional/government and public service uses that support community health, safety and welfare may also be screened from subsequent CEQA VMT analysis. These facilities (e.g., police stations, fire stations, government offices, utilities, public libraries, community centers, and refuse stations) would be a part of the community and, as public services, the VMT would be accounted for within the community. A decision whether a particular project can be categorized as a public service facility will be determined at the discretion of the City. Similarly, any other similar use not included in the list can be approved on a case-by-case basis by the City as applicable. As such, these uses would result in reduction in total VMT due to the proximity of these services within the community. Additionally, many of these facilities would generate fewer than 1,000 ADT and/or use vehicles other than passenger-cars or light-duty trucks. These other vehicle fleets are subject to regulation outside of CEQA, such as the California Air Resources Board (CARB) and San Joaquin Valley Air Pollution Control District.
- Local parks, daycare centers, student housing projects on or adjacent to a college campus, local-serving gas stations, banks, and K–12 public schools.
- Projects located in areas with low VMT may be screened out from further CEQA analysis. The TA acknowledges that residential and office projects located in areas having a low VMT, (which incorporate features such as density, mix of uses, transit accessibility), tend to exhibit similarly low VMT. Also, areas that are mapped as low VMT areas do not need to prepare any additional VMT analysis. Therefore, residential, office, industrial, or mixed-use projects that are consistent with the City's General Plan and located within low VMT areas (using the City of Lemoore VMT Screening Tool[2] and applying appropriate thresholds) can be presumed to have similar low VMT profiles and could be screened out from the need for further VMT analysis. It should be noted that if a project constitutes a General Plan Amendment or Zone Change, such projects will be evaluated on a case-by-case basis. Figures 3, 4, and 5 illustrate the VMT per capita, VMT per employee, and VMT per service population screening maps for the City.
- The 2022 *State CEQA Guidelines* Section 15007 (c) states that "if a document meets the content requirements in effect when the document is sent out for public review, the document shall not need to be revised to conform to any new content requirements in Guideline amendments taking effect before the document is finally approved." Therefore, if a development/land use plan/ transportation project is already cleared by a certified Environmental Impact Report (EIR) or an adopted Negative Declaration/Mitigated Negative Declaration, then subsequent projects that are consistent with the approved project will not require a new VMT analysis unless mandated by another section of the CEQA Guidelines.

[2] City of Lemoore VMT Screening Tool: https://gis1.lsa.net/lvmt/(Link Forthcoming)

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Figure 3: VMT per Capita Screening Map for City of Lemoore

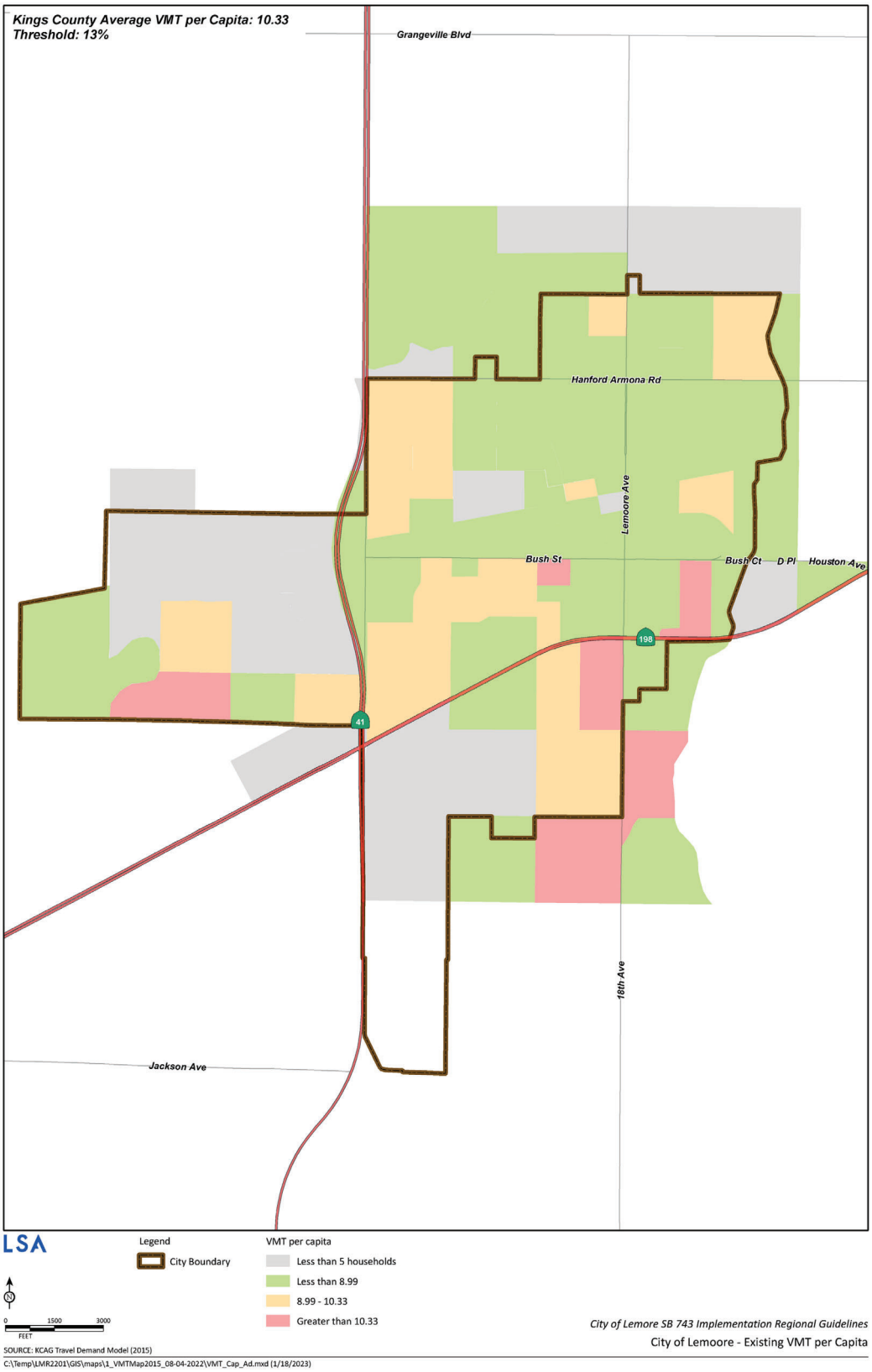

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Figure 4: VMT per Employee Screening Map for City of Lemoore

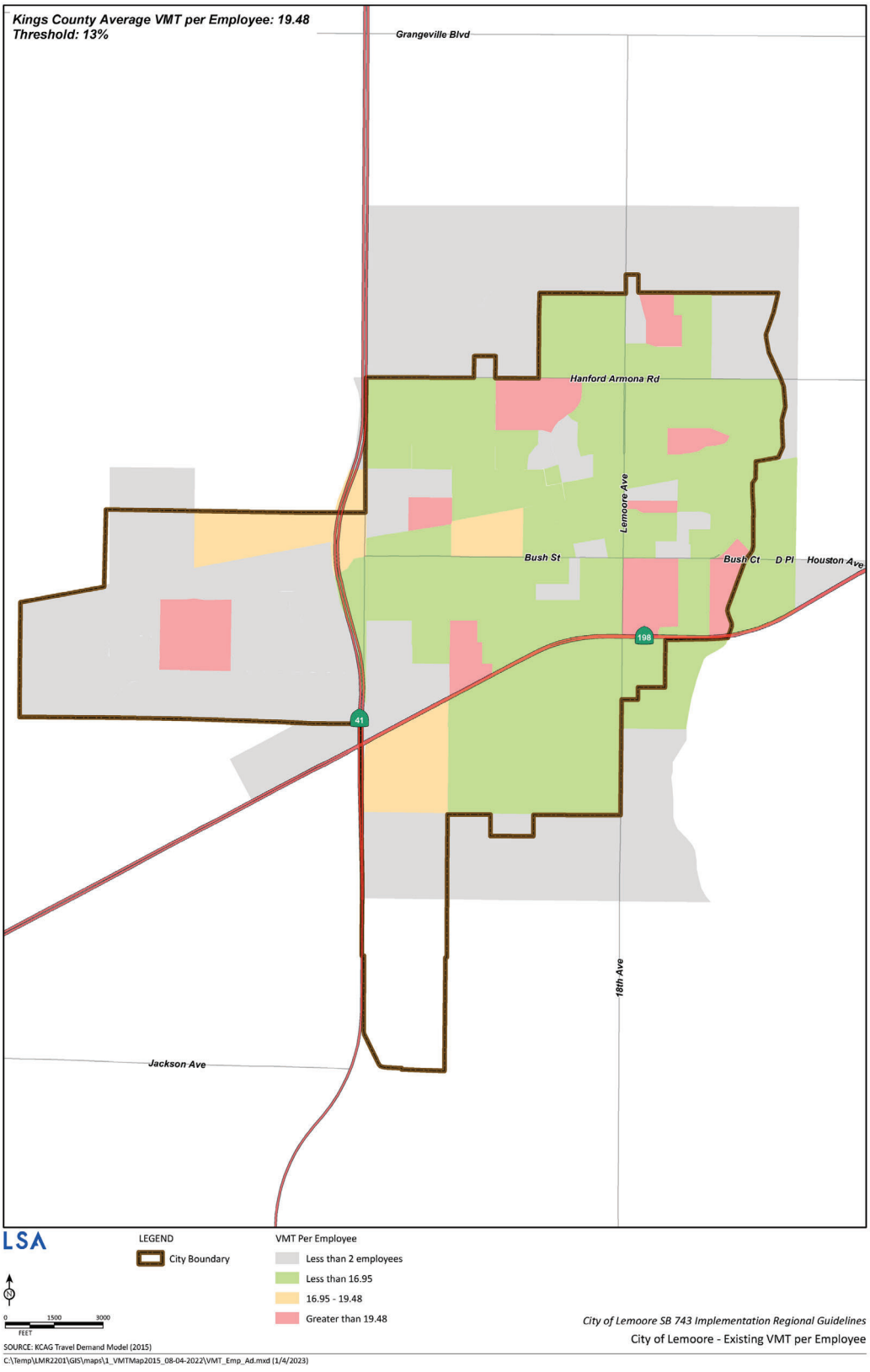

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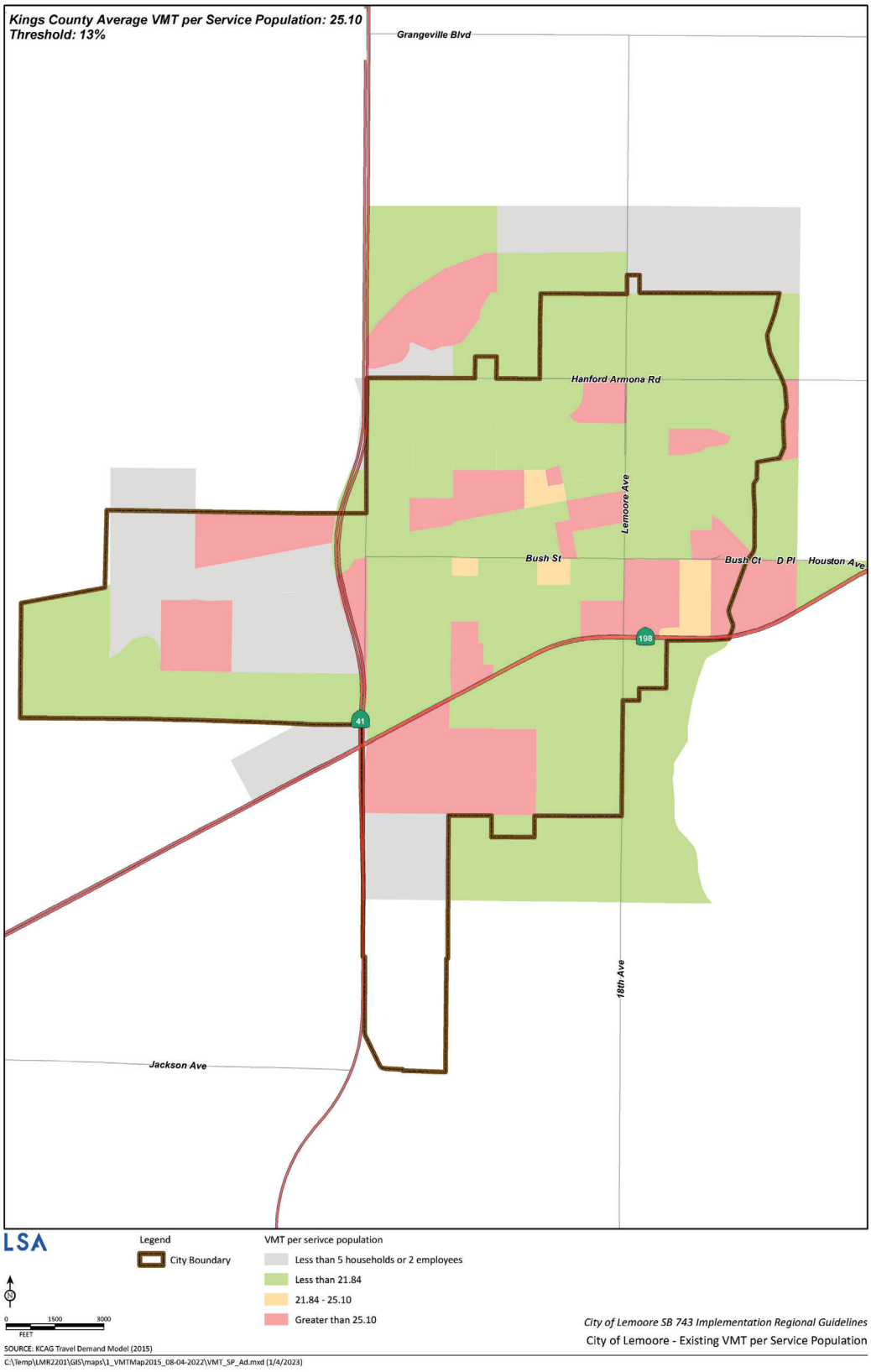
Figure 5: VMT per Service Population Screening Map for City of Lemoore



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3.1.1 Average Daily Trips (ADT) Threshold

Under Section 15301(e)(2) of the *CEQA Guidelines*, existing facilities, including additions to existing structures of up to 10,000 sf are exempt from CEQA review if the project is located in an area where public infrastructure is available to allow for maximum planned development and the project is not located in an environmentally sensitive area.

The City's trip screening threshold is based on reduction of GHG emissions as further described below.

The California Emissions Estimator Model (CalEEMod) is a tool provided by CARB and is accepted as the statewide standard to evaluate air quality and GHG emission impacts for CEQA assessment. As such, CalEEMod was used to characterize the effect of changes in project-related ADT to the resulting GHG emissions. To account for geographical relevance to project location, LSA calculated trip lengths from the KCAG TDM as applicable for the City. The trip lengths were calculated for various trip purposes for single-family residential developments as example. Table A shows the resulting annual VMT and GHG emissions produced by incremental ADT for single-family residential projects.

Table A: Representative VMT and GHG Emissions from CalEEMod

Average Daily Trips (ADT)	Annual Vehicle Miles Traveled (VMT)	Vehicular GHG Emissions (Metric Tons of CO_2e per year)	Total Project GHG Emissions (Metric Tons of CO_2e per year)
100	1,796,375	799	1,133
200	3,592,751	1,597	2,266
300	5,389,126	2,395	3,398
400	7,185,502	3,194	4,531
500	8,981,877	3,992	5,664
750	13,472,815	5,989	8,496
1,000	17,963,754	7,985	11,328
1,500	26,945,631	11,977	16,991

Source: CalEEMod version 2022.1.0.

CalEEMod = California Emissions Estimator Model; GHG = Greenhouse Gas; CO_2e = carbon dioxide equivalent

GHG emissions threshold under CEQA can vary between 3,000 metric tons (MT) of carbon dioxide equivalent[3] (CO_2e) per year (as recommended by South Coast Air Quality Management District (SCAQMD)) and 1,100 MT CO_2e (as recommended by Sacramento Metropolitan Air Quality Management District). For purposes of this analysis, the threshold of 3,000 MT CO_2e has been utilized. As shown in Table A, a project with an ADT lower than 1,500 would generally be expected to have a total project emission of less than 3,000 MT CO_2e/year. LSA conducted this exercise for several other land uses to identify appropriate GHG screening thresholds. Table B shows the potential maximum GHG screening thresholds (up to 3,000 MT) for these land uses.

[3] CO_2e is a concept developed to provide one metric that includes the effects of numerous GHGs. The global warming potential (GWP) of each GHG characterizes the ability of each GHG to trap heat in the atmosphere relative to another GHG. The GWPs of all GHGs are combined to derive the CO_2e.

Table B: CO_2e Emission Rates by Land Use Type

Land Use	DU or TSF	Total $MTCO_2e$ per year	Annual $MTCO_2e$ per DU or TSF
Single Family Residential	270 DU	2,998	11.10
Low-Rise Multifamily Residential	385 DU	2,997	7.78
Mid-Rise Multifamily Residential	513 DU	2,997	5.84
Office	337 TSF	2,993	8.88
Warehouse	426 TSF	2,996	7.03
Light Industrial	507 TSF	2,998	5.91
Hotel	382 Rooms	2,971	7.78
Medical Office	142 TSF	2,993	21.08
Hospital	197 Beds	2,989	15.17
Shopping Plaza	82 TSF	2,993	36.50
Strip Retail Plaza	137 TSF	2,994	21.85

Source: California Emissions Estimator Model (CalEEMod) version 2022.1.0.
DU = Dwelling Units; TSF = Thousand Square Feet; CO_2e = carbon dioxide equivalent

The 3,000 $MTCO_2e$ per year threshold developed by the SCAQMD is based on a 90 percent emission "capture" rate methodology. The 90 percent emissions capture approach was one of the options suggested by the California Air Pollution Control Officers Association (CAPCOA) in their CEQA & Climate Change white paper from 2008. A 90 percent emission capture rate means that unmitigated GHG emissions from the top 90 percent of all GHG-producing projects within a geographic area – the Air Basin in this instance – would be subject to a detailed analysis of potential environmental impacts from GHG emissions, while the bottom 10 percent of all GHG-producing projects would be excluded from detailed analysis. A GHG significance threshold based on a 90 percent emission capture rate is appropriate to address the long-term adverse impacts associated with global climate change because medium and large projects will be required to implement measures to reduce GHG emissions, while small projects, which are generally infill development projects that are not the focus of the State's GHG reduction targets, are allowed to proceed. Further, a 90 percent emission capture rate sets the emission threshold low enough to capture a substantial proportion of future development projects and demonstrate that cumulative emissions reductions are being achieved while setting the emission threshold high enough to exclude small projects that will, in aggregate, contribute approximately 1 percent of projected statewide GHG emissions in the Year 2050. SCAQMD's selection of the threshold at 3,000 $MTCO_2e$ per year was based on OPR's database of projects containing 798 projects and information about their GHG emissions. 87 very large projects were eliminated from calculation because they would skew emissions values too high, leaving 711 as the sample population to use in determining the 90th percentile capture rate. The 711 projects analyzed by SCAQMD consisted of commercial, residential, and mixed-use projects and included warehouses and other light industrial land uses but did not include industrial processes (i.e., oil refineries, heavy manufacturing, electric generating stations, mining operations). 4 SCAQMD calculated emissions from each project to provide a consistent method of emissions calculations across the sample population and from projects within the sample population. In calculating the emissions, the SCAQMD determined that the 90th percentile ranged between 2,983 to 3,143 $MTCO_2e$ per year. The SCAQMD set the significance

[4] South Coast Air Quality Management District – Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold, October 2008.

threshold at 3,000 $MTCO_2e$ per year to exclude small projects that are considered less than significant and do not need to provide further analysis. Substantial evidence supporting this emission level is provided in the 2008 document, Draft Guidance Document – Interim CEQA Greenhouse Gas Significance Threshold and the documentation from subsequent working group meetings.

The GHG analysis above concludes that projects with up to 1,500 ADT may be screened out from VMT analysis. As a conservative approach, the City of Lemoore *VMT Thresholds and Implementation Guidelines* document adopts a daily trip threshold of 1,000 ADT be applied to projects that are consistent with the City's General Plan. However, for projects that are not consistent with the City's General Plan, a screening threshold of 500 ADT will be applied. Historically, the City required traffic studies (LOS analysis) for projects that generate 50 or more peak hour trips. Since 1 peak hour trip equates to approximately 10 ADT, 50 peak hour trips would equate to approximately 500 ADT. It is prudent to take a conservative approach, and important to be consistent with previous methodologies and past precedence. Therefore, 500 ADT has been determined as the screening criteria for development projects that are not consistent with City's General Plan and takes precedence from previous transportation analysis procedures within the City. A sample list of size of projects generating fewer than 1,000 and 500 daily vehicle trips that are eligible for exemption from a VMT analysis are included in Table C.

Table C: VMT Screening Thresholds for Sample Land Uses

Land Use	Size of Projects (Requiring a GPA)	Size of Projects (Not Requiring a GPA)
Single-Family Residential[1]	53 DU	106 DU
Low-Rise Multifamily Residential[2]	74 DU	148 DU
Mid-Rise Multifamily Residential[3]	110 DU	220 DU
Office	46.125 TSF	92.250 TSF
Warehouse	292.397 TSF	584.795 TSF
Light Industrial	102.669 TSF	205.338 TSF
Hotel	62 Rooms	125 Rooms
Medical Office[4]	13.888 TSF	27.777 TSF
Hospital	22 Beds	44 Beds

Notes: DU = Dwelling Units; TSF = Thousand Square Feet
Project sizes have been determined based on trip generation rates obtained from the ITE *Trip Generation Manual* (11th Edition).
[1] The project sizes have been provided for single-family detached residential only.
[2] The project sizes have been provided for low-rise multifamily residential (not close to rail transit) only.
[3] The project sizes have been provided for mid-rise multifamily residential (not close to rail transit) only.
[4] The project sizes have been provided for stand-alone medical office buildings only.

3.2 SCREENING BY PROJECT TYPE: TRANSPORTATION PROJECTS

Transportation projects refer to capital improvement projects that relate to roadway widening, roadway infrastructure improvements, active transportation projects or operational improvements. The primary attribute to consider with transportation projects is the potential to increase vehicle travel demand, also referred to as 'induced travel.' While the City has discretion to continue to use a delay-based LOS analysis for CEQA disclosure of transportation projects, changes in vehicle travel must be quantified. To comply with SB 743, the City of Lemoore will use VMT analysis, and may also require a LOS analysis for design, traffic operations, and safety purposes to comply with the City's General Plan Circulation Element. The State identifies the types of transportation improvement projects that would not likely to lead to a measurable and substantial increase in VMT and which therefore generally should not require an induced travel analysis per OPR's Technical Advisory. These include the following:

- Rehabilitation, maintenance, replacement, safety, and repair projects designed to improve the condition of existing transportation assets (e.g., highways; roadways; bridges; culverts; Transportation Management System field elements such as cameras, message signs, detection, or signals; tunnels; transit systems; and assets that serve bicycle and pedestrian facilities) and that do not add additional motor vehicle capacity.
- Roadside safety devices or hardware installation such as median barriers and guardrails.
- Roadway shoulder enhancements to provide "breakdown space," dedicated space for use only by transit vehicles, to provide bicycle access, or to otherwise improve safety, but which will not be used as automobile vehicle travel lanes.
- Addition of an auxiliary lane of less than one mile in length designed to improve roadway safety.
- Installation, removal, or reconfiguration of traffic lanes that are not for through traffic, such as left, right, and U-turn pockets, two-way left turn lanes, emergency truck pullovers, or emergency breakdown lanes that are not utilized as through lanes.
- Addition of roadway capacity on local or collector streets provided the project also substantially improves conditions for pedestrians, cyclists, and, if applicable, transit.
- Addition of a new lane that is permanently restricted to use only by transit vehicles.
- Reduction in number of through lanes.
- Grade separation to separate vehicles from rail, transit, pedestrians or bicycles, or to replace a lane in order to separate preferential vehicles (e.g., HOV, HOT, or trucks) from general vehicles.
- Installation, removal, or reconfiguration of traffic control devices, including Transit Signal Priority (TSP) features.
- Installation of traffic metering systems, detection systems, cameras, changeable message signs and other electronics designed to optimize vehicle, bicycle, or pedestrian flow.
- Timing of signals to optimize vehicle, bicycle, or pedestrian flow.
- Installation of roundabouts or traffic circles.
- Installation or reconfiguration of traffic calming devices.

- Initiation of new transit service.
- Conversion of streets from one-way to two-way operation with no net increase in number of general purpose or continuous through traffic lanes.
- Removal or relocation of off-street or on-street parking spaces.
- Adoption or modification of on-street parking or loading restrictions (including meters, time limits, accessible spaces, and preferential/reserved parking permit programs).
- Addition of traffic wayfinding signage.
- Rehabilitation and maintenance projects that do not add motor vehicle capacity.
- Addition of new or enhanced bike or pedestrian facilities on existing streets/highways or within existing public rights-of -way.
- Addition of Class I bike paths, trails, multi-use paths, or other off-road facilities that serve non-motorized travel.
- Installation of publicly available alternative fuel/charging infrastructure.
- Local and collector roads in rural areas that don't include sidewalks where there would be no pedestrian traffic to use them.
- Park and Ride facilities.
- Truck size and weight inspection stations.

While the above list is thorough, it is not necessarily comprehensive. There may be types of projects in addition to those listed that would not lead to a measurable and substantial increase in VMT. When concluding that a particular project may be screened out from further analysis, the practitioner should review and fully document the rationale supporting the conclusion that the respective project would not likely lead to a measurable and substantial increase in VMT.

4.0 VMT THRESHOLD ANALYSIS FOR DEVELOPMENT PROJECTS

4.1 THRESHOLDS

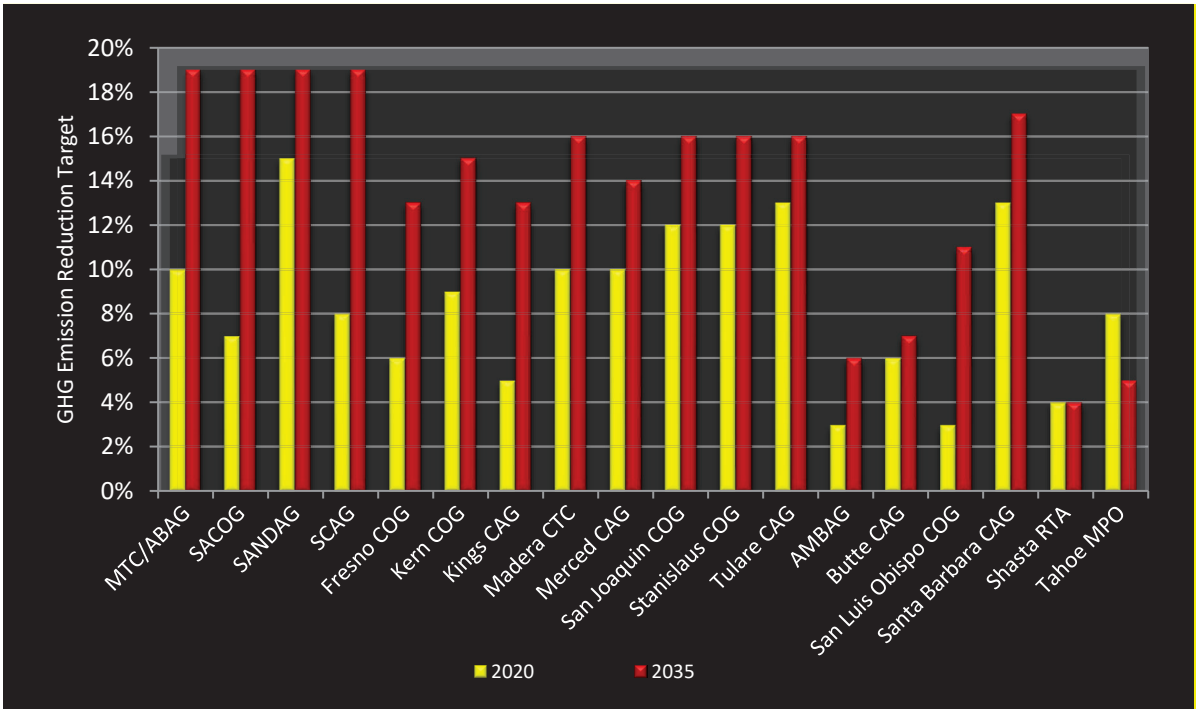
The TA states that SB 743 and all CEQA VMT transportation analyses refer to automobiles. Here, the term automobile refers to on-road passenger vehicles, specifically cars and light duty trucks (page. 4). Heavy-duty trucks can be addressed in other CEQA sections (air quality, greenhouse gas, noise, and health risk assessment analysis) and are subject to regulation in a separate collection of rules under CARB jurisdiction. This approach was amplified by Chris Ganson, Senior Advisor for Transportation at OPR, in a presentation to the Fresno Council of Governments (October 23, 2019) and by Ellen Greenberg, the California Department of Transportation (Caltrans) Deputy Director for Sustainability, at the San Joaquin Valley Regional Planning Agencies' Directors' Committee meeting (January 9, 2020).

Trips in a travel demand model are categorized by trip purpose. Each trip has a starting and ending location. If either end of the trip (starting or ending locations) is the trip producer's home, the trip is identified as a home-based trip. The OPR has identified the subject of the thresholds as the primary trips in the home-based typology: specifically, home-based work trips. This includes residential uses, office uses, and retail uses. The home-based work trip type is the primary trip type during the peak hours of commuter traffic in the morning and evening periods.

The impact of transportation has shifted from congestion to climate change, and the purpose of the CEQA analysis is to disclose and ultimately reduce GHG emissions by reducing the number and length of automobile trips. As part of the SB 375 land use/transportation integration process and the GHG goal setting, the State and Regional Transportation Planning Agencies (RTPA) have agreed to reduce GHG through integrated land use and transportation planning by a statewide average of approximately 15 percent by 2035. Figure 6 illustrates the SB 375 regional GHG emission reduction targets for all 18 Metropolitan Planning Organizations (MPOs) in California that were established by the CARB in 2018. Furthermore, in its 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals, the CARB recommends total VMT per capita rates approximately 15 percent below existing conditions.

The TA therefore recommends:

- *A proposed (residential) project exceeding a level of 15 percent below existing regional average VMT per capita may indicate a significant transportation impact.*
- *A similar threshold would apply to office projects (15 percent below existing regional average VMT per employee).*
- *VMT generated by retail projects would indicate a significant impact for any net increase in total VMT.*



Source: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets

Figure 6: SB 375 Regional Plan Climate Targets for the 18 California MPOs

CARB establishes GHG targets for each of the 18 MPOs in the State, reviews the SCSs, and makes a determination of whether the SCSs would achieve GHG reduction targets if implemented. In the spring of 2018, CARB adopted new GHG targets for all the 18 MPOs in the State based on the 2017 Scoping Plan and other new data as illustrated in Figure 6. CARB established a 13 percent GHG reduction target for 2035 for Kings County. The State recognizes that Kings County's contribution to the aggregate 15 percent statewide GHG emission reduction is 13 percent. Other regions may achieve lower reductions to achieve the aggregate statewide goal.[1] As such, reduction in GHG directly corresponds to reduction in VMT (VMT is the biggest contributor of GHG emissions as shown in Figure 1). To reach the statewide GHG reduction goal of 15 percent, the region (KCAG) must reduce GHG by 13 percent. The method of reducing GHG by 13 percent is to reduce VMT by 13 percent as well.

Therefore, the City has established a threshold for land use developments, specifically residential and office, of 87 percent of the existing regional average as indicative of a significant transportation impact. For retail projects, increase in total regional roadway VMT with the implementation of the project would indicate a significant transportation impact. In general, addition of new retail rediverts majority of trips from existing retail locations located further away. Given the potential redistribution of majority of trips rather than addition of trips, a comparison of total regional roadway VMT is appropriate to determine whether the retail project would benefit in overall reduction of regional VMT. Therefore, a net reduction in total VMT would be the appropriate metric to determine VMT

[1] The latest GHG targets by region can be found at https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets.

impacts for such projects. Total roadway VMT needs to be calculated using the final roadway assignment outputs from the KCAG TDM.

Other distinct land uses are not identified for threshold development in the OPR TA. For other non-residential projects, a significance threshold of 87 percent of existing regional average VMT per employee has been established. The only exceptions would be hotels, hospitals, medical offices, and related projects. These land uses are service oriented facilities which includes both visitors and employees. Therefore, for such projects, VMT per service population (population/users + employment) has been established as the VMT metric. Any other similar use could be evaluated using the same metric subject to approval of the methodology by the City on a case-by-case basis. As such, a significance threshold of 87 percent of the existing regional average VMT per service population will be applied for these projects.

Evaluation of mixed-use projects shall be for each land use component of the project using the most appropriate VMT metric. Credit for internal trip capture shall be made. Internal trip capture may be calculated using the latest edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual,* the KCAG TDM, or other applicable sources approved by the City. The appropriate methodology for calculating a project's internal capture would be determined in consultation with the City's Traffic Engineer. The significance threshold for these projects would be the respective VMT thresholds for its different land use components.

4.2 IMPACT ASSESSMENT

Figure 7 illustrates the VMT screening methodology for development entitlement projects. Additionally, Figures 8-A through 8-C illustrate the VMT analysis methodology for non-screened projects. Every development application is unique and may create alternative or modified steps through the process described in the aforementioned figures. Each step that diverges from this standard process shall be accompanied with substantial evidence demonstrating compliance with other climate change and GHG emission reduction laws and regulations.

4.2.1 Agency Communication

As part of the site plan review process, the applicant shall provide a detailed project description, including area/number of units and potential number of residents/employees added or created by the project, and the applicable VMT analysis methodology. Key elements include a description of the project in sufficient detail to generate trips and the potential catchment area (i.e., trip lengths if no modeling is undertaken), estimated project VMT, project design features that may reduce the VMT from the project development, and the project location and associated existing regional VMT percentages. Further, the applicant or their consultant shall prepare a transportation analysis scope of work for review and approval by the City.

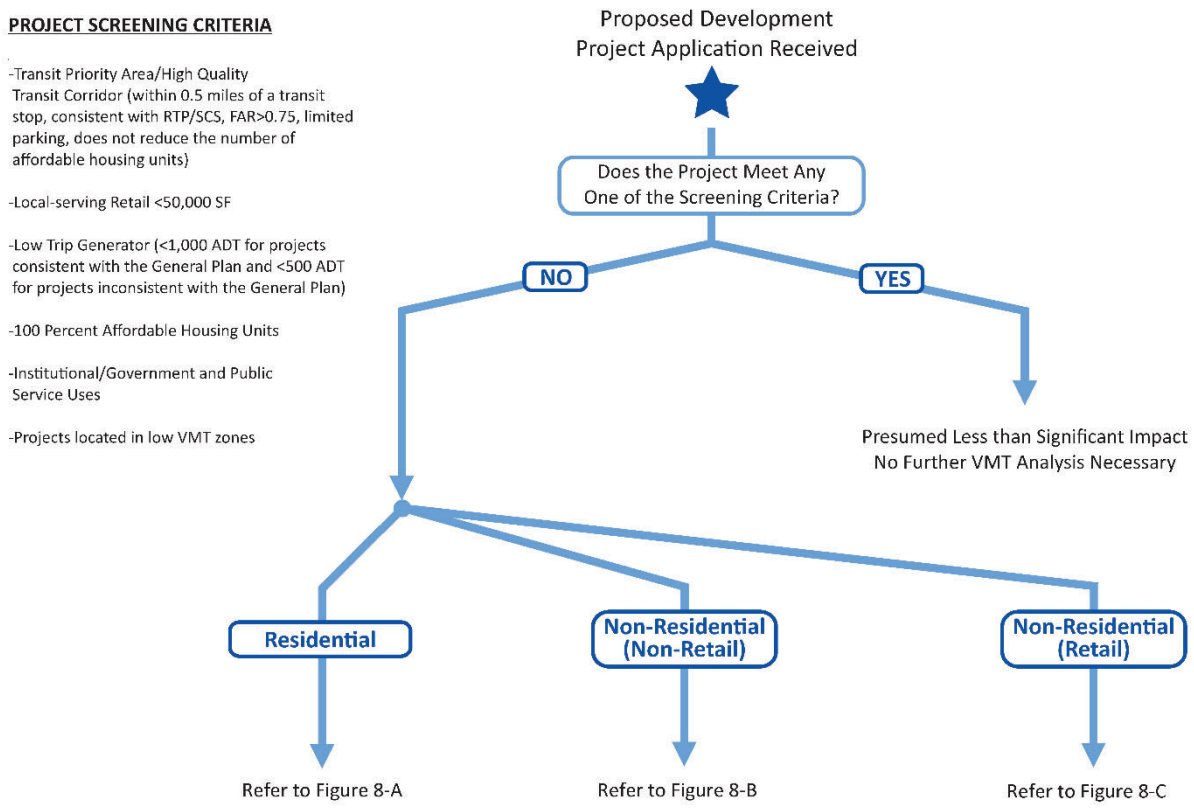


Figure 7: VMT Screening Methodology for Development Projects

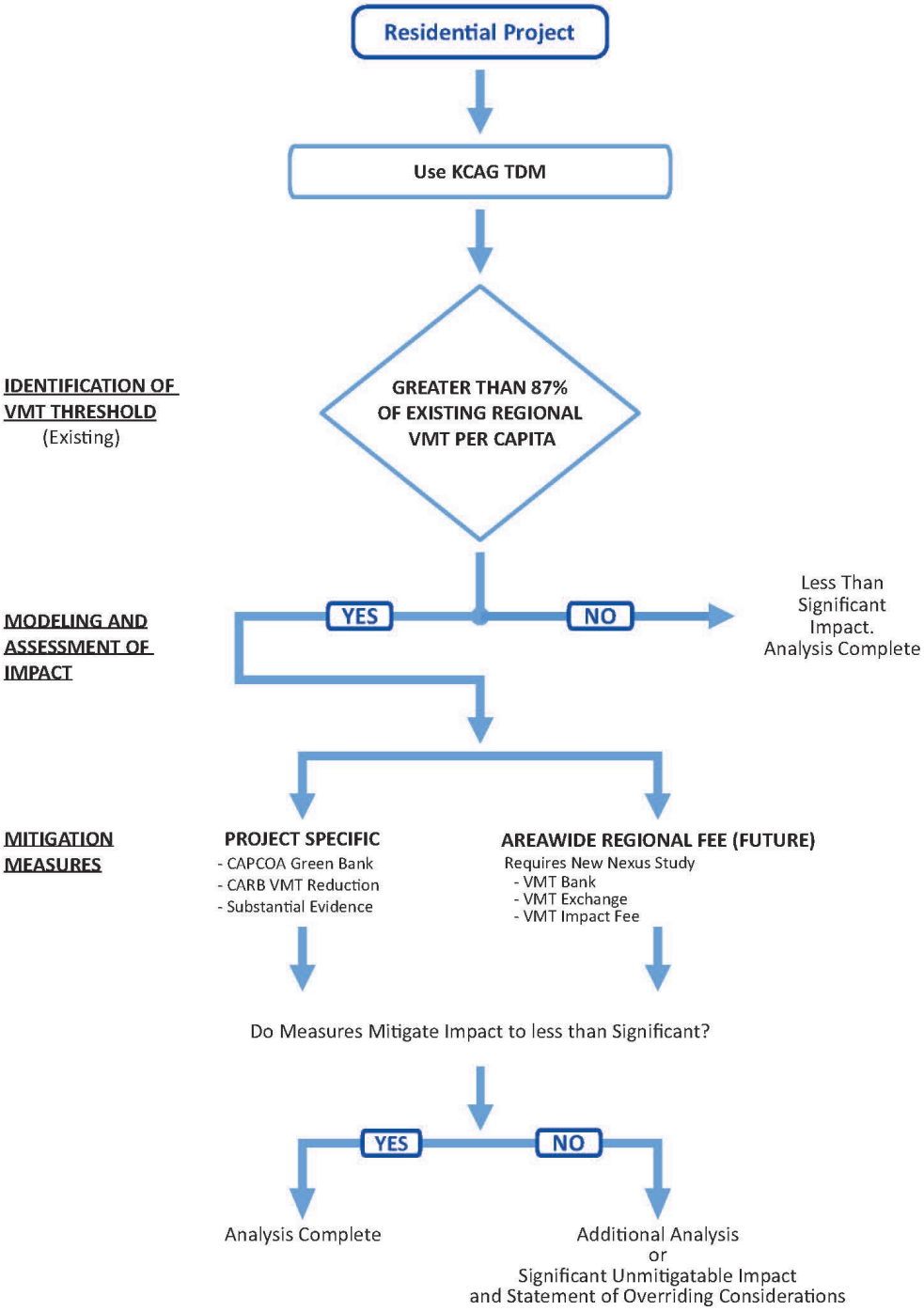


Figure 8-A: VMT Analysis Methodology for Non-Screened Residential Projects

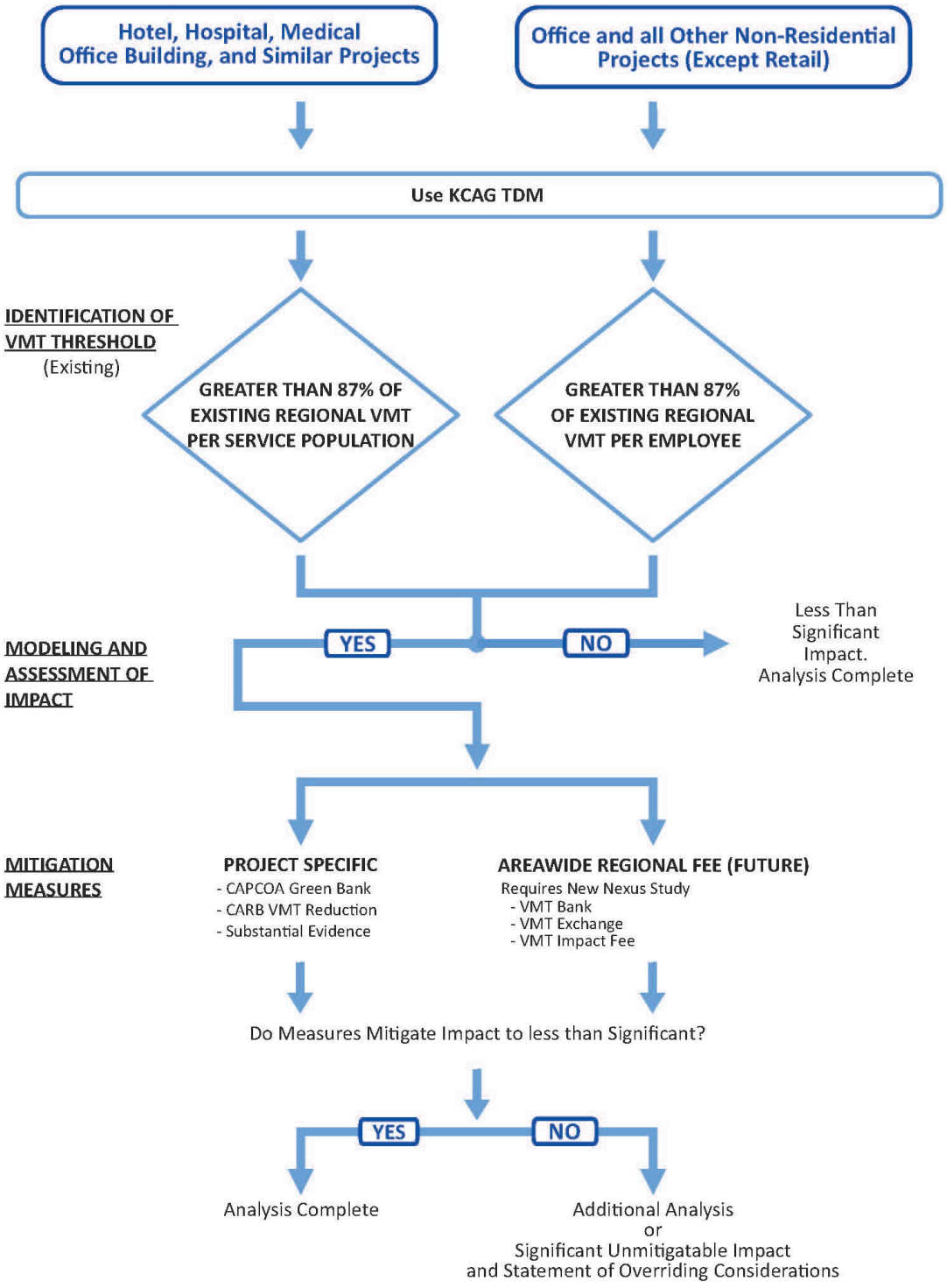


Figure 8-B: VMT Analysis Methodology for Non-Screened Non-Residential (Non-Retail) Projects

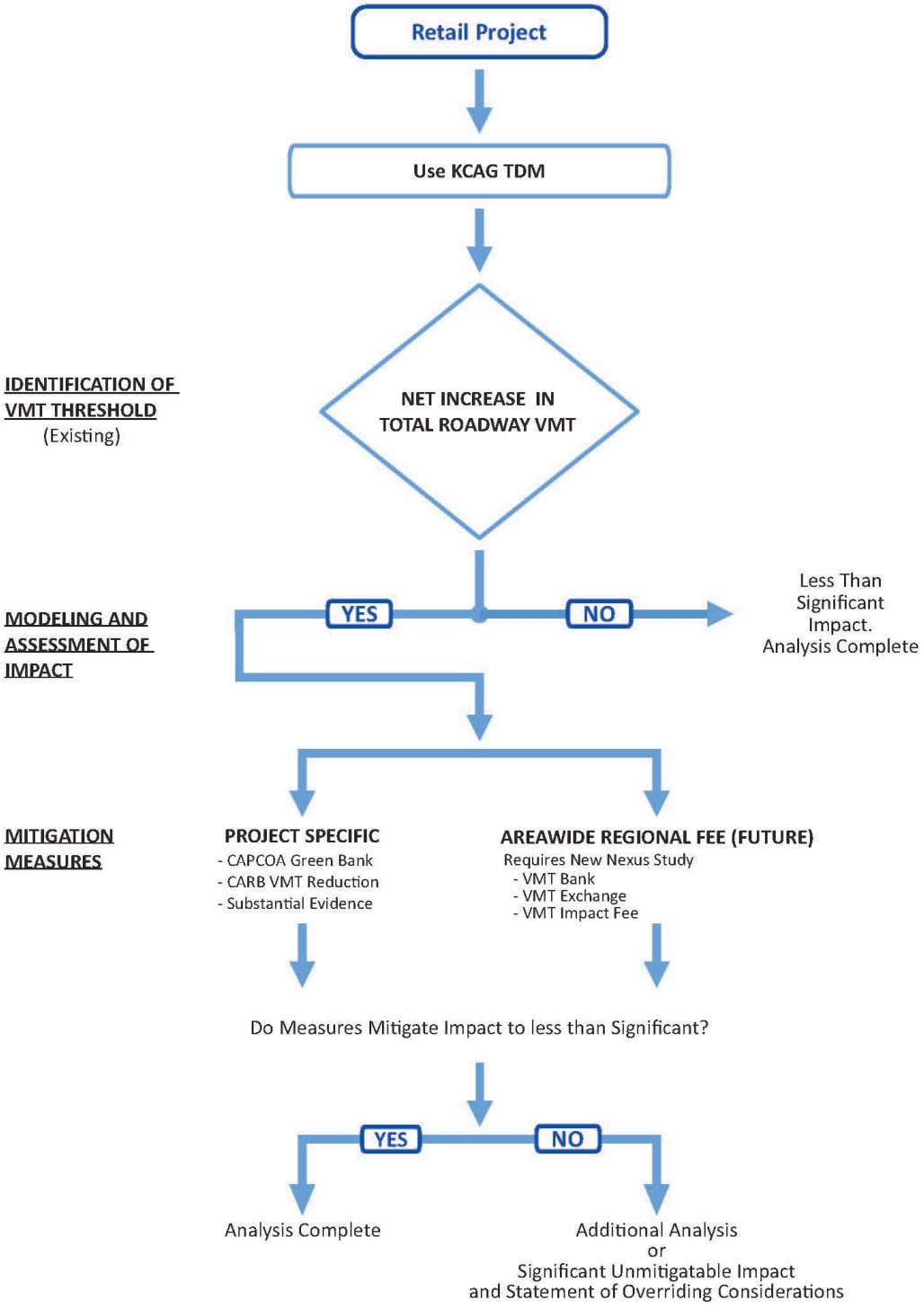


Figure 8-C: VMT Analysis Methodology for Non-Screened Non-Residential (Retail) Projects

Projects that will influence Caltrans facilities may be subject to the Caltrans Local Development-Intergovernmental Review program. As part of the program, Caltrans may review the VMT analysis methodology, findings, and mitigation measures to ensure consistency with statewide standards.

4.2.2 Project Screening

Once a development application is filed and determined to be complete for processing purposes, project screening may commence. If the project meets any one of the screening criteria, it may be presumed to have a less than significant transportation impact. No further VMT analysis would then be necessary, and a Notice of Exemption may be filed. The CEQA document shall enumerate the screening criteria and how the project meets or exceeds that applicable VMT threshold.

If project screening does not apply, a VMT analysis will be required. The extent of this analysis may be a simple algebraic demonstration or a more sophisticated traffic modeling exercise. This distinction is addressed later in this report.

4.2.3 VMT Identification

The project land use type will determine the appropriate metric to use (i.e., VMT per capita, VMT per employee, VMT per service population, or total VMT). Appropriate VMT metrics for different land uses are stated in Table D.

Table D: VMT Metrics for Land Use Projects

Land Use	VMT Metric
Residential	VMT per Capita
Office	VMT per Employee
Retail	Total VMT
Hotel, Hospital, Medical Office Building, or any similar use with approval from the City	VMT per Service Population
Mixed-Use, Land Use Plan (General Plan/Specific Plan)	Respective VMT metrics for its different land use components
Other Land Uses	VMT per Employee

VMT = Vehicle Miles Traveled

For all projects that require a VMT analysis, use of the KCAG TDM is required unless the project includes a special land use that is difficult to analyze using a travel demand model. For the latter, the City may require a qualitative analysis or an analysis using empirical data as applicable to the project.

Next, the project generated VMT (per capita, per employee, per service population, or total) is compared to the appropriate significance threshold provided in Table E. If the project VMT metric is less than the significance threshold, the project is presumed to create a less than significant impact. No further VMT analysis for CEQA purposes would be required.

Table E: Significance Thresholds for VMT Analysis

VMT Metric	Threshold	Regional Average
VMT per Capita	8.99	10.33
VMT per Employee	16.95	19.48
VMT per Service Population	21.84	25.10

Source: KCAG TDM (2015 Scenario)
VMT = Vehicle Miles Traveled

Should project VMT metrics exceed the significance threshold, mitigation measures will be required. It should be noted that the thresholds identified in Table E are based on the current version of the KCAG TDM (provided by KCAG in October 2021). These thresholds are subject to change when a newer version of the KCAG TDM is available.

4.3 MITIGATION MEASURES

State law requires the project applicant to identify feasible offsets to mitigate significant VMT impacts generated by the proposed project. These can come from the mitigation strategies provided in this document (as described in Table F at the end of Chapter 7.0) or selected by the applicant based on their CEQA project experience and expertise. A proposed mitigation measure must be supported by substantial evidence illustrating that the measure will mitigate VMT impacts to less than significant. The City must approve and accept the final VMT mitigation program ascribed to the project and the related VMT percentage reduction. A detailed discussion about project-specific mitigations is included in Section 7.2.

If it is determined that the selected VMT mitigation measures effectively reduce the project impact to less than the applicable threshold, the project is presumed to have an impact mitigated to a less than significant level for purposes of CEQA. No further VMT analysis is required in such case. If the project's VMT impact cannot be mitigated to less than significant, the City may (1) request the project be redesigned to reduce the VMT impact, or (2) require the preparation of an EIR with a Statement of Overriding Considerations (SOC) for the transportation impacts associated with the project. All feasible mitigation measures must be assigned to and carried out by the project even if an EIR and SOC are prepared.

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5.0 VMT THRESHOLD ANALYSIS FOR TRANSPORTATION PROJECTS

A VMT assessment of a transportation project should disclose the VMT profile without the project and the difference in the VMT profile with the project. Any increase in VMT attributable to the proposed transportation project would result in a significant impact. A significant transportation project impact is presumed when VMT increases with the project as compared to the 'No Project' scenario.

Capacity improvement projects have the potential of producing significant transportation impacts because they tend to induce new travel. The State describes induced travel as the additional motor vehicle travel that is generated by the newly available capacity on the roadway. Induced travel may include route switching, time-of-day change, mode shift to single occupancy vehicle, longer trips, new trips to existing destinations, and additional travel due to new development. Current traffic models have limited abilities to forecast new trips and new developments associated with roadway capacity improvements, as land use or socioeconomic databases are fixed to a specific horizon date. OPR refers to a limited number of published studies that seek to define travel demand elasticities.

The most recent major study (Duranton & Turner 2011, p. 24) estimates an elasticity of 1.0, meaning that every one percent change in lane miles results in a one percent increase in VMT.

One method to quantify induced growth is recommended by the State:

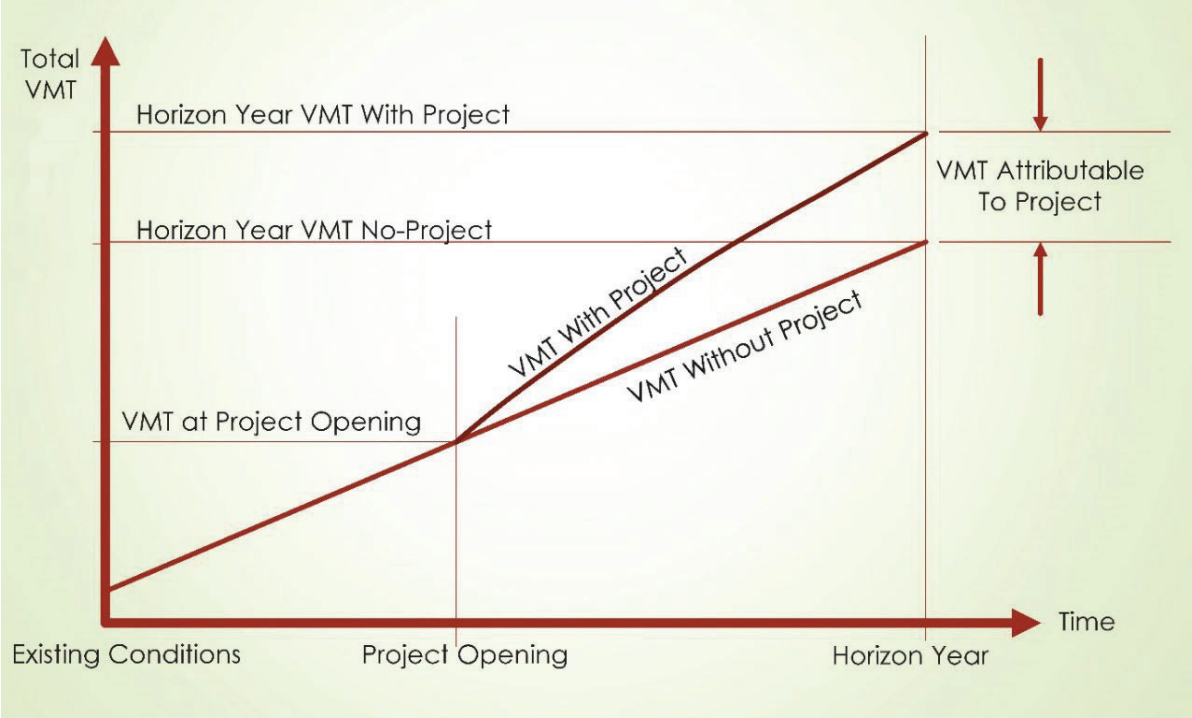
To estimate VMT impacts from roadway expansion projects:

1. *Determine the total lane-miles over an area that fully captures travel behavior changes resulting from the project (generally the region, but for projects affecting interregional travel look at all affected regions).*
2. *Determine the percent change in total lane miles that will result from the project.*
3. *Determine the total existing VMT over that same area.*
4. *Multiply the percentage increase in lane miles by the existing VMT, and then multiply that by the elasticity from the induced travel literature:*

[% increase in lane miles] × [existing VMT] × [elasticity] = [VMT resulting from the project]

OPR assigns this induced growth to project-induced changes in land use; that is, new land uses that are not included in any approved general or area plan and not accounted for in any traffic-forecasting tool.

Figure 9 provides a representative illustration of induced VMT attributable to a project.

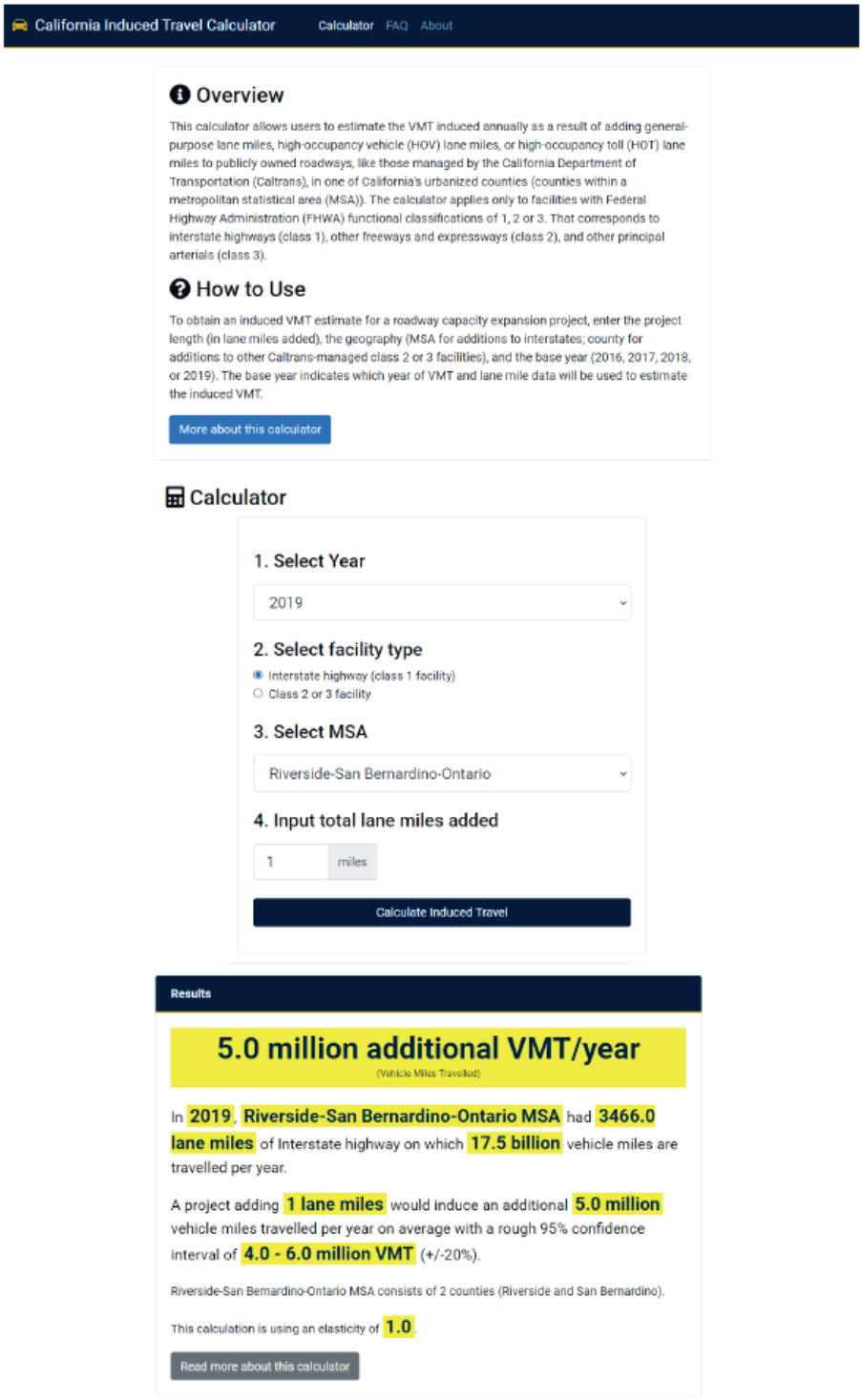


Source: Presentation: Caltrans Transportation Analysis under CEQA or TAC: Significance Determinations for Induced Travel Analysis (SHCC Pre-Release Session 2 Jeremy Ketchum, Division of Environmental Analysis, Caltrans; March 2, 2020)

Figure 9: Induced Travel – VMT Attributable to Project

Caltrans has identified a computerized tool to estimate VMT generation from transportation projects. The tool (https://travelcalculator.ncst.ucdavis.edu) was developed by the University of California, Davis and is based on travel demand elasticities and the relationship of lane mile additions with growth in VMT. It uses Federal Highway Administration (FHWA) definitions of facility type and ascribes VMT increases to each facility. Output data includes increases in million miles of VMT per year. Caltrans is investigating the use of this tool for all of its VMT analyses of capital projects on the State Highway System. Figure 10 provides an illustration of the tool.

Because of limitations in applying the NCST calculator to roadways within the City, the City recommends using the KCAG model to determine VMT impacts associated with transportation projects in case the project is not eligible to be screened out from a VMT analysis. The screening criteria for transportation projects is included under Section 3.2 of this report.



Source: https://blinktag.com/induced-travel-calculator/index.html

Figure 10: Caltrans Induced Travel Calculator

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6.0 VMT THRESHOLD ANALYSIS FOR LAND USE PLANS

The TA provides guidance on the treatment of CEQA traffic analyses for land use plans (General Plan, Specific Plan) as follows:

- Analyze the VMT outcomes over the full area over which the plan may substantively affect travel patterns (the definition of region).
- VMT shall be counted in full rather than split between origins and destinations (the full impact of the project VMT).

Specifically, OPR states, "A general plan, area plan, or community plan may have a significant impact on transportation if proposed new residential, office or retail land uses would in aggregate exceed the respective thresholds recommended above." (OPR TA page 18) This recommendation refers to a threshold of 15 percent lower than the existing regional average for residential and office uses and no net gain for retail land uses.

To assess a land use plan, use of a traffic-forecasting tool shall be applied. The total VMT for the plan shall be identified for all trips and all potential VMT contributors within the plan area. Model runs shall be conducted for the existing base year and the horizon year (the future year scenario analyzed in the Circulation Element of the City's General Plan) with project (plan).

SB 375 establishes ambitious and achievable GHG reduction targets for the 18 Metropolitan Planning Organizations (MPOs) in the State. Achievement of these targets is to be accomplished through the improved integration of regional land use and transportation planning processes; not solely through the imposition of new regulation on passenger cars and light-duty trucks.

CARB reviews the SCS that is produced as part of the RTP produced by each of the State's MPOs. The SCS details the strategies and programs the regional agencies are planning to implement to achieve its designated GHG emission reduction targets. CARB approved the new GHG reduction targets for all 18 MPOs in the State in the spring of 2018. The 2018 targets are applicable to the third SCSs for the MPOs.

Other legislative mandates and State policies are also supportive of GHG reduction targets. A sample of these include:

- Assembly Bill 32 (2006) requires statewide GHG emissions reductions to 1990 levels by 2020 and continued reductions beyond 2020.
- SB 32 (2016) requires at least a 40 percent reduction in GHG emissions from 1990 levels by 2030.
- Executive Order (EO) B-30-15 (2015) sets a GHG emissions reduction target of 40 percent below 1990 levels by 2030.
- EO S-3-05 (2005) sets a GHG emissions reduction target of 80 percent below 1990 levels by 2050.
- EO B-16-12 (2012) specifies a GHG emissions reduction target of 80 percent below 1990 levels by 2050 specifically for transportation.

These mandates suggest that a land use plan consistent with the regional RTP/SCS would generally help achieve the target GHG reductions for the region.

California PRC Section 15064.3(b)(4) states (in part) the following:

> *A lead agency has discretion to choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household, or in any other measure.*

Since VMT is the largest contributor to GHG emissions, a land use plan consistent with regional RTP/SCS GHG reductions target does not constitute a significant VMT impact. Therefore, the methodology for conducting VMT assessments for land use plans shall be the comparison of existing VMT per capita, VMT per employee, and/or VMT per service population for the region with the respective expected horizon year VMT metrics for the different land use components (VMT per capita, VMT per employee, and/or VMT per service population) of the land use plan (project). If there is a net increase in the VMT metric under horizon year conditions, then the project will have a significant impact.

7.0 MITIGATION STRATEGIES

When a lead agency identifies a potentially significant CEQA VMT impact according to the thresholds described in this report, the agency must identify feasible mitigation measures to avoid or substantially reduce that impact. Unlike LOS impacts, which may be mitigated with location-specific motor vehicle delay improvements, VMT impacts typically require a more regional approach to mitigation, including the provision of incentives to effect changes in travel behavior. Enforcement of mitigation measures will still be subject to the mitigation monitoring requirements of CEQA, as well as the regular police powers of the agency. VMT mitigation measures may also be incorporated into the design of plans, policies, regulations, or projects.

7.1 DEFINITION OF MITIGATION

Section 15370 of the *2022 State CEQA Guidelines* defines mitigations as follows:

> *"Mitigation" includes:*
>
> *a. Avoiding the impact altogether by not taking a certain action or parts of an action.*
>
> *b. Minimizing impacts by limiting the degree or magnitude of the action and its implementation.*
>
> *c. Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.*
>
> *d. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.*
>
> *e. Compensating for the impact by replacing or providing substitute resources or environments, including through permanent protection of such resources in the form of conservation easements.*

Section 15097 of the *CEQA Guidelines* states that, "the public agency shall adopt a program for monitoring or reporting on the revisions which it has required in the project and the measures it has imposed to mitigate or avoid significant environmental effects. A public agency may delegate reporting or monitoring responsibilities to another public agency or to a private entity which accepts the delegation; however, until mitigation measures have been completed the lead agency remains responsible for ensuring that implementation of the mitigation measures occurs in accordance with the program."

VMT mitigations may not necessarily be physical improvements. Such improvements are complex in nature and will significantly depend on changes in traveler behavior. Therefore, it will be important that lead agencies develop an appropriate monitoring program to ensure the implementation of these mitigation measures throughout the life of a project, in compliance with CEQA. The City must also coordinate with other responsible agencies as part of the mitigation monitoring program to evaluate the ongoing feasibility and durability of the mitigations.

Historically, mitigation measures for LOS-based transportation impacts have addressed either trip generation reductions or traffic-flow-capacity enhancements. LOS mitigation measures typically

include physical infrastructure improvements adding capacity to intersections, roadways, ramps, and freeways. However, transportation demand management activities, active transportation amenities, and other measures designed to reduce the number of new single-occupancy vehicle trips are also potential LOS mitigation strategies.

VMT mitigation measures are significantly different. Most VMT mitigations may seem feasible from a theoretical perspective, but practical implementation of these strategies as formal CEQA mitigation measures in perpetuity is yet to be tested. Several of these mitigations are contextual and behavioral in nature. Their success will depend on the size and location of the project as well as expected changes in travel behavior. For example, a project providing a bike share program does not necessarily guarantee a travel mode change among the project's affected population; the level of improvement may be uncertain and subject to the travel preferences and attitudes of the population affected.

LOS mitigations (such as addition of turn lanes) focus more on rectifying a physical CEQA impact (strategy "c" of *State CEQA Guidelines* Section 15370). On the contrary, the majority of VMT mitigations (such as commute trip-reduction programs) aim at reducing or eliminating an impact over time through preservation and monitoring over the life of the project (strategy "d" of *State CEQA Guidelines* Section 15370). Additionally, some VMT mitigations (such as those focused on land use/location-based policies) aim at minimizing impacts by reducing the number of trips generated by the projects (strategy "b" of *State CEQA Guidelines* Section 15370).

Furthermore, it may be determined that some VMT impacts are not able to be feasibly mitigated at the project level. Most VMT impacts occur within the context of a regional scale of analysis. The incremental change in VMT associated with a project in its particular locational setting might indicate a greater VMT increase than individual mitigation strategies can offset. Only a regional solution (e.g., completion of a transit system, purchase of more transit buses, or gap closure of a bicycle lane network) may offer the incremental change necessary to reduce the VMT impact to an appropriate level of significance. Also, VMT, as a proxy for GHG emissions, may not require locational specificity. A project does not necessarily need to reduce the VMT at the project site to provide regional or statewide VMT and GHG reduction benefits. Offsets in an area where the benefit would be greater will have a more effective reduction in VMT and GHG and contribute to achievement of regional and statewide climate goals. This regional perspective provides the basis for cap-and-trade style VMT mitigation strategies.

The issues of regional scale, appropriate and timely fair share contributions from projects and/or local jurisdictions (partial versus comprehensive participation), and geographic ambiguity confound the certainty of the City's identification of an effective VMT mitigation strategy. Section 15126.4 of the *State CEQA Guidelines* states, "Where several measures are available to mitigate an impact, each should be discussed and the basis for selecting a particular measure should be identified. **Formulation of mitigation measures shall not be deferred until some future time."** [Emphasis added.] Regional VMT mitigation is considered the most effective method for large-scale VMT reduction, as cost and implementation barriers are often greater than one project may feasibly accommodate. However, regionally scaled VMT mitigation strategies may be provided in the form of mitigation banks, fees, and/or exchanges, with individual projects subject to contribute to these programs consistent with applicable provisions to ensure compliance and consistency with CEQA and other legal requirements.

Section 21099 (b) (4) of the PRC states, "This subdivision [requiring a new transportation metric under CEQA] does not preclude the application of local general plan policies, zoning codes, conditions of approval, thresholds, or any other planning requirements pursuant to the police power or any other authority." Hence, although automobile delay will no longer be considered a significant impact under CEQA, the City can still require projects to meet the LOS standards designated in its zoning code or general plan. Therefore, this report is not intended to supersede LOS assessment in the City's evaluation of projects, and a project may still be required to propose LOS improvements for congestion relief in addition to the implementation of any VMT mitigation strategies as required by CEQA.

7.2 MITIGATION MEASURES AND PROJECT ALTERNATIVES

Mitigations and project alternatives for VMT impacts have been suggested by the OPR. VMT mitigations can be extremely diverse and can be classified under several categories such as land use/ location, road pricing, transit improvements, commute trip reduction strategies, and parking pricing/ policy. However, the issue with VMT mitigations is the quantitative measurement of the relief provided by the strategies. How much VMT reduction does a transportation demand management program, a bike share program, a transit route, or one mile of sidewalk provide? Improvements related to VMT reduction strategies have been quantified in sources such as the California Air Pollution Control Officers Association (CAPCOA) report *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (CAPCOA Manual) Final Draft*, December 2021, and by various resources provided by CARB. This information is generally presented with a wide range of potential VMT reduction percentages. This report does not, however, confirm the existence of substantial evidence supporting the application of any such mitigation measures to projects within the City. If a CAPCOA mitigation measure will be considered for a project, it must be determined, through substantial evidence, that the mitigation measure will result in VMT reduction in the manner suggested. For example, if a mitigation measure's VMT reduction will be calculated by use of a mathematical formula, the formula, including each of its components, must be analyzed to confirm that they reflect the conditions existing in the City, and the analysis must be supported by substantial evidence. In other words, a mitigation measure, which is reliant upon a formula developed utilizing data from and conditions in a locale that is dissimilar to the City, may be inapplicable to a project within the City. Similarly, any mitigation measure suggested by CAPCOA that depends on cited reports or studies must be assessed to determine whether substantial evidence confirms that such reports and studies apply to the conditions under which a proposed project will be developed within the City. Mitigation measures will not be utilized merely because they are suggested by CAPCOA or another organization.

Table F provides a summary of various potential VMT mitigation measures and project alternatives presented in the *CAPCOA Manual* (only those strategies directly attributed to transportation) for development projects. For any VMT mitigation measure, the project applicant will be required to provide substantial evidence while identifying a project-specific value.

Additionally, the mitigation measures listed under Table F were compared with the City's General Plan goals and policies. Mitigation measures that would be consistent with the City's General Plan goals and policies have been noted in the table.

As for land use plans, the OPR TA does not specifically identify any VMT mitigations. The potential VMT mitigation measures for community/general plans are similar to those available for development projects, with certain modifications. Therefore, the mitigation measures provided in Table F can be used as appropriate. Additional measures may also be applied with substantial evidence.

It must be noted that Table F provides only summaries of the VMT mitigations provided in the sources indicated above. The reader shall refer to the original source for further details and for subsequent updates to the mitigation measures. Also, Table F does not provide an exhaustive list of VMT mitigation measures for offsetting CEQA transportation impacts. Other measures can also be accepted by the City based on the provision of substantial evidence.

As additional mitigation measures are evaluated to offset VMT impacts in the future for the *State CEQA Guidelines* process, linkages between a specific strategy and its quantified incremental VMT reduction effect must be established. This process may be based on the observations and measurements provided by other sources or by the City's experience in these practices. The key to effective VMT mitigation is to base its efficacy on real and substantial evidence.

7.3 FUNDING MECHANISMS

The change in methodology used for the assessment of CEQA transportation impacts from LOS to VMT will lead to a shift in and the scale of mitigation efforts from local and project-specific, to a more regional approach. OPR acknowledges the regional nature of VMT impacts and states that regional VMT reduction programs and fee programs (in-lieu fees and development impact fees) may be appropriate forms of mitigation. Fee programs are particularly useful to address cumulative impacts. It is very important for the City to coordinate with KCAG to develop such mitigation programs that may be used to fund new transit service or develop applicable active transportation plans or other regionally scaled VMT mitigation activities. These programs are regional in nature and best suited for administration by a regional agency. Projects may be able to pay into the fee program to offset project VMT impact. Regional agencies may also wish to coordinate with appropriate stakeholders, including participating local jurisdictions, developers, and other interests while conducting nexus studies and checking for rough proportionality and compliance with CEQA.

Most of the VMT mitigations included in Table F are applicable in urban areas. They are less effective in suburban and rural contexts, where traditional transportation demand management strategies are less feasible. Thus, site-specific strategies are more suitable in more densely urbanized areas, whereas program-level strategies may be more appropriate for some projects located in suburban or rural areas. In the latter approach, the cumulative VMT mitigation contributions provided in support of individual developments may be used to fund regional VMT reduction strategies that would not be feasible or cost-effective at the individual project scale. Apart from fee programs, program-based mitigation strategies may include VMT mitigation exchanges and/or VMT mitigation banks. The VMT mitigation exchange concept requires a developer to select and implement mitigation project(s) from a predetermined list of projects that would serve to reduce the excess new VMT generated by the proposed project. On the other hand, a mitigation banking program would assign monetary values for VMT reductions that would allow developers to purchase the applicable number of VMT reduction credits. These credits would be used to fund larger, regionally scaled VMT mitigation projects throughout the affected region.

As previously discussed, VMT impacts are regional in scope. Hence, there may at times be mitigation requirements that extend beyond the control of the City, and without the ability of the City to manage these mitigations, the impacts might remain significant and unaddressed. Additionally, the identification and management of regionally scaled improvements where developers contribute their fair share to mitigate impacts might prove to be difficult. Therefore, the City may choose to work collaboratively with other jurisdictions within the region to ultimately establish VMT mitigation fee programs, mitigation banks, or exchanges to establish a regional mitigation pathway where developers contribute to a regionally administered VMT mitigation funding pool in a manner commensurate to the impact of their individual project. Procedural flow charts for VMT mitigation banks, exchanges, and impact fees are illustrated in Figures 11, 12, and 13, respectively.

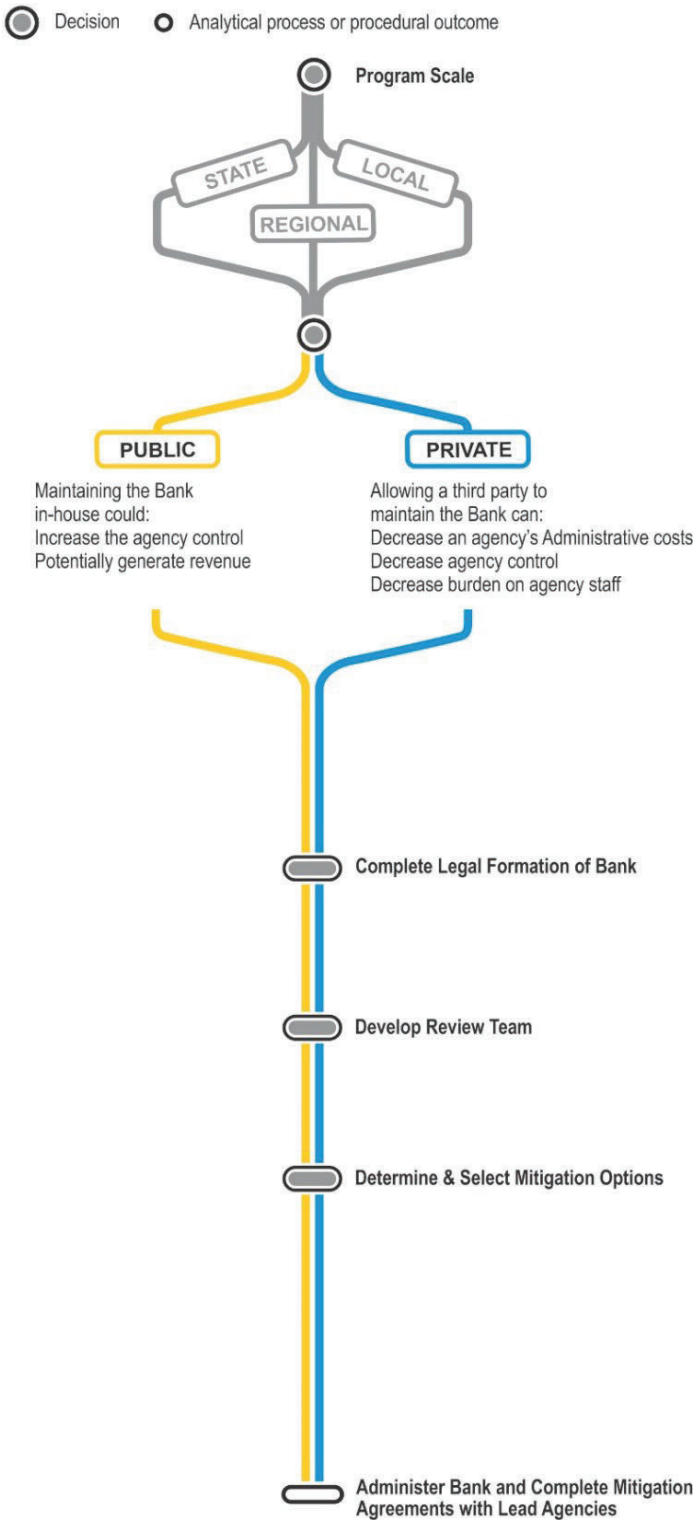

Figure 11: Procedural Flow Chart – VMT Bank

Source: VMT Mitigation Through Banks and Exchanges: Understanding New Mitigation Approaches. A White Paper by Fehr & Peers (January 2020).

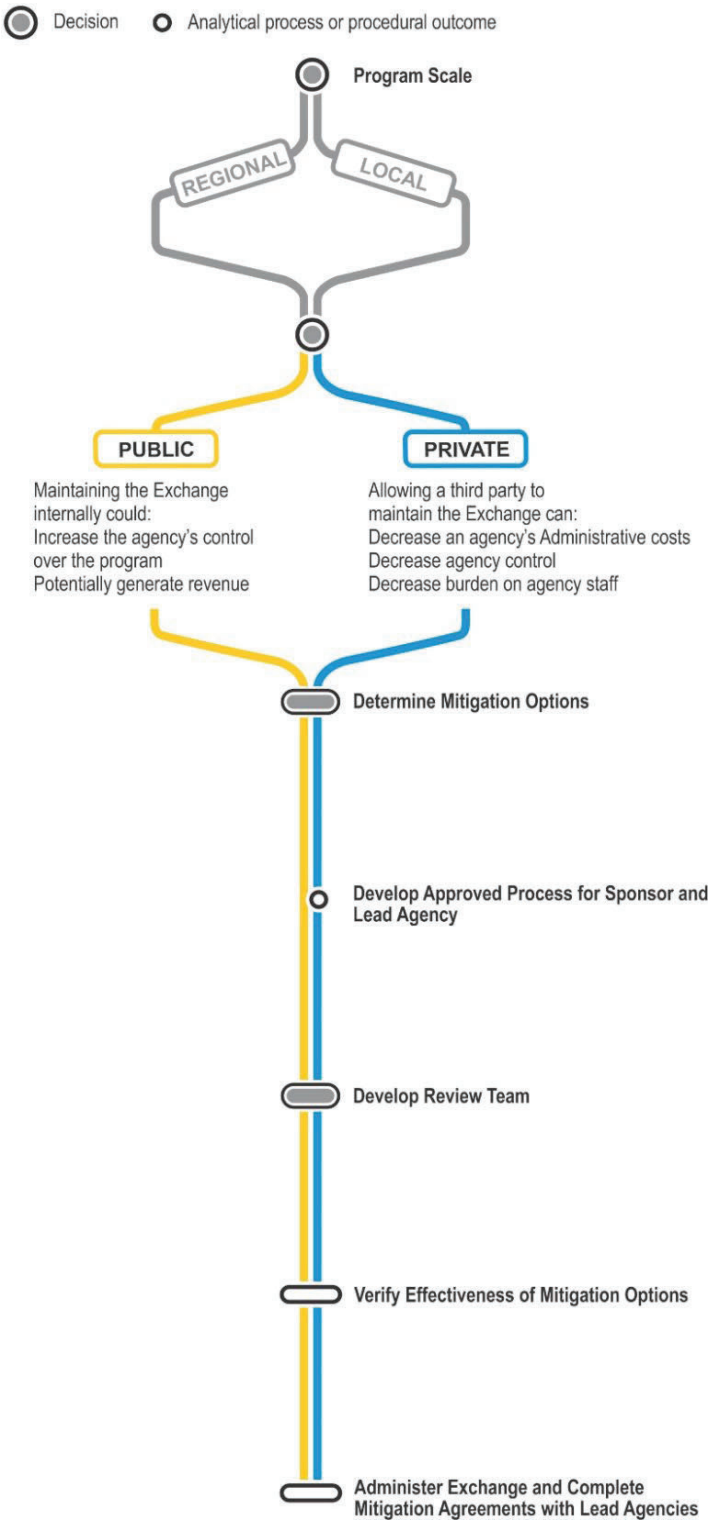

Figure 12: Procedural Flow Chart – VMT Exchange

Source: VMT Mitigation Through Banks and Exchanges: Understanding New Mitigation Approaches. A White Paper by Fehr & Peers (January 2020).

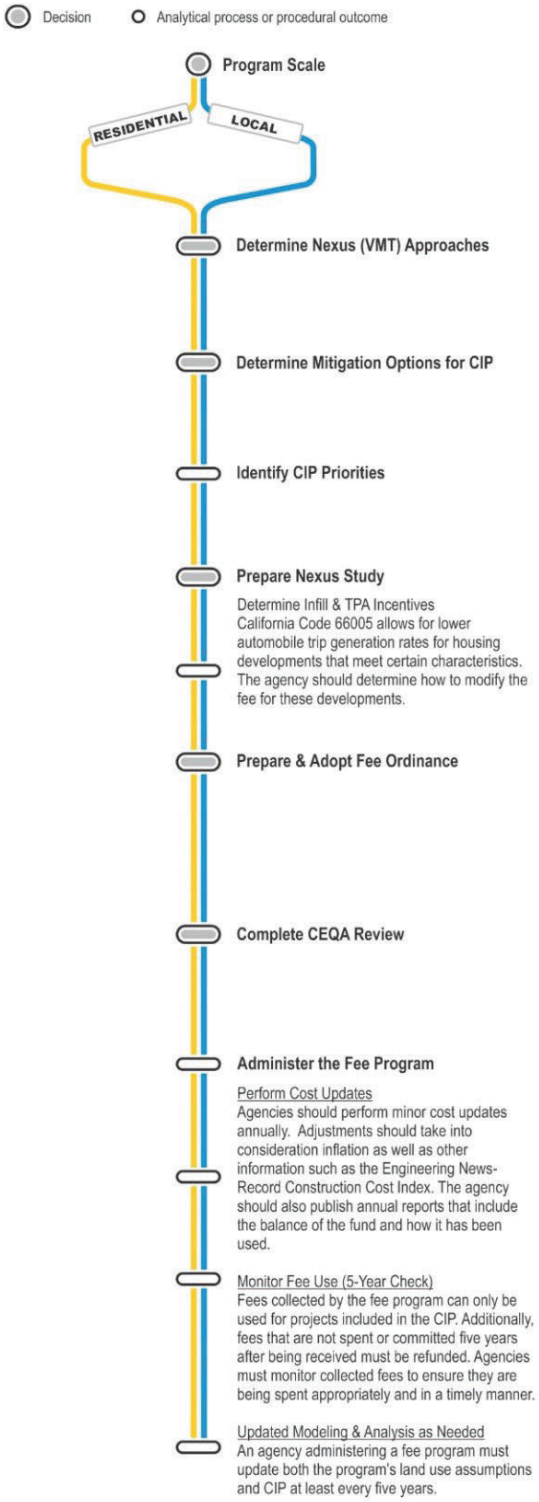

Figure 13: Procedural Flow Chart – VMT Impact Fee

Source: Understanding New Mitigation Approaches. A White Paper by Fehr & Peers (January 2020).

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Table F - Vehicle Miles Traveled Mitigation Measures for Land Development Projects

No.	CAPCOA Mitigation Measure No.	Mitigation Measure	Measure Description	Locational Context	Scale of Application	Implementation Requirements	Expanded Mitigation Options	Formula	VMT Reduction
1	T-1	Increase Residential Density	This measure accounts for the vehicle miles traveled (VMT) reduction achieved by a project that is designed with a higher density of dwelling units (DU) compared to the average residential density in the U.S. 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 and thus a reduction in GHG emissions. This measure is best quantified when applied to larger developments and developments where the density is somewhat similar to the surrounding area due to the underlying research being founded in data from the neighborhood level.	Urban, Suburban	Project/Site	This measure is most accurately quantified when applied to larger developments and/or developments where the density is somewhat similar to the surrounding neighborhood.	When paired with Measure T-2, Increase Job 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.	Refer to California Air Pollution Control Officers Association (CAPCOA) report Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (CAPCOA Manual), Final Draft, December 2021, page 71.	Up to 30.0 percent project VMT in the study area
2	T-2	Increase Job Density	This measure accounts for the VMT reduction achieved by a project that is designed with a higher density of jobs compared to the average job density in the U.S. 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 and thus a reduction in GHG emissions.	Urban, suburban	Project/Site	This measure is most accurately quantified when applied to larger developments and/or developments where the density is somewhat similar to the surrounding neighborhood.	When paired with Measure T-1, 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.	Refer to CAPCOA Manual, page 74.	Up to 30.0 percent project VMT in the study area
3	T-3	Provide Transit-Oriented Development	This measure would reduce project VMT in the study area relative to the same project sited in a non-transit-oriented development (TOD) location. 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 and associated GHG emissions.	Urban, suburban. Rural only if adjacent to commuter rail station with convenient rail service to a major employment center.	Project/Site	To qualify as a 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. Users should confirm "unmitigated" or "baseline" VMT does not already account for reductions from transit proximity.	When building TOD, a best practice is to incorporate bike and pedestrian access into the larger network to increase the likelihood of transit use.	Refer to CAPCOA Manual, page 77.	Up to 31.0 percent project VMT in the study area
4	T-4	Integrate Affordable and Below Market Rate Housing	This measure requires below market rate (BMR) housing. 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. The quantification method for this measure accounts for VMT reductions achieved for multifamily residential projects that are deed restricted or otherwise permanently dedicated as affordable housing.	Urban, suburban	Project/Site	Multifamily residential units must be permanently dedicated as affordable for lower income families. The California Department of Housing and Community Development (2021) defines lower-income as 80 percent of area median income or below, and affordable housing as costing 30 percent of gross household income or less.	Pair with Measure T-1, Increase Residential Density, and Measure T-2, Increase Job Density, to achieve greater population and employment diversity.	Refer to CAPCOA Manual, page 81.	Up to 28.6 percent project/site multifamily residential VMT
5	T-5	Implement Commute Trip Reduction Program (Voluntary)	This measure will implement a voluntary 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. Voluntary implementation elements are described in this measure.	Urban, suburban	Project/Site	Voluntary CTR programs must include the following elements to apply the VMT reductions reported in literature. • Employer-provided services, infrastructure, and incentives for alternative modes such as ridesharing (Measure T-8), discounted transit (Measure T-9), bicycling (Measure T-10), vanpool (Measure T-11), and guaranteed ride home. • Information, coordination, and marketing for said services, infrastructure, and incentives (Measure T-7).	Other strategies may also be included as part of a voluntary CTR program, though they are not included in the VMT reductions reported by literature and thus are not incorporated in the VMT reductions for this measure. This program typically serves as a complement to the more effective workplace CTR measures such as pricing workplace parking (Measure T-12) or implementing employee parking "cash-out" (Measure T-13).	Refer to CAPCOA Manual, page 84.	Up to 4.0 percent project/site employee commute VMT
6	T-6	Implement Commute Trip Reduction Program (Mandatory Implementation and Monitoring)	This measure will implement a mandatory 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.	Urban, suburban	Project/Site	The mandatory CTR program must include all other elements (i.e., Measures T-7 through T-11) described for the voluntary program (Measure T-5) plus include mandatory trip reduction requirements (including penalties for non-compliance) and regular monitoring and reporting to ensure the calculated VMT reduction matches the observed VMT reduction.	This program typically serves as a complement to the more effective workplace CTR measures, such as pricing workplace parking (Measure T-12) or implementing employee parking "cash-out" (Measure T-13).	Refer to CAPCOA Manual, page 87.	Up to 26.0 percent project/site employee commute VMT
7	T-7	Implement Commute Trip Reduction Marketing	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 and GHG emissions.	Urban, suburban	Project/Site	The following features (or similar alternatives) of the marketing strategy are essential for effectiveness. • Onsite or online commuter information services. • Employee transportation coordinators. • Onsite or online transit pass sales. • Guaranteed ride home service.	This measure could be packaged with other commute trip reduction measures (Measures T-8 through T-13) as a comprehensive CTR program (Measure T-5 or T-6).	Refer to CAPCOA Manual, page 90.	Up to 4.0 percent project/site employee commute VMT

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Table F - Vehicle Miles Traveled Mitigation Measures for Land Development Projects

No.	CAPCOA Mitigation Measure No.	Mitigation Measure	Measure Description	Locational Context	Scale of Application	Implementation Requirements	Expanded Mitigation Options	Formula	VMT Reduction
8	T-8	Provide Ridesharing Program	This measure will implement a ridesharing program and 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, and GHG emissions.	Urban, suburban	Project/Site	Ridesharing must be promoted through a multifaceted approach. Examples include the following. • Designating a certain percentage of desirable parking spaces for ridesharing vehicles. • Designating adequate passenger loading and unloading and waiting areas for ridesharing vehicles. • Providing an app or website for coordinating rides.	When providing a ridesharing program, a best practice is to establish funding by a non-revocable funding mechanism for employer-provided subsidies. In addition, encourage use of low-emission ridesharing vehicles (e.g., shared Uber Green). This measure could be paired with any combination of the other commute trip reduction strategies (Measures T-7 through T-13) for increased reductions.	Refer to CAPCOA Manual, page 93.	Up to 8.0 percent project/site employee commute VMT
9	T-9	Implement Subsidized or Discounted Transit Program	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 and thus a reduction in GHG emissions.	Urban, suburban	Project/Site	The project should be 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. If a well-established bikeshare service (Measure T-22-A) is available, the site may be located up to 2 miles from a high-quality transit service. If more than one transit agency serves the site, subsidies should be provided that can be applied to each of the services available. If subsidies are applied for only one service, all variable inputs below should also pertain only to the service that is subsidized.	This measure could be paired with any combination of the other commute trip reduction strategies (Measures T-7 through T-13) for increased reductions.	Refer to CAPCOA Manual, page 96.	Up to 5.5 percent from employee/resident vehicles accessing the site
10	T-10	Provide End-of-Trip Bicycle Facilities	This measure will install and maintain end-of-trip facilities for employee use. End-of-trip facilities include bike parking, bike lockers, showers, and personal lockers. The provision and maintenance of secure bike parking and related facilities encourages commuting by bicycle, thereby reducing VMT and GHG emissions.	Urban, suburban	Project/Site	End-of-trip facilities should be installed at a size proportional to the number of commuting bicyclists and regularly maintained.	Best practice is to include an onsite bicycle 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. This measure could be paired with any combination of the other commute trip reduction strategies (Measures T-7 through T-13) for increased reductions.	Refer to CAPCOA Manual, page 101.	Up to 4.4 percent project/site employee commute VMT
11	T-11	Provide Employer-Sponsored Vanpool	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, thereby reducing GHG emissions.	Urban, suburban, rural	Project/Site	Vanpool programs are more appropriate for the building occupant or tenant (i.e., employer) to implement and monitor than the building owner or developer.	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. This measure could be paired with any combination of the other commute trip reduction strategies (Measures T-7 through T-13) for increased reductions.	Refer to CAPCOA Manual, page 105.	Up to 20.4 percent project/site employee commute VMT
12	T-12	Price Workplace Parking	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, thereby reducing associated GHG emissions.	Urban, suburban	Project/Site	Implementation may include the following. • Explicitly charging for employee parking. • Implementing above-market rate pricing. • Validating parking only for invited guests (or not providing parking validation at all). • Not providing employee parking and transportation allowances. In addition, this measure should include marketing and education regarding available alternatives to driving.	Best practice is to ensure that other transportation options are available, convenient, and have competitive travel times (i.e., transit service near the project site, shuttle service, or a complete active transportation network serving the site and surrounding community), 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 available or where unrestricted street parking or other offsite parking is available nearby and has adequate capacity to accommodate project-related vehicle parking demand.	Refer to CAPCOA Manual, page 110.	Up to 20.0 percent project/site employee commute VMT
13	T-13	Implement Employee Parking Cash-Out	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 and GHG emissions.	Urban, suburban	Project/Site	To prevent spill-over parking and continued use of single occupancy vehicles, residential parking in the surrounding area must be permitted, and public on-street parking must be market rate.	This measure could be paired with many other commute trip reduction strategies (Measures T-7 through T-11) for increased reductions.	Refer to CAPCOA Manual, page 114.	Up to 12.0 percent project/site employee commute VMT
14	T-14	Provide Electric Vehicle Charging Infrastructure	Install onsite electric vehicle chargers in an amount beyond what is required by the 2019 California Green Building Standards (CALGreen) at buildings with designated parking areas (e.g., commercial, educational, retail, multifamily). This will enable drivers of plug-in hybrid electric vehicles (PHEVs) to drive a larger share of miles in electric mode (eVMT), as opposed to gasoline-powered mode, thereby displacing GHG emissions from gasoline consumption with a lesser amount of indirect emissions from electricity. Most PHEVs owners charge their vehicles at home overnight. When making trips during the day, the vehicle will switch to gasoline mode if/when it reaches its maximum all-electric range.	Urban, suburban, rural	Project/Site	Parking at the chargers must be limited to electric vehicles.	In addition to increasing the percentage of electric miles for PHEVs, the increased availability of chargers from implementation of this measure could mitigate consumer "range anxiety" concerns and increase the adoption and use of battery electric vehicles (BEVs), but this potential effect is not included in the calculations as a conservative assumption. Expanded mitigation could include quantification of the effect of this measure on BEV use.		-

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Table F - Vehicle Miles Traveled Mitigation Measures for Land Development Projects

No.	CAPCOA Mitigation Measure No.	Mitigation Measure	Measure Description	Locational Context	Scale of Application	Implementation Requirements	Expanded Mitigation Options	Formula	VMT Reduction
15	T-15	Limit Residential Parking Supply	This measure will reduce the total parking supply available at a residential project or site. 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 and thus a reduction in GHG emissions. Evidence of the effects of reduced parking supply is strongest for residential developments.	Urban, suburban	Project/Site	This measure is ineffective in locations where unrestricted street parking or other offsite parking is available nearby and has adequate capacity to accommodate project-related vehicle parking demand.	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). Limiting parking supply may also allow for more active uses on any given lot, which may support Measures T-1 and T-2 by allowing for higher density construction.	Refer to CAPCOA Manual, page 123.	Up to 13.7 percent from resident vehicles accessing the site
16	T-16	Unbundle Residential Parking Costs from Property Cost	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 and GHG emissions. Unbundling may not be available to all residential developments, depending on funding sources.	Urban, suburban	Project/Site	Parking costs must be passed through to the vehicle owners/drivers utilizing the parking spaces for this measure to result in decreased vehicle ownership.	Pair with Measure T-19-A or T-19-B to ensure that residents who eliminate their vehicle and shift to a bicycle can safely access the area's bikeway network.	Refer to CAPCOA Manual, page 127.	Up to 15.7 percent project VMT in the study area
17	T-17	Improve Street Connectivity	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 and thus a reduction in GHG emissions.	Urban, suburban	Plan/Community	Projects that increase intersection density would be building a new street network in a subdivision or retrofitting an existing street network to improve connectivity (e.g., converting cul-de-sacs or dead-end streets to grid streets).	Pair with Measure T-18, Provide Pedestrian Network Improvement, to best support use of the local pedestrian network.	Refer to CAPCOA Manual, page 131.	Up to 30.0 percent from vehicle travel in the plan/community
18	T-18	Provide Pedestrian Network Improvement	This measure will increase the sidewalk coverage to improve pedestrian access. Providing sidewalks and an enhanced pedestrian network encourages people to walk instead of drive. This mode shift results in a reduction in VMT and GHG emissions.	Urban, suburban, rural	Plan/Community	The GHG reduction of this measure is based on the VMT reduction associated with expansion of sidewalk coverage expansion, which includes not only building of new sidewalks but also improving degraded or substandard sidewalk (e.g., damaged from street tree roots). However, pedestrian network enhancements with non-quantifiable GHG reductions are encouraged to be implemented, as discussed under Expanded Mitigation Options.	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. Other best practice features could include high-visibility crosswalks, pedestrian hybrid beacons, and other pedestrian signals, mid-block crossing walks, pedestrian refuge islands, speed tables, bulb-outs (curb extensions), curb ramps, signage, pavement markings, pedestrian-only connections and districts, landscaping, and other improvements to pedestrian safety (see Measure T-3S, Provide Traffic Calming Measures).	Refer to CAPCOA Manual, page 134.	Up to 6.4 percent from vehicle travel in the plan/community
19	T-19-A	Construct or Improve Bike Facility	This measure will construct or improve a single bicycle lane facility (only Class I, II, or IV) that connects to a larger existing bikeway network. Providing bicycle infrastructure helps to improve biking conditions within an area. This encourages a mode shift on the roadway parallel to the bicycle facility from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. When constructing or improving a bicycle facility, a best practice is to consider local or state bike lane width standards. A variation of this measure is provided as T-19-B, Construct or Improve Bike Boulevard.	Urban, suburban	Plan/Community. This measure reduces VMT on the roadway segment parallel to the bicycle facility (i.e., the corridor). An adjustment factor is included in the formula to scale the VMT reduction from the corridor level to the plan/community level.	The bicycle lane facility must be either Class I, II, or IV. Class I bike paths are physically separated from motor vehicle traffic. Class IV bikeways are protected on-street bikeways, also called cycle tracks. Class II bike lanes are striped bicycle lanes that provide exclusive use to bicycles on a roadway.	Implement alongside Measures T-22-A, T-22-B, and/or T-22-C to ensure that micromobility users can ride safely along bicycle lane facilities and not have to ride along pedestrian infrastructure, which is a risk to pedestrian safety.	Refer to CAPCOA Manual, page 138.	Up to 0.8 percent from vehicles on parallel roadways
20	T-19-B	Construct or Improve Bike Boulevard	Construct or improve a single bicycle boulevard that connects to a larger existing bikeway network. Bicycle 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 bicycles, displacing VMT and thus reducing GHG emissions. A variation of this measure is provided as T-19-A, Construct or Improve Bike Facility, which is for Class I, II, or IV bicycle infrastructure.	Urban, suburban	Plan/Community. This measure reduces VMT on the roadway segment parallel to the bicycle facility (i.e., the corridor). An adjustment factor is included in the formula to scale the VMT reduction from the corridor level to the plan/community level.	The following roadway conditions must be met. • Functional classification: local and collector if there is no more than a single general-purpose travel lane in each direction. • Design speed: <= 25 miles per hour. • Design volume <= 5,000 average daily traffic. • Treatments at major intersections: both directions have traffic signals (or an effective control device that prioritizes pedestrian and bicycle access such as rapid flashing beacons, pedestrian hybrid beacons, high-intensity activated crosswalks, TOUCANs), bike route signs, "sharrowed" roadway markings, and pedestrian crosswalks.	Construct boulevards with forced turns for vehicles every few blocks to minimize through traffic while ensuring that speed and volume metrics are met. Implement alongside Measures T-22-A, T-22-B, and/or T-22-C to ensure that micromobility users can ride safely along bicycle lane facilities and not pedestrian infrastructure, which is a risk to pedestrian safety.	Refer to CAPCOA Manual, page 143.	Up to 0.2 percent from vehicles on roadways
21	T-20	Expand Bikeway Network	This measure will increase the length of a city or community bikeway network. A bicycle network is an interconnected system of bike lanes, bike paths, bike routes, and cycle tracks. Providing bicycle 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 bicycles, displacing VMT and thus reducing GHG emissions. When expanding a bicycle network, a best practice is to consider bike lane width standards from local agencies, state agencies, or the National Association of City Transportation Officials' Urban Bikeway Design Guide.	Urban, suburban	Plan/Community	The bikeway network must consist of either Class I, II, or IV infrastructure.	As networks expand, ensure safe, secure, and weather-protected bicycle parking facilities at origins and destinations. Also, implement alongside T-22-A, T-22-B, and/or T-22-C to ensure that micromobility options can ride safely along bicycle lane facilities and not have to ride along pedestrian infrastructure, which is a risk to pedestrian safety.	Refer to CAPCOA Manual, page 147.	Up to 0.5 percent from vehicle travel in the plan/community

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No.	CAPCOA Mitigation Measure No.	Mitigation Measure	Measure Description	Locational Context	Scale of Application	Implementation Requirements	Expanded Mitigation Options	Formula	VMT Reduction
22	T-21-A	Implement Conventional Carshare Program	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 avoiding VMT and associated GHG emissions. A variation of this measure, electric carsharing, is described in Measure T-21-B, Implement Electric Carshare Program.	Urban, suburban	Plan/Community	The GHG mitigation potential is based, in part, on literature analyzing one-way carsharing service with a free-floating operational model. This measure should be applied with caution if using a different form of carsharing (e.g., roundtrip, peer-to-peer, fractional).	When implementing a carshare program, best practice is to discount carshare membership and provide priority parking for carshare vehicles to encourage use of the service.	Refer to CAPCOA Manual, page 151.	Up to 0.15 percent from vehicle travel in the plan/community
23	T-21-B	Implement Electric Carshare Program	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 avoiding VMT and associated GHG emissions. This also encourages a mode shift from internal combustion engine vehicles to electric vehicles, displacing the emissions-intensive fossil fuel energy with less emissions-intensive electricity. Electric carshare vehicles require more staffing support compared to conventional carshare programs for shuttling electric vehicles to and from charging points. A variation of this measure, conventional carsharing, is described in Measure T-21-A, Implement Conventional Carshare Program.	Urban, suburban	Plan/Community	The GHG mitigation potential is based, in part, on literature analyzing one-way carsharing service with a free-floating operational model. This measure should be applied with caution if using a different form of carsharing (e.g., roundtrip, peer-to-peer, fractional).	When implementing a carshare program, best practice is to discount carshare membership and provide priority parking for carshare vehicles to encourage use of the service.	Refer to CAPCOA Manual, page 158.	Up to 0.18 percent GHG reduction from vehicle travel in the plan/community. Please refer to VMT reduction formula on CAPCOA Manual, page 158.
24	T-22-A	Implement Pedal (Non-Electric) Bikeshare Program	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 bicycles, displacing VMT and thus reducing GHG emissions. Variations of this measure are described in Measure T-22-B, Implement Electric Bikeshare Program, and Measure T-22-C, Implement Scootershare Program.	Urban, suburban	Plan/Community	The GHG mitigation potential is based, in part, on literature analyzing docked (i.e., station-based) bikeshare programs. This measure should be applied with caution if using dockless (free-floating) bikeshare.	Best practice is to discount bikeshare membership and dedicate bikeshare parking to encourage use of the service. Also consider including space on the vehicle to store personal items while traveling, such as a basket.	Refer to CAPCOA Manual, page 160.	Up to 0.02 percent from vehicle travel in the plan/community
25	T-22-B	Implement Electric Bikeshare Program	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 bicycles, displacing VMT and reducing GHG emissions. Variations of this measure are described in Measure T-22-A, Implement Pedal (Non-Electric) Bikeshare Program, and Measure T-22-C, Implement Scootershare Program.	Urban, suburban	Plan/Community	The GHG mitigation potential is based, in part, on literature analyzing docked (i.e., station-based) bikeshare programs. This measure should be applied with caution if using dockless (free-floating) bikeshare.	Best practice is to discount electric bikeshare membership and dedicate electric bikeshare parking to encourage use of the service. Consider also including space on the vehicle to store personal items while traveling, such as a basket.	Refer to CAPCOA Manual, page 164.	Up to 0.06 percent from vehicle travel in the plan/community. This quantification methodology does not account for the miles traveled from vehicle travel of program employees picking up and dropping off bikes.
26	T-22-C	Implement Scootershare Program	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 and thus reducing GHG emissions. Variations of this measure are described in Measure T-22-A, Implement Pedal (Non-Electric) Bikeshare Program, and Measure T-22-B, Implement Electric Bikeshare Program.	Urban, suburban	Plan/Community	The GHG mitigation potential is based, in part, on literature analyzing docked (i.e., station-based) bikeshare programs. This measure should be applied with caution given the likely higher popularity of scootershare compared to bikeshare.	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.	Refer to CAPCOA Manual, page 168.	Up to 0.07 percent from vehicle travel in the plan/community. This quantification methodology does not account for the miles traveled from vehicle travel of program employees picking up and dropping off scooters.
27	T-23	Provide Community-Based Travel Planning	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 and associated GHG emissions.	Urban, suburban	Plan/Community	CBTP 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. Due to the personalized outreach method, communities are typically targeted in phases.	Pair with any of the Measures from T-17 through T-22-C to ensure that residents that are targeted by CBTP who want to use alternative transportation have the infrastructure and technology to do so.	Refer to CAPCOA Manual, page 172.	Up to 2.3 percent from vehicle travel in the plan/community
28	T-24	Implement Market Price Public Parking (On-Street)	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. This VMT reduction results in a corresponding reduction in GHG emissions.	Urban, suburban	Plan/Community	When pricing on-street parking, best practice is to allow for dynamic adjustment of prices to ensure approximately 85 percent occupancy, which helps prevent induced VMT due to circling behaviors as individuals search for a vacant parking space. In addition, this method should primarily be implemented in areas with available alternatives to driving, such as transit availability within 0.5 mile or areas of high residential density nearby (allowing for increased walking/biking). If the measure is implemented in a small area, residential parking permit programs should be considered to prevent parking intrusion on nearby streets in residential areas without priced parking.	Pricing on-street parking also helps support individual projects with priced onsite parking by removing potential alternative parking locations.	Refer to CAPCOA Manual, page 175.	Up to 30.0 percent from vehicle travel in the plan/community

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Table F - Vehicle Miles Traveled Mitigation Measures for Land Development Projects

No.	CAPCOA Mitigation Measure No.	Mitigation Measure	Measure Description	Locational Context	Scale of Application	Implementation Requirements	Expanded Mitigation Options	Formula	VMT Reduction
29	T-25	Extend Transit Network Coverage or Hours	This measure will 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 and associated GHG emissions.	Urban, suburban	Plan/Community	There are two primary means of expanding the transit network: by increasing the frequency of service, thereby reducing average wait times and increasing convenience, or by extending service to cover new areas and times.	This measure is focused on providing additional transit network coverage, with no changes to transit frequency. This measure can be paired with Measure T-26, Increase Transit Service Frequency, which is focused on increasing transit service frequency, for increased reductions.	Refer to CAPCOA Manual, page 179.	Up to 4.6 percent from vehicle travel in the plan/community
30	T-26	Increase Transit Service Frequency	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 and associated GHG emissions.	Urban, suburban	Plan/Community	Refer to measure description.	This measure is focused on providing increased transit frequency, with no changes to transit network coverage. This measure can be paired with Measure T-25, Extend Transit Network Coverage or Hours, which is focused on increasing transit network coverage, for increased reductions.	Refer to CAPCOA Manual, page 185.	Up to 11.3 percent GHG reduction from vehicle travel in the plan/community. Please refer to VMT reduction formula on CAPCOA Manual, page 185.
31	T-27	Implement Transit-Supportive Roadway Treatments	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 and the associated GHG emissions.	Urban, suburban	Plan/Community	Treatments can include transit signal priority, bus-only signal phases, queue jumps, curb extensions to speed passenger loading, and dedicated bus lanes.	This measure could be paired with other Transit subsector strategies (Measure T-25 and Measure T-29) for increased reductions.	Refer to CAPCOA Manual, page 189.	Up to 0.6 percent from vehicle travel in the plan/community
32	T-28	Provide Bus Rapid Transit	This measure will convert an existing bus route to a bus rapid transit (BRT) system. 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. 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 and the associated GHG emissions.	Urban, suburban	Plan/Community	The measure quantification methodology accounts for the increase in ridership from (1) improved travel times from transit signal prioritization, (2) increased service frequency, and (3) the unique ridership increase associated with a full-featured BRT service operating on a fully segregated running way with specialized (or stylized) vehicles, attractive stations, and efficient fare collection practices. To take credit for the estimated emissions reduction, the user should implement, at minimum, these components.	This measure could be paired with Measure T-25, Extend Transit Network Coverage or Hours, and Measure T-29, Reduce Transit Fares, for increased reductions.	Refer to CAPCOA Manual, page 193.	Up to 13.8 percent from vehicle travel in the plan/community. Please refer to VMT reduction formula on CAPCOA Manual, page 195.
33	T-29	Reduce Transit Fares	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 and associated GHG emissions. This measure differs from Measure T-8, Implement Subsidized or Discounted Transit Program, which can be offered through employer-based benefits programs in which the employer fully or partially pays the employee's cost of transit.	Urban, suburban	Plan/Community	Transit fare reductions can be implemented systemwide or in specific fare-free or reduced-fare zones.	This measure could be paired with other Transit subsector strategies (Measure T-25, Extend Transit Network Coverage or Hours, and Measure T-26, Increase Transit Service Frequency) for increased reductions.	Refer to CAPCOA Manual, page 200.	Up to 1.2 percent from vehicle travel in the plan/community
34	T-30	Use Cleaner-Fuel Vehicles	This measure requires use of cleaner-fuel vehicles in lieu of similar vehicles powered by gasoline or diesel fuel. Cleaner-fuel vehicles addressed in this measure include electric vehicles, natural gas and propane vehicles, and vehicles powered by biofuels such as composite diesel (blend of renewable diesel, biodiesel, and conventional fossil diesel), ethanol, and renewable natural gas. The full GHG emissions impact of cleaner fuels depends on the emissions from the vehicle's tailpipe as well as the emissions associated with production of the fuel (sometimes termed "upstream" emissions). For example, tailpipe GHG emissions from renewable natural gas are identical to tailpipe GHG emissions from conventional natural gas; the GHG benefits of renewable natural gas come from the fact that it is produced from biomass. Similarly, BEVs have zero tailpipe emissions, but properly accounting for their GHG impacts requires quantifying the emissions associated with the electricity generation needed to charge the vehicle's batteries.	Not-applicable	Project/Site or Plan/Community	-	If using electric vehicles, pair with Measure T-14 to ensure that electric vehicles have sufficient access to charging infrastructure.	-	-
35	T-31-A	Locate Project in Area with High Destination Accessibility	The measure requires development in an area with high accessibility to destinations. Destination accessibility is measured in terms of the number of jobs or other attractions (e.g., schools, supermarkets, and health care services) 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 VMT and associated GHG emissions. As an implementation consideration, projects should consider accessibility by people of all functional abilities and incorporate design principles such as Universal Design.	Urban, suburban	Project/Site	-	This is a variation of measure T-31-B.	-	-

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Table F - Vehicle Miles Traveled Mitigation Measures for Land Development Projects

No.	CAPCOA Mitigation Measure No.	Mitigation Measure	Measure Description	Locational Context	Scale of Application	Implementation Requirements	Expanded Mitigation Options	Formula	VMT Reduction
36	T-31-B	Improve Destination Accessibility in Undeserved Areas	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 and associated GHG emissions. As an implementation consideration, projects should consider accessibility by people of all functional abilities and incorporate design principles such as Universal Design.	Urban, suburban	Plan/Community	-	This is a variation of measure T-31-A.	-	-
37	T-32	Orient Project Toward Transit, Bicycle, or Pedestrian Facility	This measure requires projects to minimize setback distance between the project and planned or existing transit, bicycle, or pedestrian corridors. A project that is designed around an existing or planned transit, bicycle, or pedestrian corridor encourages sustainable mode use. As an implementation consideration, projects should consider accessibility by people of all functional abilities and incorporate design principles such as Universal Design.	Urban, suburban, rural	Project/Site	-	-	-	-
38	T-33	Locate Project near Bike Path/Bike Lane	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 bicycle 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. As an implementation consideration, projects should provide sufficient and convenient bicycle parking and long-term storage, ideally near the bike lane itself, for residents, employees, and visitors, and a bicycle repair station with tools and equipment.	Urban, suburban	Project/Site	-	This measure can be implemented with Measure T-9.	-	-
39	T-34	Provide Bike Parking	This measure requires projects provide short-term and long-term bicycle 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.	Urban, suburban, rural	Project/Site or Plan/Community	-	-	-	-
40	T-35	Provide Traffic Calming Measures	This measure requires projects to include pedestrian/bicycle safety and traffic calming measures above jurisdictional requirements. Roadways should also be designed to reduce motor vehicle speeds and encourage pedestrian and bicycle 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. This mode shift will result in a decrease in vehicle miles traveled. Traffic calming also promotes active transportation, which improves physical health.	Urban, suburban, rural	Plan/Community	-	-	-	-
41	T-36	Create Urban Non-Motorized Zones	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. This measure is only applicable to projects located in urban environments. Consider access issues for paratransit users and those with mobility impairments.	Urban	Plan/Community	-	-	-	-
42	T-37	Dedicate Land for Bike Trails	This measure requires projects to provide for, contribute to, or dedicate land for the provision of off-site bicycle trails linking the project to designated bicycle 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.	Urban, suburban, rural	Plan/Community	-	-	-	-

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No.	CAPCOA Mitigation Measure No.	Mitigation Measure	Measure Description	Locational Context	Scale of Application	Implementation Requirements	Expanded Mitigation Options	Formula	VMT Reduction
43	T-38	Provide First and Last Mile TNC Incentives	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. Consider providing inclusive mechanisms so people without bank accounts, credit cards, or smart phones can access the incentives.	Urban, suburban, rural (only if the project is adjacent to a commuter rail station with convenient rail service to a major employment center)	Plan/Community	-	-	-	-
44	T-39	Implement Preferential Parking Permit Program	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. Commercial preferential parking can accommodate workers who work non-standard hours by providing opportunities to participate. Residential preferential parking can consider an equitable distribution of permits, giving priority to owners of sustainably fueled vehicles.	Urban, suburban	Project/Site	-	-	-	-
45	T-40	Implement School Bus Program	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. This measure is more effective at schools that draw students from a larger enrollment area, such as high schools or private schools.	Urban, suburban, rural	Project/Site	-	-	-	-
46	T-41	Implement a School Pool Program	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. A school pool program can help reduce onsite air pollutant emissions at the school by reducing private vehicle trips, especially if the pool vehicle is zero emissions.	Urban, suburban, rural	Project/Site	-	-	-	-
47	T-42	Implement Telecommute and/or Alternative Work Schedule Program	This measure requires projects to permit employee telecommuting and/or alternative work schedules and monitor employee involvement to ensure forecasted participation matches observed participation. While this measure certainly reduces commute-related VMT, recent research has shown that total VMT from telecommuters can exceed VMT from non-telecommuters. In addition, telecommuting affects commercial and residential electricity use, complicating the calculation of the net effect and attribution of emissions. More specifically, an office with fewer employees could result in a decrease in the project's energy used to operate equipment and provide space heating and air conditioning. Conversely, an increase in telecommuters using their private homes as workspaces could result in a residential increase in energy for those same end uses and appliances. While this measure is currently not quantified and, according to some studies, could result in total VMT increases and other disbenefits, it is recommended that users review the most recent literature at the time of their project initiation to see if new findings more conclusively support a quantifiable emissions reduction.	Urban, suburban, rural	Project/Site	-	-	-	-
48	T-43	Provide Real-Time Transit Information	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.	Urban, suburban, rural	Plan/Community	-	-	-	-

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No.	CAPCOA Mitigation Measure No.	Mitigation Measure	Measure Description	Locational Context	Scale of Application	Implementation Requirements	Expanded Mitigation Options	Formula	VMT Reduction
49	T-44	Provide Shuttles (Gas or Electric)	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, reducing associated GHG emissions. Electric shuttle vehicles provide a marginally more effective reduction to GHG emissions compared to gas- or diesel-fueled shuttles due to their use of less emissions-intensive electric power. 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.	Urban, suburban	Project/Site	-	-	-	-
50	T-45	Provide On-Demand Microtransit	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. 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 (e.g., Google's Via2G pilot) as part of a Trip Reduction Program.	Urban, suburban	Project/Site or Plan/Community	-	-	-	-
51	T-46	Improve Transit Access, Safety, and Comfort	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.	Urban, suburban, rural (only if the project is adjacent to a commuter rail station with convenient rail service to a major employment center, or if there is available transit and the project is close to jobs/services)	Plan/Community	-	-	-	-
52	T-47	Provide Bike Parking Near Transit	This measure requires the project to provide short-term and long-term bicycle 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 bicycles.	Urban, suburban	Plan/Community	-	-	-	-
53	T-48	Implement Area or Cordon Pricing	This measure requires projects implement a cordon pricing scheme. 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. This measure should provide an exception for low-income residents or workers within the pricing zone.	Urban	Plan/Community	-	-	-	-
54	T-49	Replace Traffic Controls with Roundabout	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.	Urban, suburban, rural	Plan/Community	-	-	-	-
55	T-50	Required Project Contributions to Transportation Infrastructure Improvement	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. Ensure the jurisdictional fee system does not disadvantage infill projects over greenfield projects.	Urban, suburban, rural	Plan/Community	-	-	-	-

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No.	CAPCOA Mitigation Measure No.	Mitigation Measure	Measure Description	Locational Context	Scale of Application	Implementation Requirements	Expanded Mitigation Options	Formula	VMT Reduction
S6	T-S1	Install Park-and-Ride Lots	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.	Suburban, rural	Plan/Community	-	-	-	-
S7	T-S2	Designate Zero Emissions Delivery Zones	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.	Urban	Plan/Community	-	-	-	-
S8	T-S3	Electrify Loading Docks	This measure will require that Transport Refrigeration Units and auxiliary power units (APUs) be plugged into the electric grid at the loading dock instead of running on diesel. The indirect GHG emission from electricity generation can partially offset the emissions reduction from fuel reductions. Electrifying loading docks can reduce exposure to air pollutants for workers and drivers.	Urban, suburban, rural	Project/Site	-	-	-	-
S9	T-S4	Install Hydrogen Fueling Infrastructure	The measure requires projects to implement accessible hydrogen fuel cell fueling infrastructure. Drivers of fuel cell electric vehicles (FCEV), from individual passenger vehicles to haul truck fleets, will be able to refuel using this infrastructure. The expansion of hydrogen fueling locations indirectly supports the uptake of FCEV in place of the typical internal combustion engine vehicle fueled by carbon-emitting gasoline and diesel.	-	Project/Site or Plan/Community	-	-	-	-

Source: *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity,* Final Draft, by the California Air Pollution Control Officers Association, December 2021.