VMT THRESHOLDS AND IMPLEMENTATION ANALYSIS

LSA

Adopted February 07, 2022
City Council Resolution No. 2022-17

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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 and the implementation deadline of July 1, 2020, the City of Big Bear Lake is adopting a set of VMT thresholds to support the shift from a delay-based analysis to VMT. The City is also creating separate guidelines for the preparation of VMT analysis and traffic impact studies.

This document provides a detailed discussion on implementing the CEQA VMT metric as applicable to the City of Big Bear Lake. Substantial evidence and explanation on establishing the "Region," VMT screening criteria, and VMT analysis thresholds are also described. The VMT analysis described in this document support the City's *Traffic Impact Analysis Guidelines for Local Transportation and Vehicle Miles Traveled Analysis (TIA Guidelines)*. Upon adoption by the City Council, projects will utilize the City's *TIA Guidelines* to prepare VMT and LOS analysis in compliance with State requirements and City policies.

The following topics establish the steps for preparation of VMT analysis. Each topic is discussed in more detail further in this report.

- **Definition of 'Region':** The Big Bear Valley Region is recommended as the region for VMT analysis purposes.
- **Standardized Screening Methods:** Residential and office projects within a Transit Priority Area, local-serving retail projects up to 50,000 square feet (sf), residential, office, industrial, or mixed-use projects within low-VMT generating areas, projects with 100 percent affordable housing units, and projects that generate fewer than 500 daily trips can be screened out from the need for a VMT analysis.
- **Appropriate VMT Significance Thresholds for Development Projects, Transportation Projects, and Community/General Plans:** For residential and office projects, a significance threshold of 85 percent of the existing regional average is recommended. For retail projects, a significance threshold of no net increase in VMT is recommended. For other non-residential projects consistent with the General Plan, a significance threshold of no net change in VMT per employee or VMT per service population (based on the land use type) is recommended. For projects that are not consistent with the General Plan, a significance threshold of 85 percent of the existing regional average would apply. For mixed use projects, the VMT thresholds are based on the respective thresholds for the various land use components. For transportation projects, net increase in induced VMT is recommended as the significance threshold. Finally, for land use plans, the existing regional average VMT per service population is recommended as the threshold of significance.
- **Feasible Mitigation Strategies:** A list of VMT mitigation measures applicable to development projects, transportation projects, and plans in the context of the City of Big Bear Lake are provided for projects which may not meet the recommended significance thresholds. Additionally,

implementation of a VMT mitigation bank, VMT mitigation exchange, and/or VMT impact fee are discussed as potential future regional VMT mitigation mechanisms.

The City recommends the use of the San Bernardino Transportation Analysis Model (SBTAM) for VMT analysis purposes. SBTAM is the sub-regional travel demand model applicable to jurisdictions within San Bernardino County including the City for evaluating project VMT. The appropriate use of SBTAM for VMT calculations is further elaborated in subsequent chapters of this document.

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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 Big Bear Lake
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
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
SBCTA	San Bernardino County Transportation Authority
SBTAM	San Bernardino Transportation Analysis Model
SCAG	Southern California Association of Governments
SCS	Sustainable Communities Strategy
sf	Square foot/Feet
SOC	Statement of Overriding Considerations
TA	Technical Advisory
TDM	Transportation Demand Management
TIA Guidelines	City of Big Bear Lake *Traffic Impact Analysis Guidelines for Local Transportation and Vehicle Miles Traveled Analysis*
TPA	Transit Priority Area
VMT	Vehicle Miles Traveled

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1.0 INTRODUCTION

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 should be supported by substantial evidence.

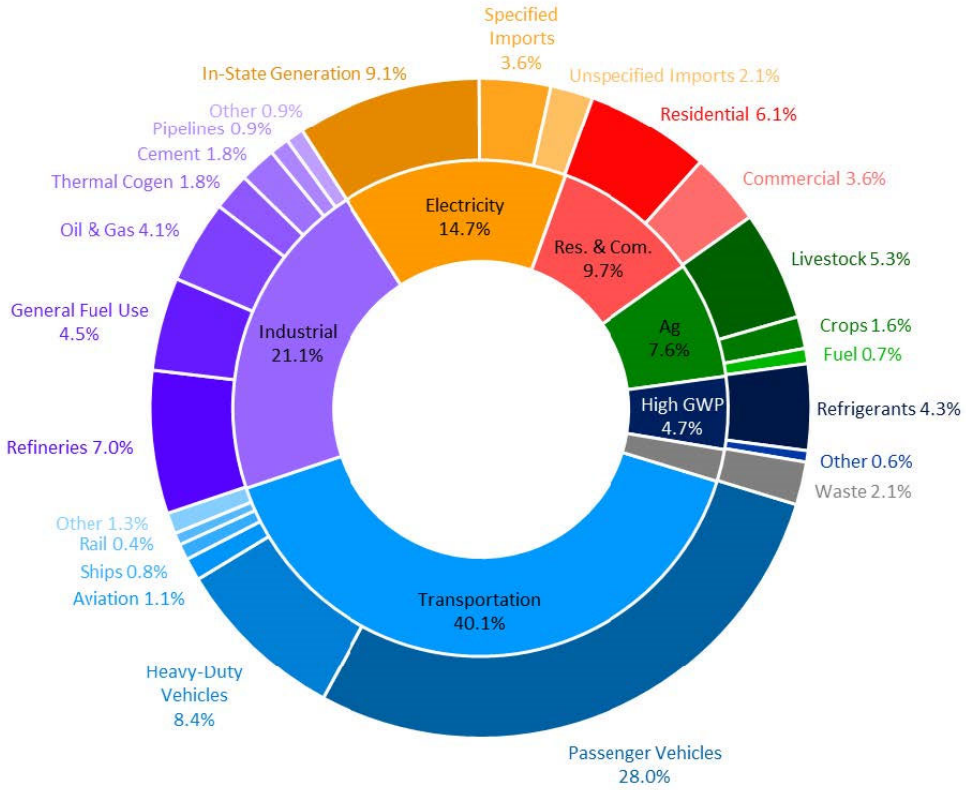
The State of California is committed to reducing greenhouse gas (GHG) emissions and achieving long-term climate change goals. As a means for achieving statewide sustainability and climate goals, California legislation is focused on reducing VMT to achieve statewide climate goals. Over the last 40 years, across the state, VMT has far exceeded that of the state's population increase during the same period. Transportation is the single largest sector contributing to California's GHG emissions. More than 40 percent of statewide GHG emissions are generated by the transportation sector, primarily passenger cars and light-duty trucks (see Figure 1, following page). 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 Big Bear Lake'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 recommended 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 Big Bear Lake. 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: California Greenhouse Gas Emissions for 2000 to 2017 Trends of Emissions and Other Indicators (California Air Resources Board Report)

Figure 1: 2017 GHG Emissions in California by Scoping Plan Sector and Sub-Sector Category

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.

Unlike delay-based LOS analyses, VMT produces a regional impact that is not defined 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."*

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)*

In most of urbanized areas throughout the state, the county boundary is selected as the region for purposes of VMT analysis. San Bernardino County exceeds 20,000 square miles in size and is the largest county (by area) in the contiguous United States. Use of the entire county as the City's local region for VMT analysis would not accurately represent the City's traffic patterns.

The geographic boundary needs to contain the majority of trips that either originate in or are destined to the City. To determine this boundary, a review of the regional or sub-regional travel demand model data that includes the City of Big Bear Lake was evaluated.

Mobility, as related to vehicle travel, can be studied using a trip-based approach or a tour-based approach. A trip-based approach calculates VMT as individual trips to and from the project. On the other hand, a tour-based approach considers a chain of linked trips that includes the project as a trip. The State supports the trip-based approach and states "When 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." (OPR TA page 5)

The City measures about seven square miles in area and is located approximately 100 miles east of Los Angeles, in the Big Bear Valley area of the San Bernardino Mountain Region, at the southwestern corner of the San Bernardino County. The Big Bear Valley encompasses almost 35 square miles and is comprised of four United States ZIP Code boundaries: 92314, 92315, 92386, and 92333. These zip code boundaries represent the communities of Big Bear City, Sugarloaf, Erwin Lake, Lake Williams, and Fawnskin. While some trips are expected to travel to other parts of the County and beyond, most are contained within the mountain region. Therefore, the City's trip characteristics were analyzed to identify the origin and/or the destination for majority of the residential and employment trips within Big Bear Valley.

San Bernardino Transportation Analysis Model (SBTAM) is the sub-regional model for the County. This model is applicable to jurisdictions within San Bernardino County including the City for evaluating project VMT. This model is also trip-based and was used to evaluate the City's typical 'trip catchment area.' Additionally, consistent with OPR, only trips having origins or destinations or both within the City were considered for analysis. External pass-through trips were not considered as these are not required for the analysis.

As illustrated in Figure 2, based on the analysis using SBTAM, about 59 percent of all trips are contained within the City. Another 25 percent originate in or are destined to the Big Bear Valley region. Few (16%) of the remaining trips originate in or destined to the Mountain Region while the balance of the trips (12%) are equally distributed between the County (outside of the Mountain Region) or entirely outside of the County.

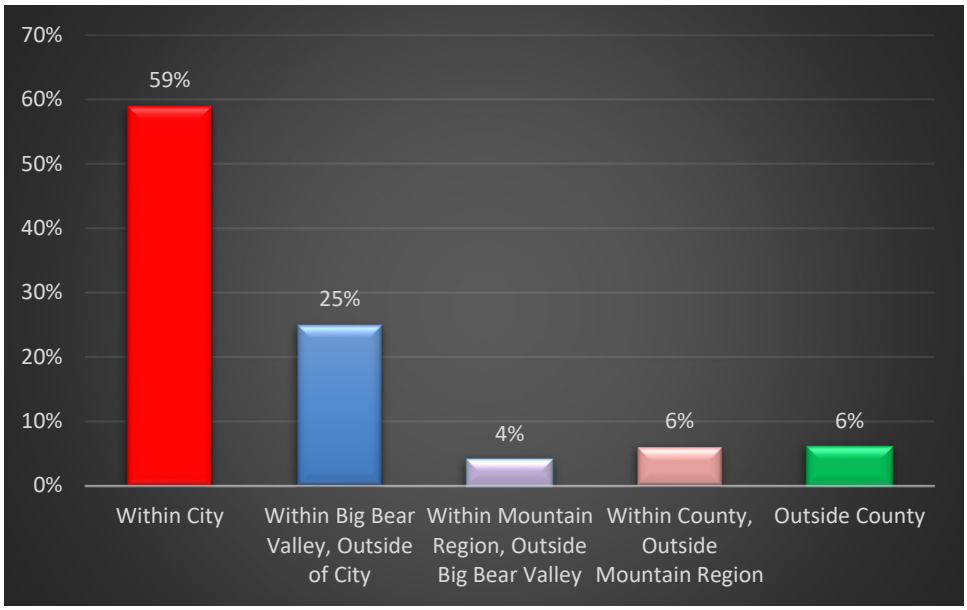


Figure 2: Share of Total Trips Having Origins/Destinations within the City of Big Bear Lake, within Big Bear Valley, within the Mountain Region, within San Bernardino County, or Outside the County (SBTAM 2016)

Therefore, the Big Bear Valley Region is an appropriate 'region' for VMT analysis purposes because the majority of the trips (84 percent) are contained within this distinct area.

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3.0 SCREENING CRITERIA

The State 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 as accepted by OPR, 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 located within half mile of a designated Transit Priority Area (TPA) or a High-Quality Transit Area (HQTA). A TPA is located within one-half mile of a major transit stop (existing or planned) where frequency of service occurs at intervals of 15 minutes or less during the morning and afternoon peak commute periods. As of February 2022, no TPA or HQTA exists in the City of Big Bear Lake. This criteria would be applicable if at a future date there are any TPA or HQTA areas identified within the City. In case such areas are identified, projects proposed in these areas may be presumed to have a less than significant transportation impact if the project is consistent with the City's General Plan and zoning, has a floor area ratio greater than 0.75, provides parking less than or equal to what is required in the City's Municipal Code, and does not replace affordable residential units with moderate- or high-income residential units.
- The project involves local-serving retail space of less than 50,000 sf. Local-serving retail would include projects that serve the local community and visitors within the Big Bear Valley region. Local-serving retail projects would include projects such as grocery stores, restaurants, or any other commercial development.
- 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.
- The project generates fewer than 500 average daily trips (ADT). (See section 3.1.1 below.)
- 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. 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 500 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 the South Coast Air Quality Management 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 State 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 a detailed 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 Big Bear Lake VMT Screening Tool[1] 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. VMT screening maps extracted from this tool are included in Appendix A. 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.
- The 2020 *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.

3.1.1 Average Daily Trips (ADT) Threshold

Although OPR recommends 110 ADT as an appropriate threshold, this number is not based on any analysis of GHG reduction potential but, rather, on a CEQA categorical exemption. 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.

Similar adjustments have been successfully implemented in other jurisdictions. The justification for the City's screening threshold, from 110 ADT to 500 ADT, based on reduction of GHG emissions, is further described below.

According to OPR, projects have a linear increase in trip generation with respect to the building footprint. Specifically, between 110 and 124 daily vehicle trips are anticipated per 10,000 sf. Based on this assumption, OPR recommends 110 ADT as the screening threshold.

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 SBTAM as applicable for the City. The trip lengths were calculated for various project types and trip purposes. Table A shows the resulting annual VMT and GHG emissions produced by incremental ADT for single-family residential projects.

[1] City of Big Bear Lake VMT Screening Tool: https://gis1.lsa.net/BBVMT/

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)
200	934,969	346	434
300	1,424,714	528	662
400	1,869,938	693	869
500	2,359,683	874	1,096
600	2,849,429	1,056	1,324
750	3,517,264	1,303	1,634
1,000	4,719,366	1,748	2,192
1,500	7,079,050	2,623	3,288

Source: CalEEMod version 2020.4.0.

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

A common GHG emissions threshold is 3,000 metric tons (MT) of carbon dioxide equivalent[2] (CO_2e) per year. 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.

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	145	2,998.81	20.68
Low-Rise Multifamily Residential	196	2,986.16	15.24
Mid-Rise Multifamily Residential	252	2,992.07	11.87
Office	297	2,999.07	10.10

Source: California Emissions Estimator Model (CalEEMod) version 2020.4.0.

DU = Dwelling Units; TSF = Thousand Square Feet; CO_2e = carbon dioxide equivalent

While OPR recommends 110 ADT as the VMT screening threshold, the GHG analysis above concludes that projects with up to 1,500 ADT could be potentially screened out from VMT analysis. As there is a wide range between 110 and 1,500 ADT, the City evaluated past practice exempting projects from a transportation analysis under CEQA. 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.

[2] 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.

A sample list of size of projects generating fewer than 500 daily vehicle trips that would be eligible to be exempt from a VMT analysis are included in Table C.

Table C: VMT Screening Thresholds for Sample Land Uses

Land Use	Size of Projects
Single Family Residential	52 DU
Low-Rise Multifamily Residential	68 DU
Mid-Rise Multifamily Residential	91 DU
Office	51.334 TSF
Hotel	59 Rooms
Hospital	46.641 TSF/22 Beds
Medical Office Building	14.367 TSF
Light Industrial	100.806 TSF
Warehousing	287.356 TSF

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* (10th Edition).

3.2 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 Big Bear Lake will use VMT analysis, and will 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 lead to a substantial or measurable increase in vehicle travel and which would, therefore, not require further VMT analysis. 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) that do not add additional motor vehicle capacity.
- Roadside safety devices or hardware installation such 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 1 mile in length designed to improve roadway safety.
- Installation, removal, or reconfiguration of traffic lanes that are not for through traffic, such as left-turn, right-turn, and U-turn pockets, two-way left-turn lanes, 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.
- Conversion of existing general-purpose lanes (including ramps) to managed lanes or transit lanes, or changing lane management in a manner that would not substantially increase vehicle travel.
- Addition of a new lane that is permanently restricted for use only by transit vehicles.
- Reduction in the 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., high-occupancy vehicles [HOV], high-occupancy toll [HOT] lane traffic, or trucks) from general vehicles.
- Installation, removal, or reconfiguration of traffic control devices, including Transit Signal Priority 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.
- Adoption of or increase in tolls.
- Addition of tolled lanes, where tolls are sufficient to mitigate VMT increase.
- Initiation of a new transit service.
- Conversion of streets from one-way to two-way operation with no net increase in the number of 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.
- Addition of passing lanes, truck climbing lanes, or truck brake-check lanes in rural areas that do not increase overall vehicle capacity along the corridor.

Additionally, transit and active transportation projects generally reduce VMT and, therefore, may be presumed to cause a less than significant impact on transportation. This presumption may apply to all

passenger rail projects, bus and bus rapid-transit projects, and bicycle and pedestrian infrastructure projects. The City may use this CEQA presumption of less than significant impact to aid in the prioritization of capital improvement projects, as the CEQA process for any of these project types would be more streamlined than other capacity-enhancing projects.

4.0 VMT THRESHOLD ANALYSIS FOR DEVELOPMENT PROJECTS

4.1 THRESHOLDS

The State clarifies that SB 743 and all CEQA VMT transportation analyses refer to automobile travel. Here, the term automobile refers to on-road passenger vehicles, specifically cars and light-duty trucks. Heavy-duty trucks should 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, former 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).

OPR has identified home-based work trips as the primary type used in the home-based travel demand modeling. This includes residential uses, office uses, and retail uses. The home-based work trip type is the primary trip type generated during the peak hours of commuter traffic in the morning and evening periods.

The focus of transportation impact assessment has shifted from congestion relief to climate resiliency. 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 GHG emissions goal setting, the State and Regional Transportation Planning Agencies have agreed to reduce statewide GHG emissions by an average of approximately 15 percent by 2035 through an approach based on improved integration of land use and transportation planning. Furthermore, in its *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*, CARB recommends total VMT per capita rates be reduced to approximately 15 percent below existing conditions. While the current target is 15 percent, CARB periodically revises the target based on changing information and, therefore, the target might be revised in the future. Additionally, for purposes of VMT analysis, the existing setting will follow the base year scenario in the regional travel demand model, SBTAM. It is to be noted that the base year scenario in the model is also periodically revised and, as a result, the existing setting will change accordingly.

Specifically, the State 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.*

Pursuant to State requirements, the City has established a VMT threshold for development projects, specifically residential and office developments, of 85 percent of the existing regional average as indicative of a significant transportation impact.

Figure 3 illustrates the VMT per capita, VMT per employee, and VMT per service population for the City of Big Bear Lake, Big Bear Valley, San Bernardino Mountain Region, and San Bernardino County, calculated using SBTAM.

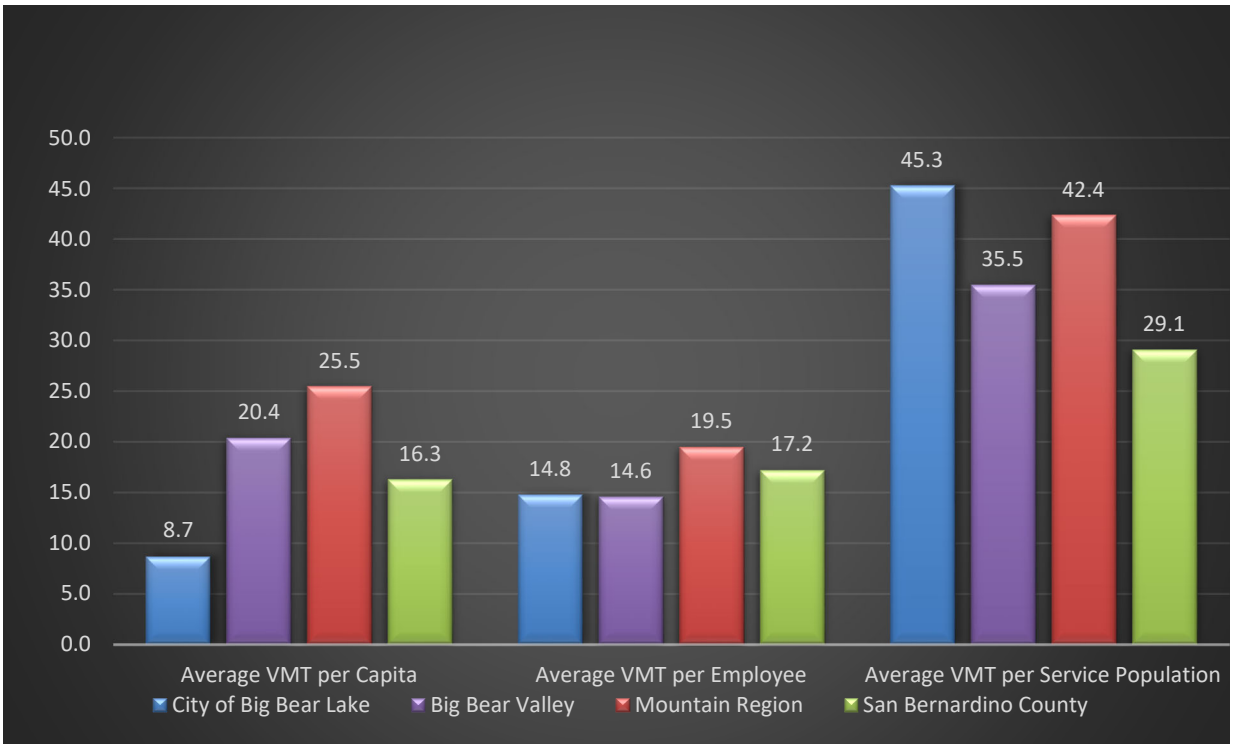


Figure 3: Average VMT per Capita, per Employee, and per Service Population in the City of Big Bear Lake, Big Bear Valley, San Bernardino Mountain Region and San Bernardino County (SBTAM 2016)

Figure 4 illustrates VMT (per capita, per employee, or per service population) thresholds for projects in the City if a project were to utilize a significance threshold of 85 percent of the existing regional VMT (per capita, per employee or per service population).

Other distinct land uses are not identified for threshold development in the OPR TA. For other non-residential projects consistent with the General Plan, a significance threshold of no net change in VMT per employee is recommended. In case a general plan amendment is required, such projects would have a significance threshold of 85 percent of the existing regional average VMT per employee. The only exceptions would be hotels, hospitals, medical offices, and recreational (e.g., campgrounds) projects. For such projects, a no net change in VMT per service population is recommended if the project is consistent with the General Plan. Otherwise, such projects would have a significance threshold of 85 percent of the existing regional average VMT per service population.

Evaluation of mixed-use projects should be for each land use component of the project using the most appropriate VMT metric. Credit for internal trip capture should be made. Internal trip capture may be calculated using the latest edition of the Institute of Transportation Engineers (ITE) *Trip Generation Handbook,* SBTAM or other applicable sources approved by the City. The appropriate methodology

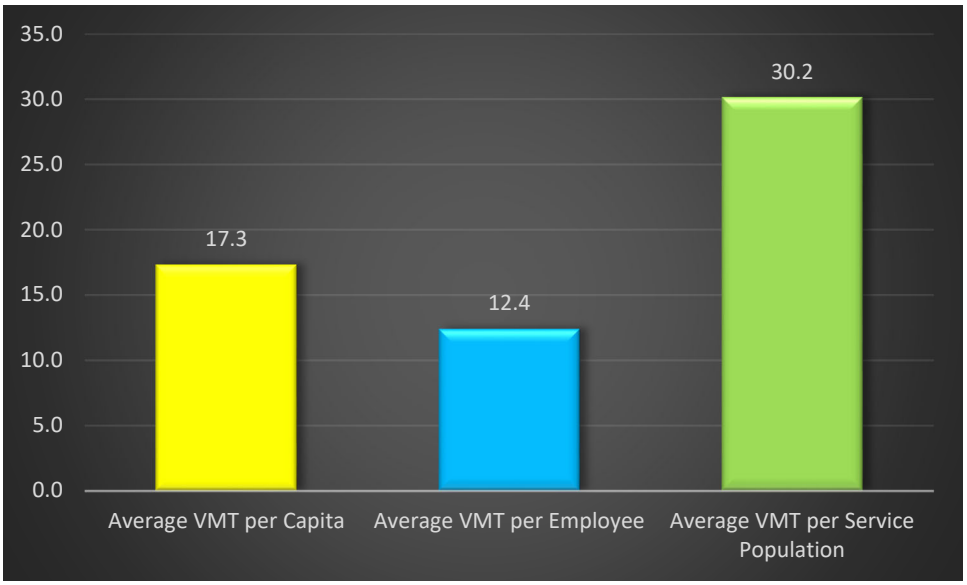


Figure 4: Average VMT per Capita, per Employee, and per Service Population Thresholds for Projects in the City of Big Bear Lake

for calculating 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.

A lead agency may develop VMT thresholds for other land uses as desired. One approach is to review the City's General Plan and/or the Southern California Association of Governments (SCAG) Regional Transportation Planning Agency/Sustainable Communities Strategy (RTP/SCS) to identify whether implementation of the plan would result in a reduction of VMT and GHG. If it does, the City may conclude that the implementation of the plan, including all the other land use types, will facilitate achievement of SCAG's regional climate goals. Therefore, consistency with the plan and no net change in VMT per employee for the other land use types provides a reasonable threshold. However, for projects seeking a general plan amendment, a project exceeding 85 percent of the existing regional average VMT per employee would indicate a significant transportation impact.

This approach would require disclosure of substantial evidence, including the General Plan findings, and other traffic and air quality forecasting support data. Additionally, if the City wishes to establish some other threshold less stringent than the 85 percent of the existing regional average recommended for residential and office projects, a body of substantial evidence would be necessary.

4.2 IMPACT ASSESSMENT

Figure 5 illustrates the process to assess potential VMT and transportation impacts for development entitlement projects. It provides the path from application filing through determination of impacts. Every development application is unique and may create alternative or modified steps through the process. Each step that diverges from this standard process should be accompanied with substantial

evidence demonstrating compliance with other climate change and GHG emission reduction laws and regulations.

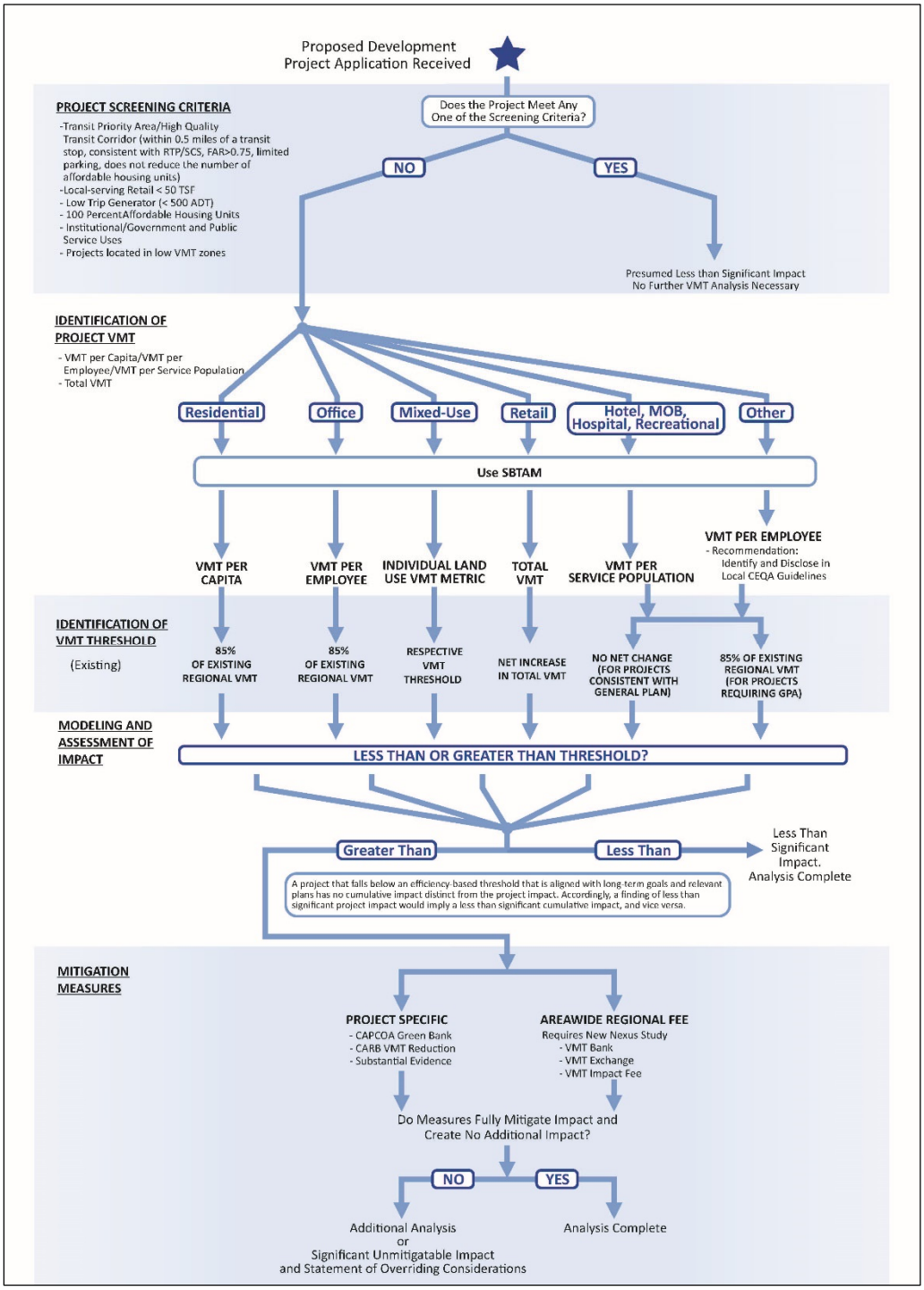


Figure 5: VMT Analysis Process for Development Projects

4.2.1 Agency Communication

As part of the site plan review process, the applicant should provide a detailed project description, including potential number of residents 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.

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 should enumerate the screening criteria and how the project meets or exceeds that applicable VMT threshold.

If project screening does not apply, a VMT analysis may 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, Campgrounds, Resorts, Hospital, Medical Office Building, Land Use Plan (General Plan/Specific Plan)	VMT per Service Population
Mixed-Use	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 SBTAM 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.

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 SBTAM (provided by San Bernardino County Transportation Authority [SBCTA] as of February 2022). These thresholds are subject to change when a newer version of SBTAM is available.

Table E: Significance Thresholds for VMT Analysis in the City of Big Bear Lake

VMT Metric	Threshold
VMT per Capita	17.3
VMT per Employee	12.4
VMT per Service Population	30.2

Source: SBTAM
VMT = Vehicle Miles Traveled

4.3 MITIGATION MEASURES

State law requires the project applicant to identify feasible offsets to mitigate VMT impacts generated by the proposed project. These can come from the mitigation strategies provided by the City (as described in Tables F, G, and H at the end of Chapter 7.0), or selected by the applicant based on their CEQA project experience and expertise. 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 7.2.1.

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. No further VMT analysis is required. If the project's VMT impact cannot be mitigated, 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/SOC is prepared.

5.0 VMT THRESHOLD ANALYSIS FOR TRANSPORTATION PROJECTS

The *2020 CEQA Guidelines* include Section 15064.3.b.(2) to address transportation projects. It reads:

> *For roadway capacity projects, agencies have the discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements.*

The City may continue to use motor vehicle delay (LOS) metrics for transportation project design and traffic operation purposes as long as impacts related to "other applicable requirements" are disclosed. This has generally been interpreted as VMT impacts and other State climate objectives. These other applicable requirements may be found in other parts of an environmental document (e.g., air quality and GHG), or may be provided in greater detail in the transportation section.

In addition, projects processed under federal environmental rules have traditionally included a traffic operational analysis to meet the requirements of the National Environmental Policy Act. Federal review is generally required if a project uses federal funding or involves federal lands. Additional safety evaluations may need to be conducted outside the CEQA process since some desirable safety improvements may not be directly related to CEQA safety impacts.

For projects on the State Highway System, Caltrans will require sponsoring agencies to use VMT as the CEQA transportation impact assessment metric, and to evaluate the amount of VMT that is "attributable to the project" (January 9, 2020, conference). Caltrans' Intergovernmental Review process will review environmental documents for capacity-enhancing projects for their analysis of VMT impact.

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:

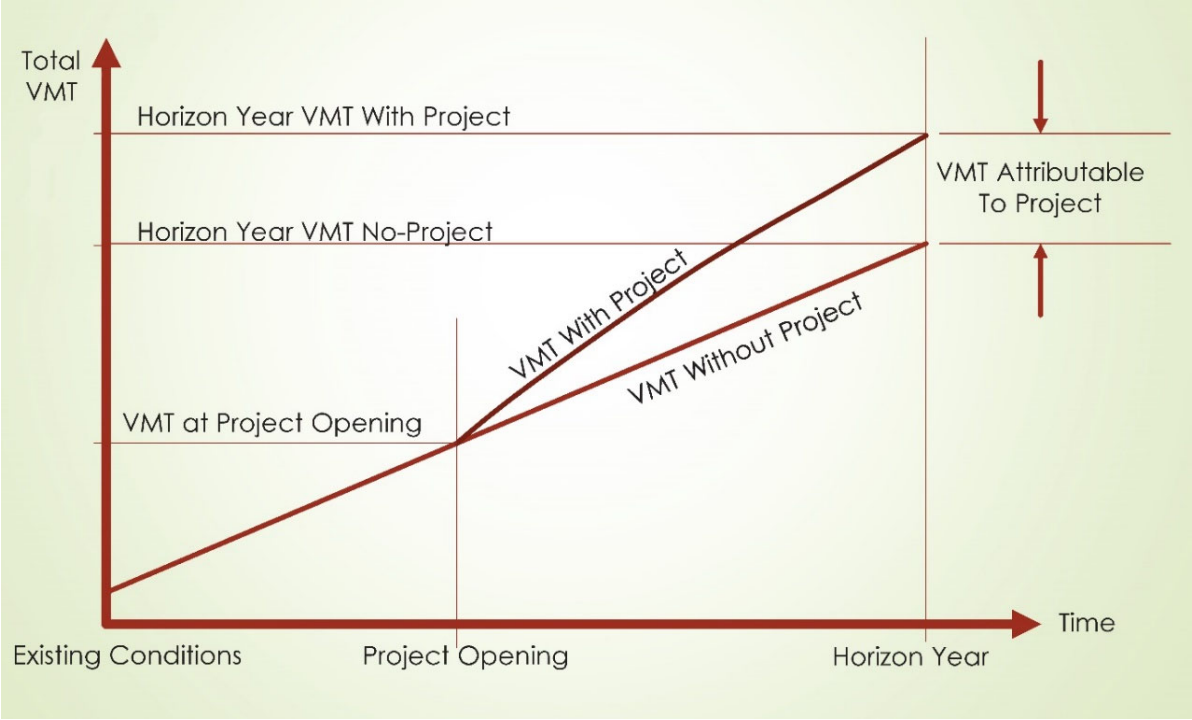
To estimate VMT impacts from roadway expansion projects:

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 6 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 6: 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 definitions of facility type and ascribes VMT increases to each facility. Output data include 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.

Other options to identify induced growth- and project-related VMT provided by the State include:

1. **Employ an expert panel.** *An expert panel could assess changes to land use development that would likely result from the project. This assessment could then be analyzed by the travel demand model to assess effects on vehicle travel. Induced vehicle travel assessed via this approach should be verified using elasticities found in the academic literature.*
2. **Adjust model results to align with the empirical research.** *If the travel demand model analysis is performed without incorporating projected land use changes resulting from the project, the assessed vehicle travel should be adjusted upward to account for those land use changes. The assessed VMT after adjustment should fall within the range found in the academic literature.*
3. **Employ a land use model, running it iteratively with a travel demand model.** *A land use model can be used to estimate the land use effects of a roadway capacity increase, and the traffic patterns that result from the land use change can then be fed back into the travel demand model. The land use model and travel demand model can be iterated to produce an accurate result.*

A final advisory from the State is provided below:

> *Whenever employing a travel demand model to assess induced vehicle travel, any limitation or known lack of sensitivity in the analysis that might cause substantial errors in the VMT estimate (for example, model insensitivity to one of the components of induced VMT described above) should be disclosed and characterized, and a description should be provided on how it could influence the analysis results. A discussion of the potential error or bias should be carried into analyses that rely on the VMT analysis, such as greenhouse gas emissions, air quality, energy, and noise.* (OPR TA page 34)

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6.0 VMT THRESHOLD ANALYSIS FOR LAND USE PLANS

The State 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 should 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 is recommended. The total VMT for the plan should be identified for all trips and all potential VMT contributors within the plan area. Model runs should 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). To capture the effect of all project-related VMT generated from a land use plan, the project's VMT per service population (population and employees) should be compared to the existing base year regional VMT per service population to determine project impact.

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. SBCTA is actively engaged in development of the RTP/SCS for San Bernardino County. The SCS details various 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.

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 would generally not have a significant VMT impact. Therefore, the recommended methodology for conducting VMT assessments for land use plans included in the *City of Big Bear Lake VMT Thresholds and Implementation Analysis* compares the existing VMT per service population for the region with the expected horizon year VMT per service population for the land use plan (project). The recommended target is to achieve a lower VMT per service population in the horizon year with the proposed land plan compared to the existing condition. For land use plans with a specific land use, VMT per capita or VMT per employee may be used as the metric as appropriate.

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 *2020 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 (TDM) 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 deficit 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 diminish 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, 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

7.2.1 Land Development Projects and Community/General Plans

Transit in the City of Big Bear Lake
Source: https://www.mountaintransit.org/

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 TDM 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 *Quantifying Greenhouse Gas Mitigation Measures* (*CAPCOA Green Book*) and by various resources provided by CARB. This information is generally presented with a wide range of potential VMT reduction percentages.

Table F provides a summary of various VMT mitigation measures and project alternatives presented in the *CAPCOA Green Book* (only those strategies directly attributed to transportation) for development projects. Table G provides a list of mitigations applicable to development projects based on research performed by Deborah Salon, Marlon G. Boarnet, Susan Handy, Steven Spears, and Gil Tal with the support of CARB. For any VMT mitigation measure, the project applicant will be required to provide substantial evidence while identifying a project-specific value. If that information is not available, the project should apply the low point of provided ranges for VMT reduction. Where a mitigation strategy does not have an identified VMT reduction range, the project applicant would be required to provide a reduction estimate supported by evidence. Tables F, G, and H are included at the end of this chapter.

As for land use plans, the potential VMT mitigation measures for community/general plans are similar to those available for development projects, with certain modifications. The OPR TA does not specifically identify any VMT mitigations for land use plans. However, a set of land use VMT mitigation measures is summarized in Table H of this report, along with the corresponding VMT reduction percentages obtained from CAPCOA.

It must be noted that Tables F and G provide only summaries of the VMT mitigations provided in the sources indicated above. The reader should refer to the original source for further details and for

subsequent updates to the mitigation measures. Also, Tables F and G do 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.

7.2.2 Transportation Projects

Although OPR provides detailed guidance on the assessment of induced-growth impacts associated with transportation improvement projects, it leaves the subject of specific VMT mitigation measures ambiguous. Only four strategies are recommended as potential mitigation options:

- Tolling new travel lanes to encourage carpools and fund transit improvements (not applicable to the City);
- Converting existing general-purpose lanes to HOV or HOT lanes (not applicable to the City);
- Implementing or funding off-site TDM programs; and
- Implementing Intelligent Transportation Systems strategies to improve passenger throughput on existing lanes.

No quantified reduction percentage is allocated to these strategies and currently available data do not offer any substantial evidence that may provide guidance on levels of significance after implementation of these strategies. Review of the four recommended mitigation strategies suggests that OPR is directing strategies away from general-purpose mixed-flow lanes on expressways, freeways, and arterial highways. It should be noted, however, that the first two mitigation strategies are not applicable to the City. Additionally, the project description and Purpose and Need may conflict, since congestion relief measures will conflict with VMT reduction strategies. The City would be subject to an SOC for the capital project VMT impact.

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 SBCTA and/or SCAG 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. It should be noted that SBCTA is currently working on a countywide VMT mitigation fee program. 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 Tables F and G are applicable in urban areas. They are less effective in suburban and rural contexts, where traditional TDM 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 lead agency 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 7, 8, and 9, respectively.

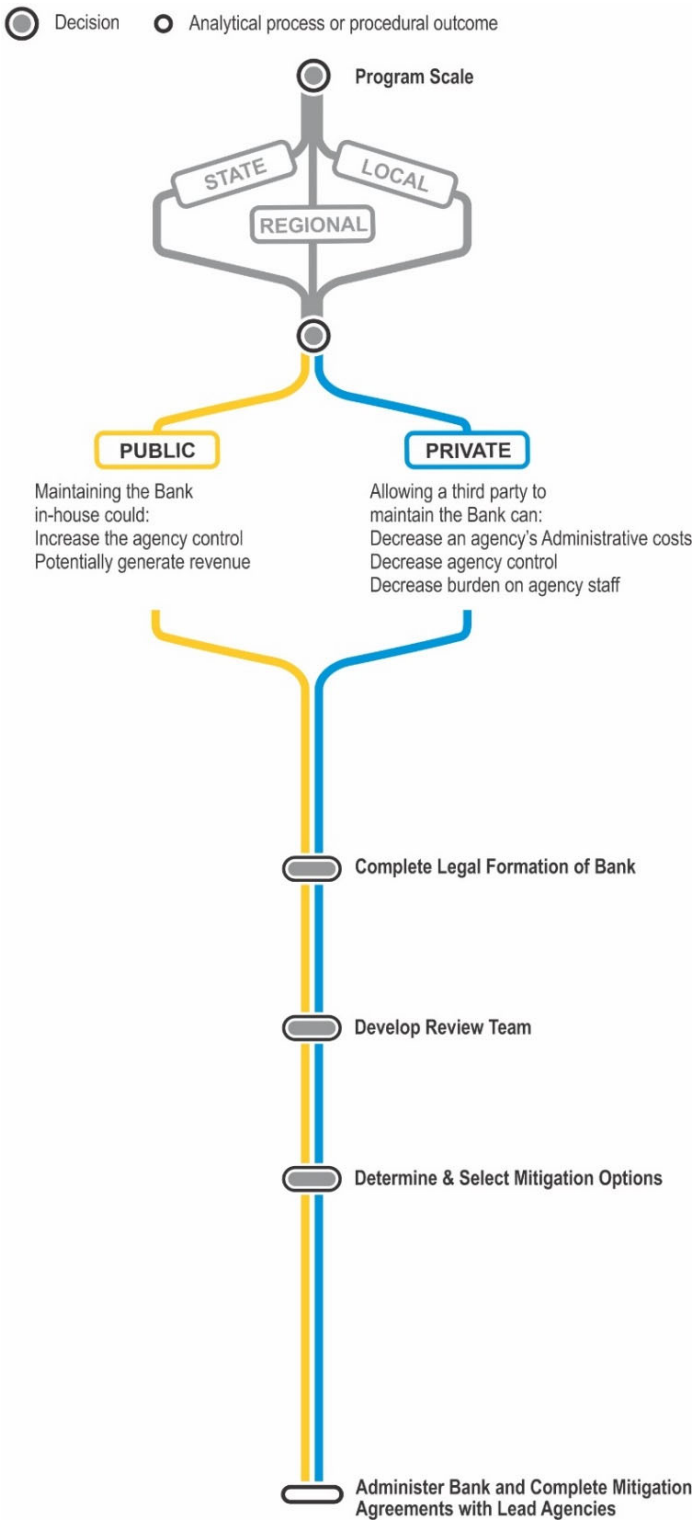

Figure 7: Procedural Flow Chart – VMT Bank

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

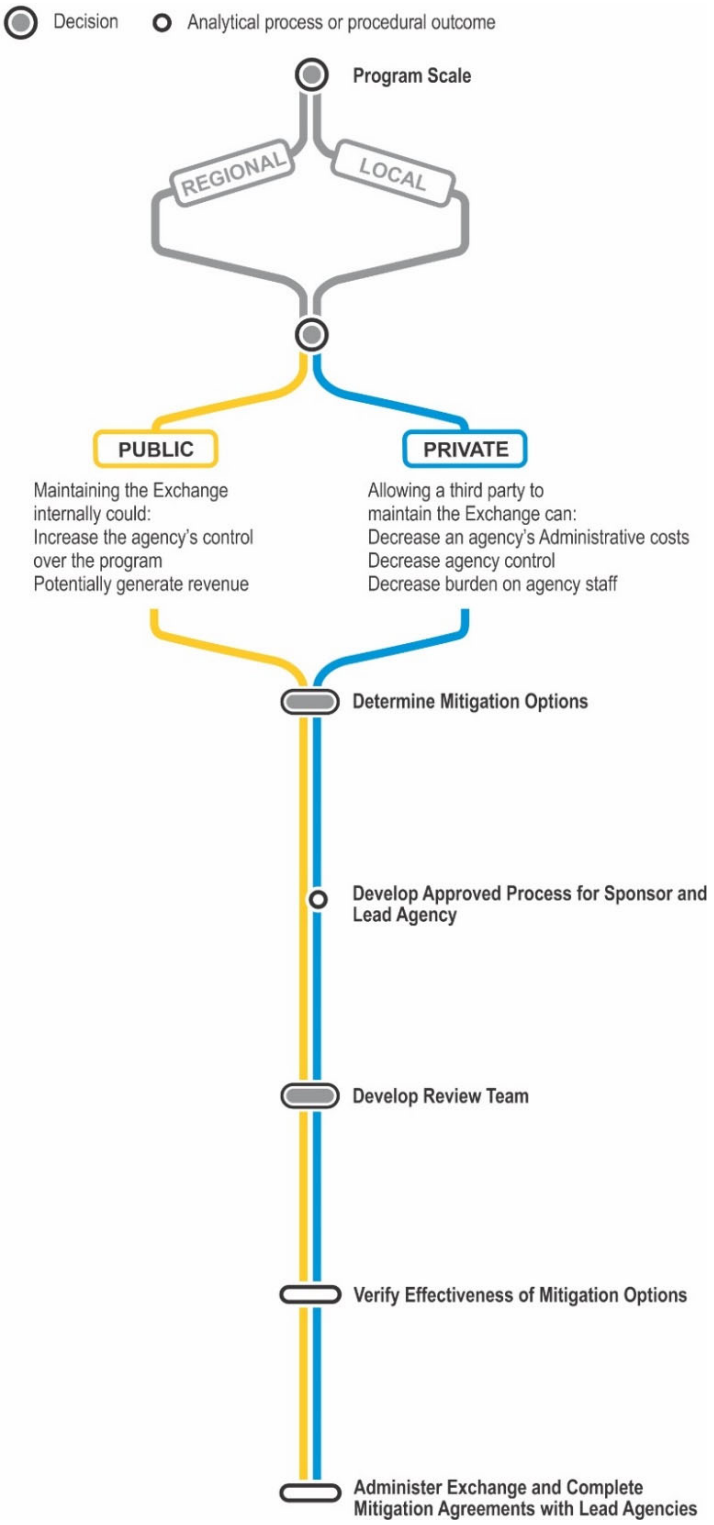

Figure 8: Procedural Flow Chart – VMT Exchange

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

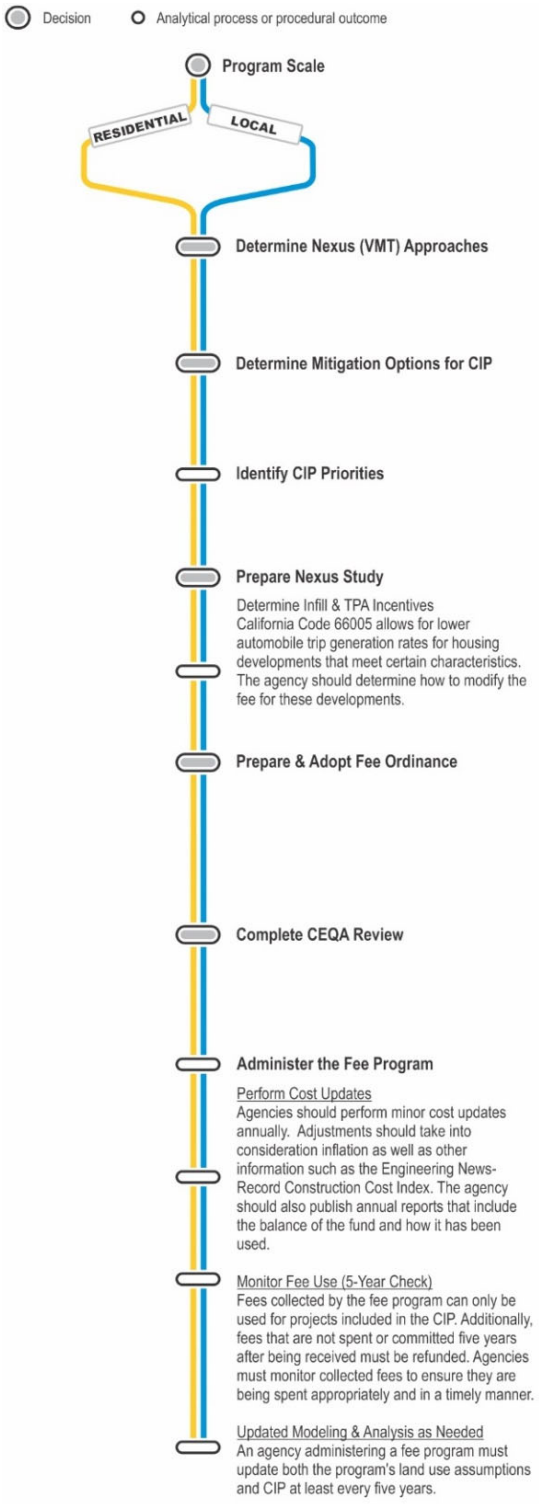

Figure 9: Procedural Flow Chart – VMT Impact Fee
Source: Understanding New Mitigation Approaches. A White Paper by Fehr & Peers (January 2020).

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

#	Mitigation Measure	VMT Reduction[1]	Notes
1	Improve or increase access to transit	CAPCOA TST-2: Not quantified alone, grouped strategy with TST-3 'Expand transit network' and TST-4 'Increase transit service frequency/speed'; CAPCOA LUT-5: 0.50% - 24.60%	Notes: CAPCOA TST-2: Implement Transit Access Improvements (applicable in urban and suburban context, and appropriate for residential, retail, office, mixed use, and industrial projects); CAPCOA LUT-5: Increase Transit Accessibility [May be grouped with CAPCOA measures LUT-3 (mixed use development), SDT-2 (traffic calmed streets with good connectivity), and PPT-1 through PPT-7 (parking management strategies); measures are applicable in urban and suburban contexts; appropriate in rural context if development site is adjacent to a commuter rail station with convenient rail service to a major employment center; appropriate for residential, retail, office, industrial, and mixed-use projects]
2	Increase access to common goods and services, such as groceries, schools, and daycare	Similar to CAPCOA LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use)): 9.00% 30.00% VMT reduction and CAPCOA LUT-4 (Increase Destination Accessibility): 6.70% - 20.00% VMT reduction	Notes: Similar to CAPCOA LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use) - Applicable in urban and suburban context; negligible in rural context (unless the project is a master-planned community; appropriate for mixed-use projects) and CAPCOA LUT-4 (Applicable in urban and suburban context, negligible in rural context, appropriate for residential, retail, office, industrial, and mixed-use projects)
3	Incorporate affordable housing into the project	0.04% - 1.20%	Notes: Similar measure is CAPCOA LUT-6 [Integrate Affordable and Below Market Rate Housing] - [Applicable in urban and suburban contexts; negligible impact in a rural context unless transit availability and proximity to jobs/services are existing characteristics; appropriate for residential and mixed-use projects]
4	Incorporate neighborhood electric vehicle network	0.50% - 12.70%	Notes: CAPCOA SDT-3 [Neighborhood electric vehicles (NEV) would result in a mode shift and therefore reduce the traditional vehicle VMT and GHG emissions. Range depends on the available NEV network and support facilities, NEV ownership levels, and the degree of shift from traditional; measure is applicable in urban, suburban, and rural context, for small citywide or large multi-use developments, and appropriate for mixed-use projects]

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

#	Mitigation Measure	VMT Reduction[1]	Notes
5	Orient project towards transit, bicycle, and pedestrian facilities	1) 0.25% - 0.5% (0.25% reduction is attributed for a project oriented towards a planned corridor and 0.5% reduction is attributed for a project oriented towards an existing corridor) (as per the Sacramento Metropolitan Air Quality Management District (SMAQMD) *Recommended Guidance for Land Use Emission Reductions*), 2) 0.5% reduction in VMT per 1% increase in transit frequency and per 10% increase in transit ridership (as per the Center for Clean Air Policy (CCAP) *Transportation Emission Guidebook*)	Notes: CAPCOA LUT-7 [Orient project toward non-auto corridor]; Grouped strategy with LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use) ; there is no sufficient evidence that the measures results in non-negotiable trip reduction unless combined with other measures, including neighborhood design, density and diversity of development, transit accessibility and pedestrian and bicycle network improvements; the measure is applicable for urban or suburban context (may be applicable in a master-planned rural community) and is appropriate for residential, retail, office, industrial, and mixed use projects
6	Provide pedestrian network improvements	0.00% - 2.00%	Notes: CAPCOA SDT-1 [applicable in urban, suburban, and rural context; appropriate for residential, retail, office, industrial, and mixed-use projects; reduction benefit only occurs if the project has both pedestrian network improvements on site and connections to the larger off-site network]. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'
7	Incorporate bike lane street design (on-site)	1% increase in share of workers commuting by bicycle (for each additional mile of bike lanes per square mile) (*Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them – Another Look* by Dill and Carr (2003)); 258% - 830% increase in bicycle community (*Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions* by Cambridge Systematics); 0.075% increase in bicycle commuting with each mile of bikeway per 100,000 residents (*If You Build Them, Commuters Will Use Them; Cross-Sectional Analysis of Commuters and Bicycle Facilities* by Nelson and Allen (1997))	Notes: CAPCOA SDT-5 [Grouped strategy, benefits of Bike Lane Street Design are small and should be grouped with the LUT-9 (Improve Design of Development) strategy to strengthen street network characteristics and enhance multi-modal environments], the measure is applicable in urban and suburban contexts and is appropriate for residential, retail, office, industrial, and mixed-use projects. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'

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

#	Mitigation Measure	VMT Reduction[1]	Notes
8	Expand transit network	0.10% – 8.20%	Notes: CAPCOA TST-3; Measure applicable in urban and suburban context, maybe applicable in rural context but no literature documentation available, appropriate for specific or general plans. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'
9	Increase transit service frequency/speed	0.02% – 2.50%	Notes: CAPCOA TST-4, applicable in urban and suburban context, maybe applicable in rural context but no literature documentation available, appropriate for specific or general plans. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'
10	Provide a Bus Rapid Transit System	0.02% – 3.20%	Notes: CAPCOA TST-1 (Applicable in urban and suburban context; negligible in rural context; appropriate for specific or general plans). This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service.'
11	Required project contributions to transportation infrastructure improvement projects	Not Quantified: Grouped strategy (with RPT-2 and TST-1 through 7)	Notes: CAPCOA RPT-3 (Applicable in urban, suburban and rural context; appropriate for residential, retail, office, mixed use, and industrial projects); measure similar to some of the measures discussed above. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service.'
12	Increase destination accessibility	6.70% – 20.00%	Notes: CAPCOA LUT-4 [Destination accessibility measured in terms of the number of jobs or other attractions reachable within a given travel time, which tends to be the highest at central locations and lowest at peripheral ones; the location of the project also increases the potential for pedestrians to walk and bike to these destinations and therefore reduces VMT; applicable for urban and suburban contexts, negligible impact in a rural context; appropriate for residential, retail, office, industrial, and mixed-use projects]. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'
13	Provide traffic calming measures	0.25% – 1.00%	Notes: CAPCOA SDT-2 [applicable in urban, suburban, and rural contexts; appropriate for residential, retail, office, industrial, and mixed-use projects]

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

#	Mitigation Measure	VMT Reduction[1]	Notes
14	Provide bike parking in non-residential projects	0.625% (as per the Center for Clean Air Policy (CCAP) *Transportation Emission Guidebook*) and 258% - 830% increase in bicycle community (*Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions* by Cambridge Systematics)	Notes: CAPCOA SDT-6 [Bike Parking in Non-Residential projects has minimal impacts as a standalone strategy and should be grouped with the LUT-9 (Improve Design of Development) strategy to encourage bicycling by providing strengthened street network characteristics and bicycle facilities]; the measure is applicable in urban, suburban, and rural contexts; appropriate for retail, office, industrial, and mixed-use projects
15	Provide bike parking with multi-unit residential projects	Not Quantified	Notes: CAPCOA SDT-7 [Grouped Strategy; the benefits of Bike Parking with Multi-Unit Residential Projects have no quantified impacts and should be grouped with the LUT-9 (Improve Design of Development) strategy to encourage bicycling by providing strengthened street network characteristics and bicycle facilities. The measure is applicable in urban, suburban, or rural contexts. It is appropriate for residential projects.]
16	Limit or eliminate parking supply	5.00% - 12.50%	Notes: CAPCOA PDT-1 (applicable in urban and suburban context, negligible in rural context, appropriate for residential, retail, office, industrial, and mixed-use projects); reduction can be counted only if spillover parking is controlled (via residential permits and on-street market parking); follow multi-faceted strategy including 1) elimination/reduction of minimum parking requirements, 2) creation of maximum parking requirements, and 3) provision of shared parking
17	Unbundle parking costs from property costs	2.60% - 13.00%	Notes: CAPCOA PDT-2 (applicable in urban and suburban context, negligible in rural context, appropriate for residential, retail, office, industrial and mixed-use projects; complimentary strategies include workplace parking pricing)
18	Provide parking cash-out programs	0.60% – 7.70% commute VMT	Notes: CAPCOA TRT-15 [Implement employee parking "cash-out"; the term “cash out” is used to describe the employer providing employees with a choice of forgoing their current subsidized/free parking for a cash payment equivalent to the cost of the parking space to the employer. The measure is applicable in urban and suburban context; it is not applicable in rural context; it is appropriate for retail, office, industrial, and mixed-use projects. Restrictions are applied only if complementary strategies are in place: a) Residential parking permits and market rate public on-street parking to prevent spill over parking; b) Unbundled parking - is not required but provides a market signal to employers to forgo paying for parking spaces and “cash-out” the employee instead. In addition, unbundling parking provides a price with which employers can utilize as a means of establishing “cash-out” prices.

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

#	Mitigation Measure	VMT Reduction[1]	Notes
19	Implement or provide access to a commute reduction program - Voluntary	1.00% - 6.20% commute VMT	Notes: CAPCOA TRT-1: Commute Trip Reduction Program – Voluntary, is a multi-strategy program that encompasses a combination of individual measures described CAPCOA measures TRT-3 through TRT-9. It is presented as a means of preventing double-counting of reductions for individual measures that are included in this strategy. It does so by setting a maximum level of reductions that should be permitted for a combined set of strategies within a voluntary program. The main difference between a voluntary and a required program is: A) Monitoring and reporting is not required B) No established performance standards (i.e. no trip reduction requirements). The measure is applicable in urban and suburban contexts, negligible in a rural context, unless large employers exist and suite of strategies implemented are relevant in rural settings. The measure is appropriate for retail, office, industrial, and mixed-use projects.
20	Implement or provide access to Commute Trip Reduction Program – Required implementation/monitoring	4.2% – 21.0% commute VMT	Notes: CAPCOA TRT-2 (Commute Trip Reduction Program is a multi-strategy program that encompasses a combination of individual measures from TRT-3 through TRT-9. It is presented as a means of preventing double-counting of reductions for individual measures that are included in this strategy. It does so by setting a maximum level of reduction that should be permitted for a combined set of strategies within a program that is contractually required of the development sponsors and managers and accompanied by a regular performance monitoring and reporting program. Check examples of Tucson, Arizona and South San Francisco, CA from CAPCOA. The measure is applicable in urban and suburban contexts; it is negligible in rural context, unless large employees exist, and suite of strategies implemented are relevant in rural settings; jurisdiction level only)
21	Provide ride-sharing program	1.00% – 15.00% commute VMT	Notes: CAPCOA TRT-3 [Provide Ride-Sharing Programs: applicable in urban and suburban context; Negligible impact in many rural contexts, but can be effective when a large employer in a rural area draws from a workforce in an urban or suburban area, such as when a major employer moves from an urban location to a rural location; appropriate for residential, retail, office, industrial, and mixed-use projects]
22	Implement car-sharing program	0.40% – 0.70%	Notes: CAPCOA TRT-9 [urban and suburban context, negligible in rural context, and appropriate for residential, retail, office, industrial, and mixed-use projects]

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

#	Mitigation Measure	VMT Reduction[1]	Notes
23	Implement bike-sharing program	Taking evidence from the literature, a 135-300% increase in bicycling (of which roughly 7% are shifting from vehicle travel) results in a negligible impact (around 0.03% VMT reduction)	Notes: CAPCOA TRT-12 [This measure has minimal impacts when implemented alone. The strategy's effectiveness is heavily dependent on the location and context. Bike-sharing programs have worked well in densely populated areas (examples in Barcelona, London, Lyon, and Paris) with existing infrastructure for bicycling. Bike sharing programs should be combined with Bike Lane Street Design (SDT-5) and Improve Design of Development (LUT-9). The measure is applicable in urban and suburban-center context only; it is negligible in a rural context; appropriate for residential, retail, office, industrial, and mixed-use projects
24	Provide transit passes	Similar to CAPCOA TRT-4 [Implement Subsidized or Discounted Transit Program]; for TRT-4, commute VMT reduction is 0.30% - 20.00%	Notes: Similar to CAPCOA TRT-4 [Implement Subsidized or Discounted Transit Program]
25	Shifting single occupancy vehicle trips to carpooling or vanpooling, for example providing ride-matching or shuttle services	0.30% - 13.40% commute VMT reduction (for CAPCOA TRT-11: Provide Employer-Sponsored Vanpool/Shuttle); 7.20% - 15.80% school VMT reduction (for CAPCOA TRT-10: Implement a School Pool Program)	Notes: Similar to CAPCOA TRT-11 (Provide employer-sponsored vanpool/shuttle) - the measure is applicable for urban, suburban, and rural context, and is appropriate for office, industrial, and mixed-use projects; Similar measure is CAPCOA TRT-10 (Implement a School Pool Program: Applicable for urban, suburban, and rural context and appropriate for residential and mixed-use projects)
26	Implement a school pool program	7.20% - 15.80% school VMT reduction	Notes: CAPCOA TRT-10 [This project will 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. The measure is applicable in urban, suburban, and rural context and is appropriate for residential and mixed-use projects.]
27	Operate free direct shuttle service	CAPCOA TST-6 (Provide Local Shuttles): Not Quantified; 0.30% - 13.40% commute VMT reduction (for CAPCOA TRT-11: Provide Employer-Sponsored Vanpool/Shuttle)	Notes: CAPCOA TST-6 (Provide Local Shuttles - grouped strategy with TST-5 'Provide Bike Parking Near Transit' and TST-4 'Increase Transit Service Frequency/Speed') - Applicable in urban/suburban context; appropriate for large residential, retail, office, mixed use, and industrial projects; solves the "first mile/last mile" problem; CAPCOA TRT-11 (Provide employer-sponsored vanpool/shuttle) - the measure is applicable for urban, suburban, and rural context, and is appropriate for office, industrial, and mixed-use projects. This measure can be considered under the Technical Advisory Measure 'Shifting single occupancy vehicle trips to carpooling or vanpooling, for example providing ride matching services.'

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

#	Mitigation Measure	VMT Reduction[1]	Notes
28	Provide teleworking options	0.07% - 5.50% commute VMT	Notes: CAPCOA TRT-6 [Applicable in urban, rural, and suburban contexts; appropriate for retail, office, industrial, and mixed-use projects]
29	Subsidize public transit service upgrades	Not Quantified	Notes: Similar to CAPCOA TST-2 through TST-4
30	Implement subsidized or discounted transit program	0.30% – 20.00% commute VMT	Notes: CAPCOA TRT-4 [Implement subsidized or discounted transit program (the measure is applicable in urban and suburban context, negligible in a rural context, appropriate for residential, retail, office, industrial, and mixed-use projects); The project will provide subsidized/discounted daily or monthly public transit passes. The project may also provide free transfers between all shuttles and transit to participants. These passes can be partially or wholly subsidized by the employer, school, or development. Many entities use revenue from parking to offset the cost of such a project. The measure is included under the Technical Advisory Measure 'Provide incentives or subsidies that increase the use of modes other than single-occupancy vehicle.'
31	Subsidize vanpool	0.30% - 13.40% commute VMT	Notes: Similar to CAPCOA TRT-11 (Provide Employer-Sponsored Vanpool/Shuttle: applicable in urban, suburban, and rural context; appropriate for office, industrial, and mixed-use projects). The measure is included under the Technical Advisory Measure 'Provide incentives or subsidies that increase the use of modes other than single-occupancy vehicle.'
32	Providing on-site amenities at places of work, such as priority parking for carpools and vanpools, secure bike parking, and showers and locker rooms	22% increase in bicycle mode share (UK National Travel Survey)/2%-5% reduction in commute vehicle trips (*Transportation Demand Management Encyclopedia*)/0.625% reduction in VMT (*Center for Clean Air Policy (CCAP) Emission Guidebook*)	Notes: CAPCOA TRT-5 [Provide End of Trip Facilities]: End-of-trip facilities have minimal impacts when implemented alone. This strategy's effectiveness in reducing vehicle miles traveled (VMT) depends heavily on the suite of other transit, pedestrian/bicycle, and demand management measures offered. End-of trip facilities should be grouped with Commute Trip Reduction (CTR) Programs (TRT-1: Implement Commute Trip Reduction Program - Voluntary through TRT-2: Implement Commute Trip Reduction Program – Required Implementation/Monitoring) and TRT-3 (Provide Ride-Sharing Programs)
33	Provide employee transportation coordinators at employment sites	Not Quantified	Included as part of CAPCOA TRT-1 (Implement Commute Trip Reduction Program - Voluntary)
34	Provide a guaranteed ride home service to users of non-auto modes	Not Quantified	-
35	Locate project in an area of the region that already exhibits low VMT	10.00% - 65.00%	Notes: CAPCOA LUT-2 (Applicable in urban and suburban contexts; negligible in rural contexts; appropriate for residential, retail, office, industrial, and mixed-use projects)

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

#	Mitigation Measure	VMT Reduction[1]	Notes
36	Locate project near transit	0.50% - 24.60%	Notes: CAPCOA LUT-5 [May be grouped with CAPCOA measures LUT-3 (mixed use development), SDT-2 (traffic calmed streets with good connectivity), and PPT-1 through PPT-7 (parking management strategies); measures are applicable in urban and suburban contexts; appropriate in rural context if development site is adjacent to a commuter rail station with convenient rail service to a major employment center; appropriate for residential, retail, office, industrial, and mixed-use projects]
37	Increase project/development density	1.50% - 30.00%	Notes: CAPCOA LUT-1 (Applicable in urban and suburban contexts only; negligible in rural context; appropriate for residential, retail, office, industrial, and mixed-use projects)
38	Increase the mix of uses within the project or within the project's surroundings	9.00% - 30.00%	Notes: CAPCOA LUT-3: Increase Diversity of Urban and Suburban Developments (Mixed Use) [Applicable in urban and suburban context, negligible in rural context, and appropriate for mixed-use projects]
39	Improve network connectivity and/or increase intersection density on the project site	Similar measure is CAPCOA LUT-9 [Improve Design of Development]: 3.0% - 21.3% reduction in VMT	Notes: Similar measure to CAPCOA LUT-9 (Improve Design of Development)
40	Deploy management strategies (e.g., pricing, vehicle occupancy requirements) on roadways or roadway lanes.	CAPCOA RPT-1: 7.90% - 22.00%	Notes: Similar CAPCOA measure is RPT-1 (Road Pricing/Management: Implement Area or Cordon Pricing)
41	Price workplace parking	0.10% - 19.70% commute VMT	Notes: CAPCOA TRT-14 [Urban and suburban context; Negligible impact in a rural context; Appropriate for retail, office, industrial, and mixed-use projects; Reductions applied only if complementary strategies are in place: o Residential parking permits and market rate public on-street parking - to prevent spill-over parking o Unbundled parking - is not required but provides a market signal to employers to transfer over the, now explicit, cost of parking to the employees. In addition, unbundling parking provides a price with which employers can utilize as a means of establishing workplace parking prices
42	Require residential area (on-street) parking permits	0.09% - 0.36%	Notes: CAPCOA PDT-4 (applicable for urban context and appropriate for residential, retail, office, mixed use, and industrial projects); the project will require the purchase of residential parking permits (RPPs) for long-term use of on-street parking in residential areas; permits reduce the impact of spillover parking in residential areas adjacent to commercial areas, transit stations, or other locations where parking may be limited and/or priced; Grouped strategy (with measures PDT-1 'Limit parking supply', PDT-2 'Unbundle parking costs from property cost' and PDT-3 'Implement market price public parking (on-street)')

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

#	Mitigation Measure	VMT Reduction[1]	Notes
43	Locate project near bike path/bike lane	0.625%	Notes: CAPCOA LUT-8 (Grouped strategy with 'Increase Destination Accessibility'; the measure is most effective when applied in combination of multiple design elements that encourage this use; strategy should be grouped with 'Increase Destination Accessibility' strategy to increase the opportunities for multi-modal travel; measure is applicable in urban or suburban context, may be applicable in a rural master planned community; appropriate for residential, retail, office, industrial, and mixed-use projects
44	Implement Commute Trip Reduction Marketing	0.80% - 4.00% commute VMT	Notes: CAPCOA TRT-7 (applicable in urban and suburban context; negligible in rural context; appropriate for residential, retail, office, industrial, and mixed-use projects)
45	Education and encouragement - Voluntary travel behavior change program	1.00% - 6.20% commute VMT	Notes: Similar to CAPCOA TRT-1 (Implement Commute Reduction Program - Voluntary)
46	Education and encouragement - Promotions and marketing	0.80% - 4.00% commute VMT	Notes: Similar to CAPCOA TRT-7 [Implement Commute Reduction Marketing]
47	Implement neighborhood shuttle	Not Quantified	Notes: CAPCOA TST-6 (Provide Local Shuttles - grouped strategy with TST-5 'Provide Bike Parking Near Transit' and TST-4 'Increase Transit Service Frequency/Speed') - Applicable in urban/suburban context; appropriate for large residential, retail, office, mixed use, and industrial projects; solves the "first mile/last mile" problem
48	Trip cap	Not Quantified	-
49	Implement market price public parking (On-street)	2.80% – 5.50%	CAPCOA PDT-3 (applicable in urban and suburban context; negligible in rural context; appropriate for retail, office, and mixed-use projects; applicable in a specific or general plan context only, reduction can be counted only if spillover parking is controlled (via residential permits); studies conducted in downtown areas, and thus should be applied carefully if project is not in a central business/activity center
50	Implement area or cordon pricing	7.90%- 22.00%	Notes: CAPCOA RPT-1; Applicable in Central Business District or urban center only
51	Create urban non-motorized zones	0.01% – 0.20% annual VMT reduction	Notes: CAPCOA SDT-4 [The project, if located in a CBD or major activity center, will convert a percentage of its roadway miles to transit malls, linear parks, or other nonmotorized zones. These features encourage non-motorized travel and thus a reduction in VMT. This measure is most effective when applied with multiple design elements that encourage this use. The benefits of Urban Non-Motorized Zones alone have not been shown to be significant. (considered grouped strategy with SDT-1 (provide pedestrian network improvements); this is applicable in urban context only and appropriate for residential, retail, office, industrial, and mixed-use projects]

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

#	Mitigation Measure	VMT Reduction[1]	Notes
52	Install park-and-ride lots	Two sources: 0.1% - 0.5% VMT reduction (as per 2005 Federal Highway Administration (FHWA) study) and 0.50% VMT reduction per day (as per Washington State Department of Transportation (WSDOT))	Notes: CAPCOA RPT-4 (Applicable in suburban and rural context; appropriate for residential, retail, office, mixed use, and industrial projects); Grouped strategy with RPT-1, TRT-11, TRT-3, and TRT-1 through 6
53	Electrify loading docks and/or require idling-reduction systems	26% - 71% reduction in Truck refrigeration units (TRU) idling GHG emissions	Notes: CAPCOA VT-1 (Measure applicability: Truck refrigeration units (TRU))
54	Utilize alternative fueled vehicles	Reduction in GHG emissions varies depending on vehicle type, year, and associated fuel economy	Notes: CAPCOA VT-2 (Measure applicability: vehicles)
55	Utilize electric or hybrid vehicles	0.40% - 20.30% reduction in GHG emissions	Notes: CAPCOA VT-3 (Measure applicability: vehicles)
56	Provide bike parking near transit	Not Quantified	Notes: CAPCOA TST-5 (should be implemented with other two measures as mentioned to encourage multi-modal use in the area and provide ease of access to nearby transit for bicyclists (measure applicable in urban and suburban context; appropriate for residential, retail, office, mixed use, and industrial projects); Grouped strategy (with measures TST-3 'Expand transit network' and TST-4 'Increase transit service frequency/speed')
57	Improve design of development	3.00% - 21.30%	Notes: CAPCOA LUT-9 (Include design elements to enhance walkability and connectivity; improved street network characteristics within a neighborhood such as street accessibility; design also measured in terms of sidewalk coverage, building setbacks, street widths, pedestrians crossings, presence of street trees, and a host of other physical variables that differentiate pedestrian-oriented environments from auto-oriented environments); measure is applicable in the urban and suburban contexts, negligible impact in rural context; appropriate for residential, retail, office, industrial, and mixed-use projects
58	Provide electric vehicle parking	Not Quantified	Notes: CAPCOA SDT-8 [This is a grouped strategy and the benefits of electric vehicle parking may be quantified when grouped with the use of electric vehicles and or SDT-3 (Implement a Neighborhood Electric Vehicle (NEV) Network). This measure is applicable in urban or suburban contexts and is appropriate for residential, retail, office, mixed use, and industrial projects.]

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

#	Mitigation Measure	VMT Reduction[1]	Notes
59	Dedicated land for bike trails	Not Quantified	Notes: CAPCOA SDT-9 [Larger projects may be required 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. The benefits of Land Dedication for Bike Trails have not been quantified and should be grouped with the LUT-9 (Improve Design of Development) strategy to strengthen street network characteristics and improve connectivity to off-site bicycle networks. The measure is applicable in urban, suburban, or rural contexts and is appropriate for large residential, retail, office, mixed use, and industrial projects.]
60	Implement school bus program	38.00% - 63.00% school VMT reduction	Notes: CAPCOA TRT-13 [Applicable in urban, suburban, and rural context; appropriate for residential and mixed-use projects]
61	Implement preferential parking permit program	Not Quantified	Notes: CAPCOA TRT-8 [The project will provide preferential parking in convenient locations (such as near public transportation or building front doors) in terms of free or reduced parking fees, priority parking, or reserved parking for commuters who carpool, vanpool, ride-share or use alternatively fueled vehicles. The project will provide wide parking spaces to accommodate vanpool vehicles. The impact of preferential parking permit programs has not been quantified by the literature and is likely to have negligible impacts when implemented alone. This strategy should be grouped with Commute Trip Reduction (CTR) Programs (TRT-1 and TRT-2) and TRT-3 (Provide Ride-Sharing Programs) as a complementary strategy for encouraging non-single occupant vehicle travel. This measure is applicable in urban and suburban contexts and is appropriate for residential, retail, office, mixed use, and industrial projects.]

Notes:

VMT = Vehicle Miles Traveled; CAPCOA = California Air Pollution Control Officers Association; OPR = Office of Planning and Research; TA = Technical Advisory; HOV = High Occup

CAPCOA Transportation Mitigation Categories (LU = Land Use/Location, SD = Neighborhood/Site Enhancements, PD = Parking Policy/Pricing, TR = Commute Trip Reduction Prog

[1] VMT reduction numbers obtained from *Quantifying Greenhouse Gas Mitigation Measures* published by the California Air Pollution Control Officers Association in August 2010.

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Table G - Vehicle Miles Traveled Mitigation Measures[1]

#	Mitigation Measure	VMT Reduction[2]	Notes
1	Improve or increase access to transit	1.3% - 5.8%	Variable: Various factors associated with proximity to transit stop (please refer to *How do Local Actions Affect CMT? A Critical Review of the Emperical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.)
2	Land Use Mix	Elasticity: 0.02 - 0.10	Variable: Entropy - variety and balance of land-use types within a neighborhood
3	Regional Accessibility	Elasticity: 0.05 - 0.25	Variable: Various factors associated with job accessibility and distance to CBD (please refer to *How do Local Actions Affect CMT? A Critical Review of the Emperical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.)
4	Job-Housing Balance	Elasticity: 0.06 - 0.31 for commute VMT	Variable: Various factors associated with job accessibility (please refer to *How do Local Actions Affect CMT? A Critical Review of the Emperical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.)
5	Provide Pedestrian Network Improvements	Elasticity: 0.00 - 0.02 for sidewalk length, 0.19 for Pedestrian Environment Factor	
6	Provide Bicycling Network Improvements	No effect on VMT	
7	Implement Transit Improvements	No effect on VMT	
8	Voluntary Travel Behavior Change (VTBC) Program	5% - 12%	
9	Implement Employer-Based Trip Reduction (EBTR) Program	1.33% - 6% of commute VMT	
10	Provide telecommuting options	Home-based telecommuting: 48.1% for household VMT, 66.5% - 76.6% for all personal VMT, and 90.3% for commute VMT only; Center-based telecommuting: 53.7% - 64.8% for all personal VMT and 62.0% - 77.2% for commute VMT only	
11	Increase Project/Development Density	Elasticity: <=0.07 - 0.19	Variable: residential density
12	Improve network connectivity and/or increase intersection density on the project site	Elasticity: -0.46 - 0.59	Variable: Various factors associated with intersection or street density (please refer to *How do Local Actions Affect CMT? A Critical Review of the Emperical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.)
13	Implement Road Pricing	10% - 14.6%	Variable: Different road prices in various parts of the US (please refer to How do Local Actions Affect CMT? A Critical Review of the Emperical Evidence (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.)
14	Implement Parking Cash-out Programs or Workplace Parking Pricing	12% of commute VMT (parking cashout); 2.3% - 2.9% for $3 per day workplace parking price; 2.8% for price increase equivalent to 60% hourly value of commuter travel time cost	

Notes:

VMT = Vehicle Miles Traveled

[1] All mitigation measures have been obtained from *How do Local Actions Affect VMT? A Critical Review of the Emperical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.).

[2] All VMT reduction numbers have been obtained from *How do Local Actions Affect VMT? A Critical Review of the Emperical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.).

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Table H - Vehicle Miles Traveled Mitigation Measures for Community Plans and General Plans[1]

#	Mitigation Measure	VMT Reduction[2]
1	Modify land use plan to increase development in areas with low VMT/capita characteristics and/or decrease development in areas with high VMT/capita characteristics	Not quantified in CAPCOA
2	Provide enhanced bicycle and/or pedestrian facilities	0.00% - 2.00% (for pedestrian network improvements); Multiple measures for bike facilities, refer to Table A for VMT reduction percentages
3	Add roadways to the street network if those roadways would provide shorter travel paths for existing and/or future trips	Not quantified in CAPCOA
4	Improve or increase access to transit	CAPCOA TST-2 (Implement transit access improvements): Not quantified alone, grouped strategy with TST-3 (Expand transit network) and TST-4 (Increase transit service frequency/speed); CAPCOA LUT-5 (Increase transit accessibility): 0.50% - 24.60%
5	Increase access to common goods and services, such as groceries, schools, and daycare	Similar to CAPCOA LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use)): 9.00% - 30.00% VMT reduction and CAPCOA LUT-4 (Increase Destination Accessibility): 6.70% - 20.00% VMT reduction
6	Incorporate a neighborhood electric vehicle network	0.50% - 12.70%
7	Provide traffic calming	0.25% – 1.00%
8	Limit or eliminate parking supply	5.00% - 12.50%
9	Unbundle parking costs	2.60% - 13.00%
10	Provide parking or roadway pricing or cash-out programs	0.10% - 19.70% commute VMT (for pricing workplace parking); 7.90% - 22.00% (for CAPCOA RPT-1 (Road Pricing/Management: Implement Area or Cordon Pricing)); 0.60% – 7.70% commute VMT (for cash-out programs)
11	Implement or provide access to a commute reduction program	1.0% – 6.2% commute VMT % (for voluntary programs); 4.2% – 21.0% commute VMT reduction (for programs with required implementation/monitoring)
12	Provide car-sharing, bike sharing, and ride-sharing programs	0.40% - 0.70% VMT reduction (for car sharing); 1.00% - 15.00% commute VMT reduction (for ride-sharing); a 135% - 300% increase in biking (of which roughly 7% are shifting from vehicle travel) results in a negligible impact (around 0.03% VMT reduction)
13	Provide partially or fully subsidized transit passes	Similar to CAPCOA TRT-4 [Implement Subsidized or Discounted Transit Program]; for TRT-4, commute VMT reduction is 0.30% - 20.00%

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Table H - Vehicle Miles Traveled Mitigation Measures for Community Plans and General Plans[1]

#	Mitigation Measure	VMT Reduction[2]
14	Shift single occupancy vehicle trips to carpooling or vanpooling by providing ride-matching services or shuttle services	0.30% - 13.40% commute VMT reduction (for CAPCOA TRT-11: (Provide Employer-Sponsored Vanpool/Shuttle)); Grouped strategy (for CAPCOA TST-6 (Provide Local Shuttles))
15	Provide telework options	0.07% - 5.50% commute VMT
16	Provide incentives or subsidies that increase the use of modes other than a single-occupancy vehicle	0.30% - 13.40% commute VMT reduction (for CAPCOA TRT-11: (Provide Employer-Sponsored Vanpool/Shuttle)); Grouped strategy (for CAPCOA TST-6 (Provide Local Shuttles)); 0.30% - 20.00% commute VMT reduction (for CAPCOA TRT-4 (Implement Subsidized or Discounted Transit Program))
17	Provide employee transportation coordinators at employment sites	Not quantified in CAPCOA
18	Provide a guarenteed ride home sevice to users of non-auto modes	Not quantified in CAPCOA

Notes:

VMT = Vehicle Miles Traveled; CAPCOA = California Air Pollution Control Officers Association

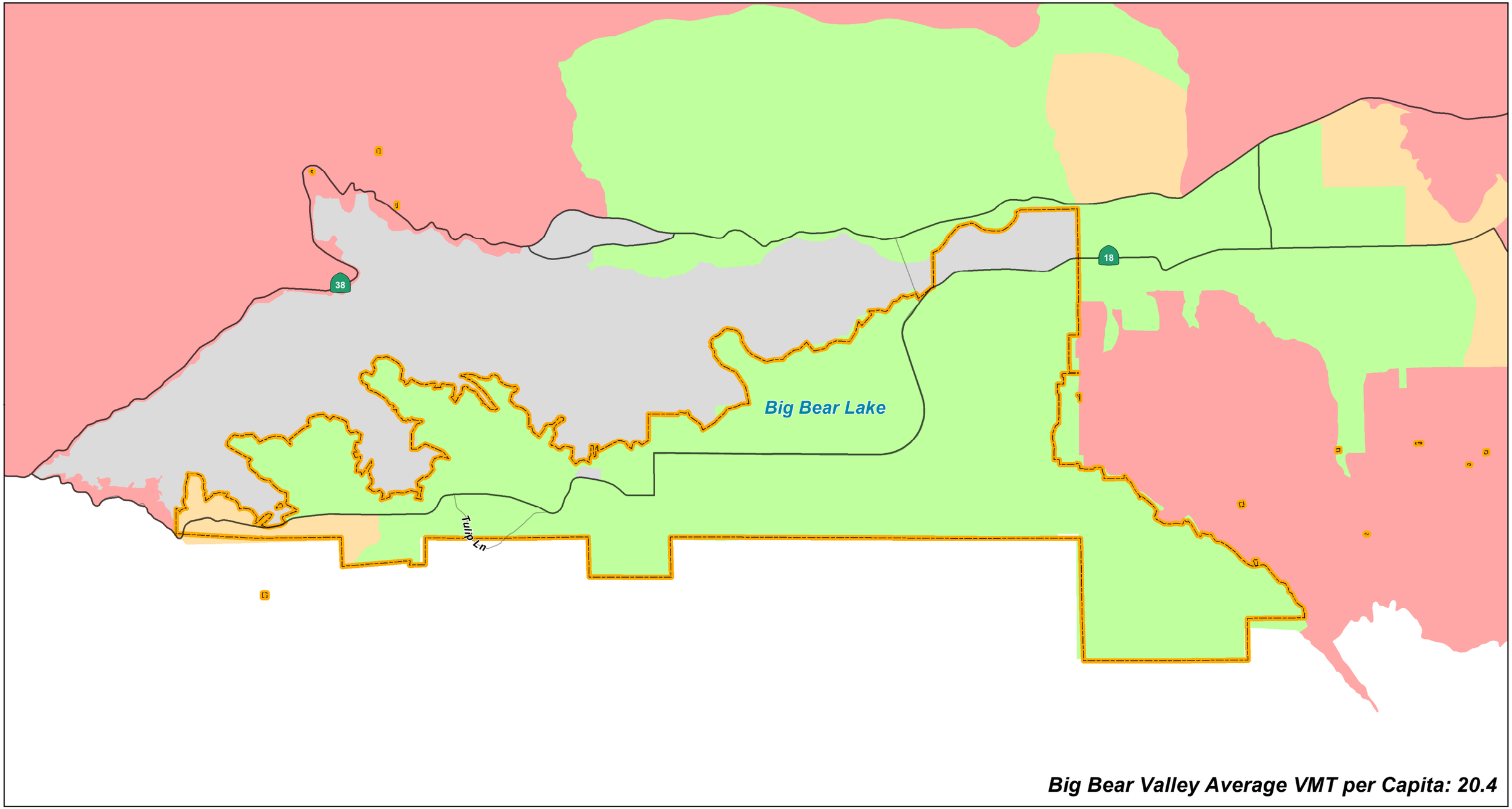
CAPCOA Transportation Mitigation Categories (LU = Land Use/Location, SD = Neighborhood/Site Enhancements, PD = Parking Policy/Pricing, TR = Commute Trip Reduction Programs, TS = Transit System Improvements, RP = Road Pricing/Management; V = Vehicles)

[1] All mitigation measures have been obtained from the *Guidelines for Transportation Impact Studies in the San Diego Region* developed by San Diego Section of the Institute of Transportation Engineers (ITE) and the San Diego Traffic Engineers Council (SANTEC) in January 2019.

[2] VMT reduction numbers obtained from *Quantifying Greenhouse Gas Mitigation Measures* published by the California Air Pollution Control Officers Association in August 2010.

APPENDIX A

VEHICLE MILES TRAVELED SCREENING MAPS



LSA

LEGEND

City of Big Bear Lake

VMT per Capita

No Population

Less than 17.3

17.3 - 20.4

Greater than 20.4

0 1500 3000

FEET

FIGURE A-1

City of Big Bear Lake VMT Thresholds and Implementation Analysis

City of Big Bear Lake Existing VMT per Capita

SOURCE: SBTAM 2016; ESRI Streetmap, 2013.

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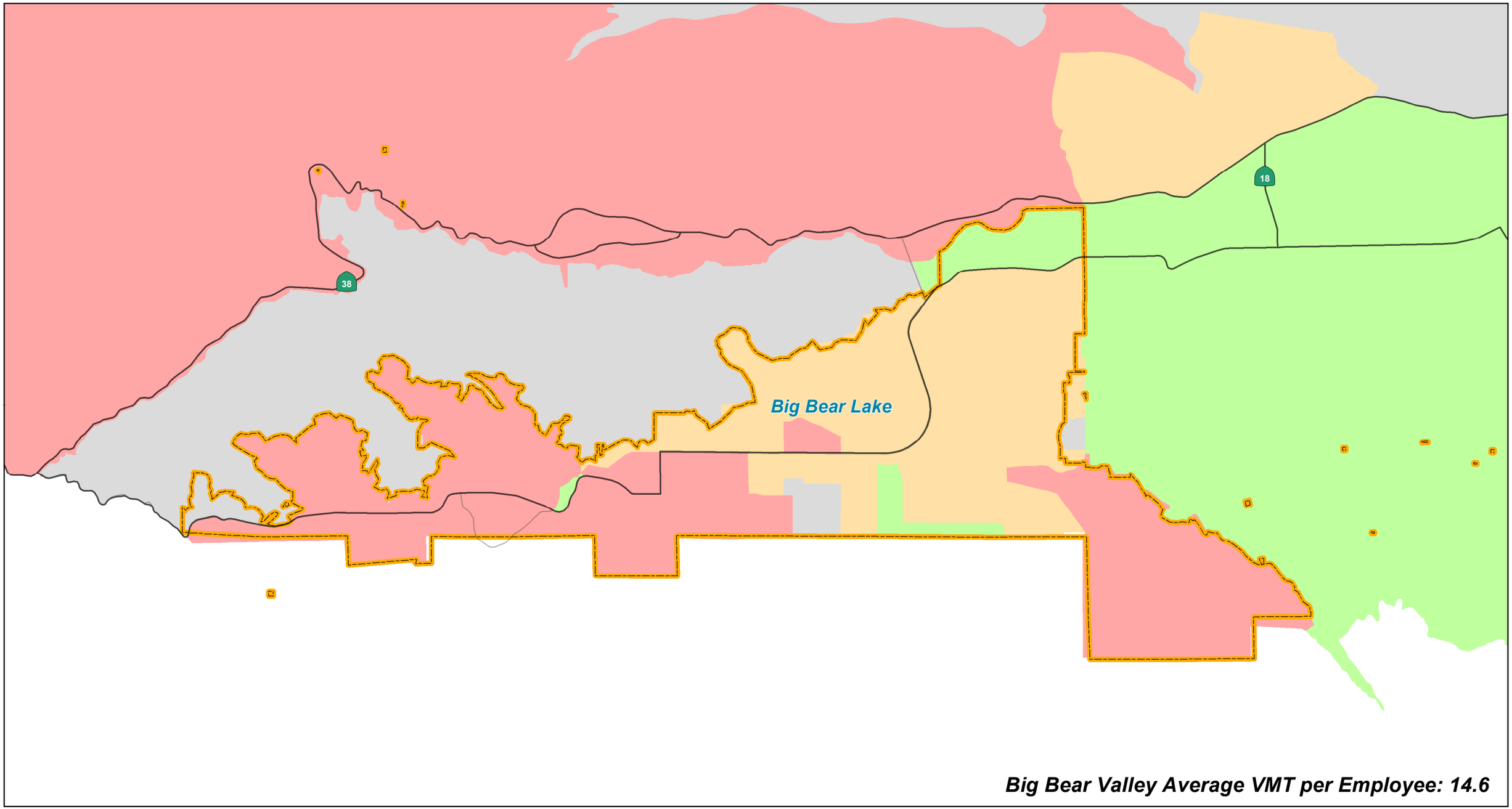

LSA

LEGEND

City of Big Bear Lake

VMT per Employee

No Employment

Less than 12.4

12.4 - 14.6

Greater than 14.6

0 1500 3000

FEET

SOURCE: SBTAM 2016; ESRI Streetmap, 2013.

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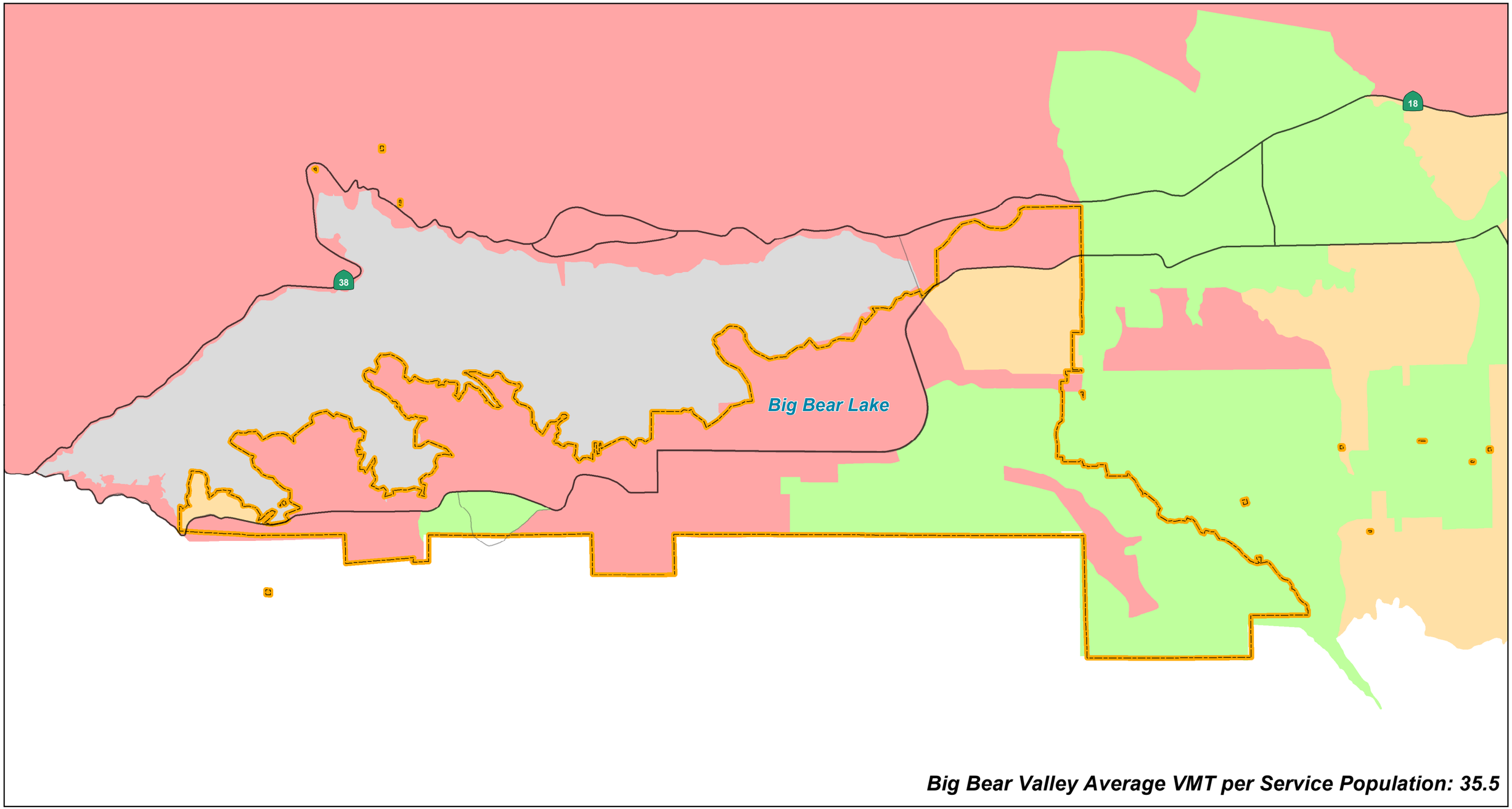
FIGURE A-2

City of Big Bear Lake VMT Thresholds and Implementation Analysis

City of Big Bear Lake Existing VMT per Employee



LSA

LEGEND

City of Big Bear Lake

VMT per Service Population

No Population or Employment

Less than 30.2

30.2 - 35.5

Greater than 35.5

0 1500 3000

FEET

SOURCE: SBTAM 2016; ESRI Streetmap, 2013.

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FIGURE A-3

City of Big Bear Lake VMT Thresholds and Implementation Analysis

City of Big Bear Lake Existing VMT per Service Population

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