SB 743 Implementation Decisions

Prepared for:
City/County Association of Governments (C/CAG) of San Mateo County and its Member Agencies

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Executive Summary

On September 27, 2013, Governor Jerry Brown signed SB 743 into law and started a process intended to fundamentally change transportation impact analysis under the California Environmental Quality Act (CEQA). Specifically, the legislation directed the State of California's Office of Planning and Research (OPR), which oversees CEQA compliance, to consider different metrics for identifying transportation impacts and make corresponding revisions to the *CEQA Statute & Guidelines*. The goal of this legislation and the pursuant change in metrics was to reform transportation impact analysis such that it was more in line with other statewide goals pertaining to infill development, reduction of greenhouse gases (GHG), and promotion of public transit and active transportation.

Changes to the *CEQA Statute & Guidelines* necessitate updates to typical transportation impact analysis metrics, methods, and thresholds. The purpose of this white paper is to help C/CAG member agencies meet the new requirements of CEQA under SB 743 by providing curated SB 743 implementation information to support decisions for VMT metrics, VMT calculation methods, VMT impact thresholds, and VMT mitigation actions for use by C/CAG member agencies. This white paper includes baseline and cumulative VMT estimates and will be accompanied by a customized City/County Association of Governments VMT Estimation Tool (C/CAG VMT Estimation Tool). The baseline and cumulative VMT data will help jurisdictions develop their VMT thresholds and methods. This baseline and cumulative VMT data will be integrated into the forthcoming C/CAG VMT Estimation, which will:

- Screen land use projects that are exempt from further VMT analysis using project generated VMT thresholds and transportation priority areas
- Estimate the project generated VMT rate, and
- Estimate VMT reductions for land use projects in San Mateo County.[1]

Each lead agency in San Mateo County will need to make several policy decisions to implement these changes. This report discusses the background of the changes and provides detailed technical information pertaining to decisions each town/city/county as a lead agency will need to make. The **Summary of Decisions, Options, and Tool Specifications**, presented as **Appendix A**, provides an abbreviated overview of this white paper's contents and corresponding decision points and the forthcoming San Mateo County VMT Estimation Tool specification. The VMT Estimation Tool will help agencies conduct a baseline VMT screening analysis. For projects that fail the VMT screening analysis, member agencies will need to conduct a complete VMT analysis that evaluates Cumulative Conditions, and the project's effect

[1] The VMT Estimation Tool will screen and estimate project generated VMT and VMT reductions for land use projects in San Mateo County. The types of land use projects would include residential, office, and industrial land uses, those land uses in combination with each other, and those land uses with or without ancillary retail space. The VMT Estimation Tool will be modular such that C/CAG, along with the cities in San Mateo County and the County of San Mateo can include their specific VMT screening requirements or model data within the VMT Estimation Tool.

on boundary VMT within a specific geographic area. This complete VMT analysis will be used as an input into the air quality, GHG, and energy impact analysis.

Background

VMT has replaced vehicle delay as an indicator of environmental impacts.

At its core, SB 743 removes the use of vehicle level of service (LOS) as an indicator of environmental impacts under CEQA. LOS is a traditional measure of vehicular delay, or the additional driving time encountered by drivers during congested time periods. Instead of measuring vehicle delay, OPR recommends considering a project's effect on total vehicle miles traveled (VMT).

VMT can be described as the product of a project's vehicle trip generation and the average length of those trips. For instance, if a project generates 100 daily vehicle trips, each with an average length of five miles, that project generates 500 daily VMT.

VMT is related to many of the externalities created by vehicle travel. In gasoline or diesel-powered vehicles, VMT is directly related to total GHG production and other tailpipe emissions. VMT also serves as an indicator of total regional congestion by measuring how much traffic a project is generating on a macroscopic scale.

However, VMT does not accurately predict changes such as increased traffic delay at intersections near a project, or how traffic will affect roadways immediately surrounding a project. It is more focused on how efficiently designed and located a land use project might be; whether the project is located near a wide variety of jobs, housing, or retail uses; and whether alternative modes of transportation are available.

As a lead agency, each C/CAG member agency must make several key policy decisions to comply with SB 743.

Because reporting the VMT associated with a given project or plan requires a different method than traditional traffic analysis, each jurisdiction (a town, city, unincorporated County, or other agency in San Mateo County,) will need to set clear guidelines and expectations for how a VMT analysis should be conducted. With the *CEQA Statute & Guidelines* expectations for an environmental impact analysis in mind, this white paper discusses seven questions, grouped by the specific decisions about VMT metrics, VMT calculation methods, VMT significance thresholds, and VMT mitigation actions.[2] We highlight options and limitations for each question from a technical transportation planning and engineering perspective, with a particular emphasis on addressing the *CEQA Statute & Guidelines'* expectations for an environmental impact analysis.

[2] Typical CEQA practice focuses on environmental effects that occur on a typical weekday, so all references to VMT in this white paper are intended to mean VMT that occurs on a typical weekday.

1. **VMT Metrics**: What form of VMT metrics could be used?
2. **VMT Calculation Methods**: What methods are available to use in estimating and forecasting VMT?
3. **VMT Impact Significance Thresholds**: Is the use of VMT impact screening desired? What is the VMT impact significance threshold for land use projects and land use plans under baseline conditions? What is the VMT impact significance threshold for land use projects and land use plans under cumulative conditions? What is the VMT impact significance threshold for transportation projects under baseline and cumulative conditions?
4. **VMT Mitigation Actions**: What VMT reduction mitigation strategies are feasible?

Each of these questions is discussed in greater detail in its own section of this white paper. Those sections are summarized below.

VMT Metrics

VMT Measured and Expressed in Multiple Ways

The first decision facing each jurisdiction is which VMT *metric* to use to express a project's transportation effects. VMT metrics fall into two general categories: absolute VMT and per capita VMT. Per capita VMT is also referred to as an efficiency metric, as it does not vary directly with project size. Based on our example above, if a project generates 100 daily trips at an average of five miles per trip, the *absolute* project generated VMT is 500 vehicle miles per day. If that project is a small office employing 25 people, the per capita VMT is 20 VMT per employee (a per capita or VMT efficiency metric). In the same fashion, residential projects can be evaluated using either total project generated VMT or partial home-based VMT per resident. Mixed-use projects can either examine each land use separately, or combine them into a "service population" that includes both employees and residents (and potentially other populations, such as visitors and students) that generate the VMT within the area being studied. "Service population" is all the population that generate VMT; in most instances this will be the total number of residents plus the number of employees in the analysis area or project; however, it may also include other categories of people, such as visitors or students, if those categories are used in the trip generation estimates in the travel forecast model.

Table ES-1 summarizes the common VMT metrics available.

Table ES-1: Summary of Common VMT Metrics

VMT Metric[1,]	Definition	Recommended by OPR[2]	VMT Used for Other CEQA Sections?
Total Project Generated VMT	Daily VMT of all vehicle trips, vehicle types, and trip purposes for all project land uses, presented as a total project generated VMT.	Yes, for land use plans, and discussed in Appendix 1 of the OPR *Technical Advisory*.	Yes
Total Project Generated VMT per Service Population[3, 4] (also "Total Project Generated VMT Rate")	Daily VMT of all vehicle trips, vehicle types, and trip purposes for all project land uses, divided by the sum of residents plus employees in the analysis area generating the VMT.	No, although may be helpful for mixed-use projects and comparing land use scenarios, particularly when using a travel forecasting model.	Yes
Partial Home-Based VMT per Resident[5](also "Home-Based VMT Rate")	VMT generated by light-duty vehicles (i.e., private cars and trucks) for all trips that begin or end at a residential land use, divided by residents.	Yes, for residential projects on page 5 and Appendix 1 of OPR *Technical Advisory*.	No
Partial Home-Based Work VMT per Employee[5] (also "Home-Based Work VMT Rate")	VMT by light-duty vehicles only for work trips (that is, trips that have one end at a workplace and one end at a residence), divided by number of employees.	Yes, for office projects on page 6 and Appendix 1 of OPR *Technical Advisory*.	No
Project's Effect on VMT within the Boundary of a Specific Area (also "Total Boundary VMT")	VMT that occurs within a selected geographic boundary (e.g., City, County, or region) by any type of vehicle. This captures all on-road vehicle travel on a roadway network for any purpose, and includes local trips as well as trips that pass through the area without stopping.	Yes, for retail projects and transportation projects on pages 5, 6 and 23 and Appendix 1 of the OPR *Technical Advisory*.	Yes

Notes:

1. Each VMT metric is an option for baseline and/or cumulative impact analysis.
2. With the exception of Total Project Generated VMT per Service Population, each VMT metric listed in this table are described in the OPR *Technical Advisory on Evaluating Transportation Impacts in CEQA* (December 2018). See pages 5, 6 and 23, and Appendix 1 of the OPR *Technical Advisory*.
3. Total project generated VMT is derived from this VMT rate.
4. The project generated VMT accounting is similar to an origin-destination accounting used for many Climate Action Plans.
5. A partial VMT estimate.

Source: Fehr & Peers, 2020.

Total VMT and Partial VMT

Total VMT metrics include all types of VMT captured by a travel forecasting model, regardless of the type of vehicle or the trip's purpose. In practice, this means the metric includes visitor trips, medium-duty and heavy-duty vehicles, public transit buses, and other types of vehicle miles that might not be captured in the most common partial VMT metrics. Partial VMT refers to the use of only particular trip purposes and/or vehicle types for assessing a project's impacts. The efficiency metrics recommended by OPR for use in analyzing office and residential projects are partial VMT metrics, because they include only light-duty passenger vehicles and only trips for a specific purpose or made by a specific population.

The benefits of partial VMT metrics are as follows: They allow for sketch-level analysis using findings from a prior model run; they are easier to understand and visualize; and for single land uses that are similar to existing development patterns, they are likely reflective of the same impact patterns as would be present with analysis of total VMT. Understanding where built environment conditions lead to VMT-efficient residential and workplace activity is substantial evidence that could help support conclusions that adding similar land uses to those areas would create similar outcomes. For projects that may be subject to further scrutiny, only reporting a portion of VMT from select trip purposes and limiting the VMT to light-duty vehicles could be considered an incomplete analysis of VMT. However, for most projects, total boundary VMT will also be reported as part of the Air Quality and Greenhouse Gas analysis.

Project Generated VMT and Project's Effect on VMT

VMT metrics also differentiate between project generated VMT and a project's effect on VMT. Project generated VMT is similar to current transportation impact analysis practice of using daily trip generation: to estimate the daily project generated VMT, the daily trips are multiplied by the distance traveled by each daily vehicle trip. The project's effect on VMT instead evaluates the change in total on-road vehicle travel within a geographic area boundary before and after the project is built (referred to as boundary VMT in this white paper). An often-cited example of how a project can affect VMT is the addition of a grocery store in a food desert. Residents of a neighborhood without a grocery store have to travel a great distance to an existing grocery store. Adding the grocery store to that neighborhood will shorten many of the grocery shopping trips and reduce the VMT to/from the neighborhood. While the new store itself will "generate" many daily trips, in that there will be many cars coming in and out of the store's driveway, it will generally attract those trips *away* from other grocery stores located farther away. If the boundary VMT in the area served by all the local grocery stores were to be assessed, it is likely that the total amount of driving in that area will have decreased rather than increased.

Key Take-Aways

In deciding what form of VMT metric to use, each jurisdiction should consider the following options:

1. Total Project Generated VMT
2. Total Project Generated VMT per Service Population[3]
3. Household Generated VMT per Resident (requires an activity/tour-based travel forecasting model)
4. Home-Based VMT per Resident (a partial VMT estimate)
5. Home-Based Work VMT per Employee (a partial VMT estimate)
6. Project's Effect on VMT within the Boundary of a Specific Area (Boundary VMT)

Metrics such as Home-Based VMT per Resident and Home-Based Work VMT per Employee represent partial VMT (i.e., some vehicle types and trip purposes are excluded from the calculation). This may be acceptable for screening purposes, but not for a complete VMT impact analysis. When selecting VMT metric(s), it is useful to keep in mind that the expectation of CEQA is to disclose the potential effects of a project on the environment and the practical consideration of using the same (or different) VMT metrics for the various topic sections of an environmental analysis – transportation, air quality, greenhouse gases, and energy consumption. A summary of the considerations for each of these options is shown in **Table ES-1** above.

VMT Calculation Methods

VMT Calculation Using Several Methods

The most common method of calculating the VMT metrics listed in **Table ES-1** is through a travel forecasting model. A travel forecasting model uses specialized software and is designed to reflect the interactions between different land use and roadway elements in a large area. The two travel models most commonly used to assess projects in San Mateo County are the City/County Association of Governments of San Mateo County (C/CAG)-Santa Clara Valley Transportation Authority (VTA)-Bi-County Model ("C/CAG-VTA travel forecasting model") and Travel Model One ("MTC travel forecasting model"), which is maintained by the Metropolitan Transportation Commission (MTC) and used for large-scale regional planning efforts. There is also a statewide model developed by Caltrans, though the level of analysis is at such a large scale that it is typically used to evaluate interregional travel and freight movements rather than localized land use changes.

In some cases where a travel model is not available or not appropriate, VMT can be estimated using sketch models or spreadsheet tools. VMT may also be estimated directly by multiplying the number of trips by an average trip length. Trips can be estimated using the results of local trip generation surveys or trip generation rate data published by the Institute of Transportation Engineers (ITE). Trip lengths can be extracted from models or from standardized averages or travel pattern data from the regional or sub-

[3] Service population includes residential population plus employment and may include students or visitors; it is intended to include all independent variables used in estimating trips.

regional planning organization. Using trip length averages does not consider changes to the roadway network or to traffic congestion, or the project's potential effects on overall travel patterns. These non-model "accounting methods" could also be paired with a travel model and used between major model updates or to estimate project generated VMT for small projects that would "get lost in a model."

Key Take-Aways

Practically speaking, the use of a travel model is preferable for projects large enough to be accurately represented in that model. In areas under a Town's/City's/County's jurisdiction, use of the C/CAG-VTA travel forecasting model is most appropriate for this analysis. **Appendix B** summarizes the activity-based (also called tour-based) Metropolitan Transportation Commission (MTC) travel forecasting model and the trip-based C/CAG-VTA Bi-County travel forecasting model ("C/CAG-VTA travel forecasting model"), including their analytical strengths and weaknesses.

Some limitations of these methods include the following:

- Statewide and regional models have limited sensitivity and accuracy for local scale applications off the shelf.
- Regional and local models often truncate trips at model boundaries.
- Sketch and spreadsheet tools do not capture the full "project effect on VMT."

For smaller projects, use of a non-model "accounting method" may be more appropriate due to their scale and ease of use. A jurisdiction may wish to set guidance as to which types of projects will generally be required to perform VMT analysis using a travel forecasting model, and which can be performed using non-model "accounting methods" (if any). One potential planning tool that may be appropriate for most small- to medium-sized projects is the forthcoming C/CAG VMT Estimation Tool under development by C/CAG (as a part of this project).

VMT Impact Significance Thresholds

A lead agency has discretion to decide what constitutes a significant impact to the environment.

SB 743 changes the focus of transportation impact analysis in CEQA from measuring impacts <u>to</u> drivers, to measuring the impact <u>of</u> driving. A lead agency has discretion to set its significance threshold for VMT impacts, provided that the basis for that threshold is grounded in substantial evidence (see **Chapter 1** Introduction chapter, **Chapter 5** VMT Impact Significance Thresholds, and **Appendix D** for additional details). With regard to establishing thresholds for VMT, lead agencies have at least four options:

1. **Use Screening Criteria**. The concept of project screening is that some projects have characteristics that readily lead to the conclusion that they would not cause a VMT impact, and therefore could be screened out of doing a detailed VMT analysis. Some types of screening criteria include proximity to transit, site located in a low-VMT area, local-serving

retail, transportation projects that do not add capacity, and projects with no net VMT increase.

2. **Rely on the OPR Technical Advisory suggestion to set thresholds consistent with state goals for air quality, greenhouse gas (GHG), and energy conservation.** The OPR *Technical Advisory* contains suggested VMT thresholds. The basic suggested threshold is that each project achieves a VMT level that is at least 15% below baseline conditions. In the case of a jurisdiction, its "region" would most likely be the nine-county Bay Area.
3. **Use a threshold adopted or recommended by another public agency consistent with lead agency air quality, GHG reduction, and energy conservation goals.** The *CEQA Statute & Guidelines* offer the option for an agency to use a threshold that is adopted or recommended by another agency, as long as that decision is supported by substantial evidence. Other state agencies, such as Caltrans and the California Air Resources Board (CARB), have technical expertise that is relevant to this topic.

   Recent CARB publications have identified that new land use projects could contribute to meeting these statewide goals by achieving total project generated VMT levels of at least 14.3% below the existing baseline (the CARB report does not specify whether this "baseline" is the regional average or some other baseline). For light-duty vehicles only, CARB cites a 16.8% reduction below baseline (2018) average VMT. However, the CARB analysis assumes that all of the regions in the state will meet the GHG reduction targets set in their Regional Transportation Plans and Sustainable Communities Strategies (RTP/SCS); thus far, indications are that not all regions are meeting those targets, and vehicular travel in California (at least prior to the COVID-19 pandemic) has been increasing rather than decreasing over the past several years. Further, the CARB analysis does not account for any future increases in the use of Transportation Network Companies (such as Uber and Lyft) or commercial delivery services, nor does it envision the potential for development of autonomous vehicles or any other emerging transportation innovations. Therefore, there is growing evidence that the VMT reduction values from the CARB publication may not be enough to actually meet the State's GHG goals. Should current VMT generation trends persist, the threshold may need to increase to 25% below baseline (2018) average of jurisdiction (all vehicles).

   Caltrans has released draft guidance endorsing the VMT thresholds published in the OPR *Technical Advisory*. Caltrans does acknowledge that each lead agency has the discretion to set its own significance thresholds, and they will be reviewing the evidence presented by any agency that uses a threshold that differs from those in the *Technical Advisory*.

   Separately, Caltrans has released draft Interim Guidance on "*Determining CEQA Significance for GHG Emissions for Projects on the State Highway System*" that *recommends that any increase in GHG emissions would constitute a significant impact*. This has been referred to as the "Net Zero VMT Threshold." While Caltrans has thus far signaled that it would apply this threshold only to transportation projects, it does raise a question about whether a "net zero VMT" threshold should also be applied to land use projects and plans.

4. **Develop jurisdiction-specific VMT thresholds consistent with the existing General Plan.** Agencies may decide to set their own thresholds, which must be supported by substantial evidence and should support the three objectives laid out in SB 743: 1) reducing GHG emissions, 2) encouraging infill development, and 3) promoting active transportation. The process of setting thresholds should consider the policies and standards set in the Regional Transportation Plan (RTP)/ Sustainable Communities Strategies (SCS), and should consider how much priority a jurisdiction wants to place on the statewide GHG reduction goals. A targeted study could determine what level of VMT in a jurisdiction would be consistent with the VMT forecasts presented in Plan Bay Area and would represent a jurisdiction's "fair share" of the State's GHG reduction goals. Another option for setting a local threshold is to consider what level of VMT reduction is feasible to achieve in the local context, or to tie thresholds to the community's greenhouse gas reduction goals set forth in a Climate Action Plan (note this may require more rigorous VMT modeling than most CAPs have completed to date).

Key Take-Aways

While it is difficult for a lead agency to determine what level of VMT change is unacceptable when viewed solely through a transportation lens, there are several possible options, depending upon if a jurisdiction chooses to set a threshold based on local or state policies. Options include the following:

1. Set thresholds based on state goals.
    a. Rely on the OPR Technical Advisory suggestion to set thresholds consistent with state goals for air quality, greenhouse gas and energy conservation.
        i. OPR 15% below baseline average of a city or region (light-duty vehicles only)
2. Use a threshold adopted or recommended by another public agency consistent with lead agency air quality, GHG reduction, and energy conservation goals.
    a. CARB 14.3% below baseline (2018) average of jurisdiction (all vehicles, presuming that MPOs meet SB 375 targets)
    b. CARB 16.8% below baseline (2018) average of jurisdiction (light-duty vehicles only, presuming that MPOs meet SB 375 targets)
    c. CARB: 25% below baseline (2018) average of jurisdiction (all vehicles, presuming that MPOs do not meet SB 375 targets).
    d. Net zero VMT
3. Set jurisdiction-specific threshold consistent with existing General Plan.
    a. Set jurisdiction-specific VMT threshold based on substantial evidence.
    b. Set thresholds based on baseline VMT performance or Climate Action Plan goals

VMT Mitigation Actions

The nature of transportation impact mitigation under CEQA will likely change.

Mitigating a LOS impact typically involves making changes to the physical transportation system to accommodate additional vehicles and reduce delays. These mitigations may involve actions such as installing traffic signals, adding turn lanes, widening roads, or contributing to the construction of HOV/Express Lanes, among other options. The identification of necessary mitigations resulting from project impacts has historically led to project sponsors identifying and funding these changes to the transportation system (i.e., paying a "fair share" contribution toward funding a new traffic signal or widening an existing roadway).

The use of VMT as a metric focuses on the total *amount* of driving, rather than the driving *experience*. Four possible mitigation approaches are described in the VMT Mitigation Actions chapter:

- VMT Cap
- VMT Based Impact Fee Program
- VMT Mitigation Bank
- VMT Mitigation Exchange

A VMT Cap can be developed and administered on a project-by-project basis, while the remaining three options (VMT Based Impact Fee Program, VMT Mitigation Bank, and VMT Mitigation Exchange) are program approaches to impact mitigation. The concept of a 'program' approach to impact mitigation is commonly used in a variety of technical subjects, including transportation, air quality, greenhouse gases, and habitat. Transportation impact fee programs have been used to help mitigate cumulative vehicle level of service (LOS) impacts. What is new is developing a fee program based on VMT impacts and alternative programs – VMT Mitigation Bank and VMT Mitigation Exchange. Absent these new program-level mitigation approaches, rural and suburban lead agencies will have limited feasible mitigation options for project sites.

Implementation Actions

Each lead agency will need to take administrative action to prepare for changes to CEQA analysis.

Each lead agency will consider the options in this white paper and develop its own implementation approach based on its local context. This will likely require public input from elected or appointed policy-makers to balance community values with CEQA requirements. Some communities may decide to set a VMT threshold that is consistent with its General Plan VMT growth budget, while others may select the screening approach described in the OPR *Technical Advisory*. Each agency has the discretion and responsibility to develop its own VMT methods for various project types, and sizes.

Use of Vehicle Level of Service for Non-CEQA Analysis

A jurisdiction has options to continue studying a project's effects on vehicle delay.

Communities place a high value on the information about traffic and transportation presented during a project's review process. Historically, much of the transportation analysis associated with new development or proposed land use plans has occurred under the umbrella of CEQA. However, with this new process, many of these guidelines and analyses may instead occur during development review as part of a jurisdiction's land use review process for proposed projects.

A jurisdiction may decide to maintain a level of service standard in its General Plan Circulation Element, and may continue to administer programs to collect impact fees that can be used for roadway improvements. However, these will no longer be subject to CEQA environmental review and potential litigation. Instead, this analysis and any related agreements would need to be performed and presented during land use review of proposed project, for example with regard to General Plan consistency. Any fees assessed to help ease the effects of a given project would be required to conform to State requirements for impact fees and present an appropriate study that documents the nexus between the impact and the fee assessed.

Other Core CEQA Tenets Remain Unchanged.

While this report focuses on the adoption of VMT as a metric for assessing transportation impacts, many other facets of CEQA practice remain unchanged. Transportation impact sections must still discuss other impact categories such as hazards due to design features, effects on emergency access, and conflicts with a program, plan, ordinance, or policy affecting transit, bicycle, and pedestrian facilities. In addition, a jurisdiction will continue to have the opportunity to comment on EIRs prepared for consideration by other lead agencies if those EIRs may affect areas in a jurisdiction.

One consistency to note is that the option to "tier" CEQA analysis will remain. The tiering process consists of streamlining topics studied for a project if that project was assessed under a previous EIR. A classic example of this is the development of a single parcel that is consistent with a previously analyzed Specific Plan. The project need only analyze those items which were not previously analyzed. This practice will also apply to VMT analysis, provided the EIR from which the project tiers also studied VMT. In the near term, this may result in tiered projects requiring supplemental VMT analysis; however, in the future, projects that are consistent with a cleared General Plan or Specific Plan may not be required to undergo the full VMT analysis process.

Taking the Next Steps

The immediate next steps for each jurisdiction in San Mateo County as a lead agency are to develop its VMT thresholds and provide staff and applicants with guidance pertaining to each of the questions posed above. This white paper provides an initial assessment of a jurisdiction's options, and has discussed each in greater detail in the body of this report; however, the decision on how to answer each implementation

question must ultimately be made by each jurisdiction. The **Summary of Decisions, Options, and Tool Specifications,** presented as **Appendix A**, provides an abbreviated overview of this report's contents and corresponding action items and decision points.

The implementation of SB 743 is just beginning for many lead agencies. Current CEQA practices have developed over several decades, incorporating a large body of case law and periodic updates to the *CEQA Statute & Guidelines*. Because SB 743 implementation is brand new, there is not yet any case law to guide our understanding or interpretation. This white paper represents our current understanding of the options, limitations, and considerations, informed by our research into SB 743 and knowledge of past CEQA practice. This understanding will evolve over time as more agencies apply SB 743 concepts to their own CEQA procedures. It is recommended that legal counsel be consulted as part of this SB 743 implementation process.

Chapter 1. Introduction

This white paper provides a summary of key information relevant to how Senate Bill 743 (SB 743) will be implemented in C/CAG's member agencies. It begins with an introduction on the background and purpose of SB 743, and then provides a summary of policy actions required for each member agency, along with discussion of guidance provided by state agencies on this process.

A jurisdiction's SB 743 implementation will provide guidance on and set VMT methods to disclose potential transportation impacts under the California Environmental Quality Act (CEQA). SB 743 removes the use of automobile delay or traffic congestion for determining transportation impacts in environmental review. Instead, the latest CEQA Statute & Guidelines now specify that Vehicle Miles Traveled, or VMT[4], is the appropriate metric to evaluate transportation impacts. To comply with these new rules, each lead agency will need to define policies and practices regarding the evaluation of transportation impacts under the California Environmental Quality Act, including guidance on how VMT should be calculated and presented in environmental documents. In short, SB 743 changes the focus of transportation impact analysis in CEQA from measuring impacts *to drivers*, to measuring the impact *of driving*.

Under CEQA, lead agencies must decide what constitutes a significant environmental impact. The *CEQA Statute & Guidelines* encourage the use of thresholds of significance; they can be quantitative (i.e., a measured value or values such as the concentration of greenhouse gas emissions in the atmosphere) or qualitative (i.e., a performance standard measuring the quality of a service such as vehicle level of service) performance standards by which the agency can measure the amount of impact the project causes and thereby determine if the project's impacts are significant. In fact, the new *CEQA Statute & Guidelines* Section 15064.3(b)(4) (cited below) establishes that the lead agency has discretion to choose the most appropriate VMT methods for transportation impact analysis.

> *Methodology. 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. A lead agency may use models to estimate a project's vehicle miles traveled and may revise those estimates to reflect professional judgment based on substantial evidence. Any assumptions used to estimate vehicle miles traveled and any revisions to model outputs should be documented and explained in the environmental document*

[4] VMT refers to "Vehicle Miles Traveled," a metric that accounts for the number of vehicle trips generated as well as the length or distance of those trips. VMT is an accessibility performance metric that evaluates the changes in land use patterns, regional transportation systems, and other built environment characteristics, which is different from what the mobility performance metric vehicle level of service measures – vehicle mobility. The white paper will use the terms project generated VMT and project's effect on VMT using boundary VMT metrics for specific geographic areas. Project generated VMT is the sum of the "VMT from" and "VMT to," and within a project site. Project's effect on VMT uses geographic boundary VMT to evaluate the change in VMT on all roadways without and with the project within a specific geographic area.

prepared for the project. The standard of adequacy in Section 15151 shall apply to the analysis described in this section.

The expectations for environmental impact analysis highlighted within the *CEQA Statute & Guidelines* are listed below.

- § 15003 (f) = fullest possible protection of the environment…
- § 15003 (i) = adequacy, completeness, and good-faith effort at full disclosure…
- § 15125 (c) = EIR must demonstrate that the significant environmental impacts of the proposed project were adequately investigated…
- § 15144 = an agency must use its best efforts to find out and disclose…
- § 15151 = sufficient analysis to allow a decision which intelligently takes account of environmental consequences…

With the *CEQA Statute & Guidelines* expectations for an environmental impact analysis in mind, this white paper discusses seven questions, grouped into four categories involving VMT metrics, VMT calculation methods, VMT significance thresholds, and VMT mitigation actions.[5] We highlight options and limitations for each question from a technical transportation planning and engineering perspective with a particular emphasis on addressing the *CEQA Statute & Guidelines* expectations for an environmental impact analysis.

For simplicity, a Decisions, Options, Considerations, and Tool Specifications matrix accompanies this white paper as **Appendix A** and summarizes the seven questions mentioned above. Each jurisdiction can use this white paper and other supporting materials to develop VMT significance thresholds.

Approach

The purpose of this white paper is to help C/CAG member agencies meet the new requirements of CEQA under SB 743 by providing curated SB 743 implementation information to support decisions for VMT metrics, VMT calculation methods, VMT impact thresholds, and VMT mitigation actions for use by C/CAG member agencies. As a lead agency, each jurisdiction will need to consult with legal counsel, CEQA experts, and local policy makers to develop and support its own VMT threshold with substantial evidence. This white paper includes baseline and cumulative VMT estimates for each jurisdiction in the County. The baseline and cumulative VMT data will help jurisdictions develop their VMT thresholds and impact analysis methods. This baseline and cumulative VMT data will also be integrated into the forthcoming customized City/County Association of Governments VMT Estimation Tool (C/CAG VMT Estimation Tool), which will screen land use projects that are exempt from further VMT analysis using project generated VMT thresholds and transportation priority areas, estimate the project generated VMT rate, and estimate VMT reductions for land use projects in San Mateo County.

[5] Typical CEQA practice focuses on environmental effects that occur on a typical weekday, so all references to VMT in this white paper are intended to mean VMT that occurs on a typical weekday.

Because VMT is also used as an input for air quality, greenhouse gases, and energy consumption impact analyses in CEQA, the white paper will also discuss how VMT significance thresholds affect other aspects of the CEQA process.

For each of the seven questions, there are three separate categories of projects that are subject to CEQA review and for which VMT evaluation will be needed. Each jurisdiction will need to address how each of these three project categories will be evaluated, and consider all three project types when responding to policy questions:

- **Land Use Projects**: typically, development projects on a single parcel or multiple adjacent parcels
- **Land Use Plans**: such as a General Plan update and future Specific Plans
- **Transportation Projects**: infrastructure changes such as building or removing roads, bicycle facilities, and transit facilities

The implementation of SB 743 is just beginning for many lead agencies. Current CEQA practices have developed over several decades, incorporating a large body of case law and periodic updates to the *CEQA Statute & Guidelines*. Because SB 743 implementation is brand new, there is not yet any case law to guide our understanding or interpretation. This white paper represents our current understanding of the options, limitations, and considerations, informed by our research into SB 743 and knowledge of past CEQA practice; this understanding will evolve over time as more agencies apply SB 743 concepts to their own CEQA procedures. It is additionally recommended that jurisdictions consult legal counsel as part of this SB 743 implementation process.

Outline

This report includes a background discussion about SB 743 and then transitions to the five sections: Background, VMT Metrics, VMT Calculation Methods, VMT Significance Thresholds, and VMT Mitigation Actions. The white paper is outlined below.

- **Chapter 2: Background**. A background discussion of transportation analysis before and after SB 743 implementation to provide context for the decisions in the following sections. This section also summarizes relevant local land use and transportation polices planning documents, including Plan Bay Area 2040, General Plans (including Circulation Elements for each of the C/CAG member agencies), recent environmental impact reports.
- **Chapter 3: VMT Metrics**. As a lead agency, a jurisdiction (town, city, county, or other agency) has the discretion to choose the most appropriate methods to evaluate a project's VMT, including how the results of that method are expressed. Generally, VMT is expressed in several ways: total project generated VMT, project generated rates (total project generated VMT per service

population[6] or partial project generated VMT per resident/per employee), in total (all VMT associated with a project or plan), or as the net "effect" a project will have on VMT (listed as project's effect on VMT). This section will describe the benefits and shortcomings of each metric.

- Question 1: What form of VMT metrics could be used?[7]
  - Total Project Generated VMT
  - Project Generated VMT rates
    - Total Project Generated VMT per Service Population
    - Partial Project Generated VMT per Resident (or per Employee)
  - Project's Effect on VMT (within a selected geographic boundary)

- **Chapter 4: VMT Calculation Methods**. VMT forecasts are generated using various forms of models that range from simple spreadsheets (off-model) based on historic traffic growth trends to complex computer models that account for numerous factors that influence travel demand. In some cases, VMT can be estimated using sketch models or spreadsheet tools. VMT can also be estimated directly by multiplying the number of trips by an average trip length. Given the availability of two travel forecasting modes, the white paper will provide each agency with a review of Metropolitan Transportation Commission (MTC) and the Santa Clara County Valley Transportation Authority (VTA) travel forecasting models for VMT calculations in Santa Mateo County, including analytical strengths and weaknesses of each option.
  - Question 2: What methods are available to use in estimating and forecasting VMT?
    - Select a non-model "accounting method" or a travel forecasting model for estimating and forecasting VMT at a regional, county, and/or local geographic area.

- **Chapter 5: VMT Impact Significance Thresholds**. Each lead agency has discretion to choose its threshold of significance for identifying a VMT impact. The intent of a VMT threshold is to identify whether a project has substantial environmental impacts due to traffic (such as noise, air, pollution, and safety concerns), and whether a project balances the needs of congestion management with statewide goals, such as the promotion of infill development. This chapter will also discuss the opportunity for "screening" projects in low VMT or transit priority areas. This chapter will describe possible thresholds and summarize the supporting evidence for each.
  - Question 3: Is the use of VMT impact screening desired?
    - Projects located near frequent and high capacity transit
    - Projects located in low-VMT generating area

[6] "Service population" is all the population that generate VMT; in most instances this will be the total number of residents plus the number of employees in the analysis area or project; however, it may also include other categories of people, such as visitors or students, if those categories are used in the trip generation estimates in the travel forecast model.

[7] Each VMT metric will be defined in the white paper.

        - Local-serving retail projects
        - Specific transportation projects
        - Projects with no net VMT increase
        - Small projects
    - Question 4: What is the VMT impact significance threshold for land use projects and land use plans under baseline conditions?
        - Set a threshold consistent with state goals for air quality, greenhouse gas, and energy conservation.
        - Set a threshold consistent with the General Plan.
    - Question 5: What is the VMT impact significance threshold for land use projects and land use plans under cumulative conditions?
        - Fair share of regional VMT allocation
        - Cumulative VMT thresholds similar to baseline VMT thresholds
        - Long-term air quality and greenhouse gas expectations
    - Question 6: What is the VMT impact significance threshold for transportation projects under baseline and cumulative conditions?
        - Consider transportation project screening criteria and Caltrans' pending VMT threshold.
- **Chapter 6: VMT Mitigation Actions**. A jurisdiction will also need to determine if projects will be able to mitigate significant VMT impacts, and whether those measures can reduce the severity of a potential VMT impact. This chapter will include a review of how other jurisdictions have incorporated transportation demand management into their VMT mitigation measures for VMT impacts, and a discussion of the potential risks and uncertainties related to VMT mitigation measures. This white paper will also discuss program-based VMT mitigation approaches which may be more effective than project-site only strategies and provide a way for development contributions to be pooled to pay for VMT reduction strategies that would not be feasible for individual projects to implement.
    - Question 7: What VMT reduction mitigation strategies are feasible?
        - Possible options include a VMT cap, VMT fee, VMT bank, and VMT exchange.
- **Chapter 7: Implementation Actions for Lead Agency Actions**. This chapter discusses the logistical and policy actions that lead agencies can take to implement the guidance presented in **Chapters 2** through **6**. This includes a discussion of how to navigate the policy questions for each topic area, which sorts of legislation may be required, and how other jurisdictions are currently planning to adopt VMT impact analysis guidance. It also includes a discussion of how agencies can consider performing vehicle delay analysis through non-CEQA planning processes.

Chapter 2. Background

Use of CEQA Prior to SB 743

CEQA was enacted in 1970 with the goal of providing a mechanism for disclosing to the public the environmental impacts of proposed actions. Before taking a discretionary action, lead agencies (such as a town, city, unincorporated county, parks district, or other agency in San Mateo County) must determine if that action is subject to CEQA and, if it is, conduct a review of the effects of that action on the physical environment. The State Office of Planning and Research (OPR) prepares and maintains guidelines to help agencies implement CEQA.

Under CEQA, lead agencies must determine whether a proposed project has the potential to cause significant environmental impacts. This determination must be based, to the extent possible, on factual data and scientific methods of analysis. The project's effect on transportation is one of the areas that must be analyzed. For many years, jurisdictions in San Mateo County have generally used vehicle Level of Service (LOS) as the primary measure to evaluate a project's effect and determine transportation impacts.

LOS is a qualitative description of vehicular traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, which reflects free-flow conditions where there is very little interaction between vehicles, to LOS F, where vehicle demand exceeds capacity and high levels of vehicle delay result. LOS E represents "at-capacity" operations. When traffic volumes exceed the capacity at an intersection, vehicles may wait through multiple signal cycles before traveling through the intersection; these operations are designated as LOS F. The calculation of vehicle LOS is done through the application of specialized software and is based on traffic counts, observations of vehicle interactions, and data about traffic signal operations (at those intersections that are signalized).

Mitigating a LOS impact typically involves making changes to the physical transportation system in order to accommodate additional vehicles and reduce delays. These mitigations may involve actions such as installing traffic signals, adding turn lanes, widening roads, or contributing to the construction of HOV/Express Lanes, among other options. The identification of necessary mitigations resulting from project impacts has historically led to project sponsors identifying and funding these changes to the transportation system (e.g., paying a "fair share" contribution toward funding a new traffic signal or widening an existing roadway).

Overview of Senate Bill 743 and Legal Framework

On September 27, 2013, Governor Jerry Brown signed SB 743 into law and started a process intended to fundamentally change transportation impact analysis as part of CEQA compliance. Specifically, the legislation directed the State of California's OPR to look at different metrics for identifying transportation

impacts and make corresponding revisions to the *CEQA Statute & Guidelines*. The initial bill includes two legislative intent statements (emphasis and bullets added):

- **New methodologies** under the California Environmental Quality Act are **needed for evaluating transportation impacts** that are better able to promote the state's goals of reducing greenhouse gas emissions and traffic-related air pollution, promoting the development of a multimodal transportation system, and providing clean, efficient access to destinations.
- More appropriately **balance the needs of congestion management with** statewide goals related to **infill development**, promotion of public health through **active transportation**, and **reduction of greenhouse gas emissions**.

These statements are important because they provide direction to OPR and to lead agencies. For OPR, the direction is largely about what the new metrics should achieve. For lead agencies, the direction is about expected changes in transportation analysis (and related technical areas) and what factors to consider for significance thresholds.

To implement this intent, SB 743 contains amendments to current congestion management law that allow cities and counties to opt out of the LOS standards that would otherwise apply. SB 743 does not prevent a lead agency from continuing to analyze delay or LOS as part of other plans (e.g., the general plan), fee programs, or ongoing network monitoring. However, automobile delay as described by LOS is no considered a significant impact on the environment for purposes of CEQA. Lead agencies may still consider vehicle LOS outside of the CEQA process if they determine it is an important part of their transportation planning process. The most common applications will likely occur for jurisdictions wanting to use vehicle LOS to plan roadways in their General Plans or determine nexus relationships for their impact fee programs. Jurisdictions can also continue to condition projects to build transportation improvements through the entitlement process in a variety of ways.

Following several years of draft proposals and related public comments, OPR selected VMT as the preferred metric for assessing passenger vehicle-related impacts and issued revised *CEQA Statute & Guidelines* in December 2018, along with a *Technical Advisory On Evaluating Transportation Impacts in CEQA* (December 2018; referred to in this document as the *Technical Advisory*) to assist practitioners in implementing the *CEQA Statute & Guidelines* revisions. Under the revised *CEQA Statute & Guidelines*, vehicle level of service (LOS)[8] is no longer to be used as a determinant of significant environmental impacts, and analysis of a project's impacts will now be based on assessment of VMT. As of July 1, 2020,

[8] LOS refers to "Level of Service," a metric that assigns a letter rating to network performance. The typical application in towns and cities is to measure the average amount of delay experienced by vehicle drivers at an intersection during the most congested time of day and assign a report card range from LOS A (fewer than 10 seconds of delay) to LOS F (more than 80 seconds of delay). Vehicle level of service is used to measure vehicle mobility.

all transportation analysis performed under CEQA must be consistent with the revised *CEQA Statute & Guidelines*.

The OPR *Technical Advisory* guidance is not a recipe for SB 743 implementation. Lead agencies must still make their own specific decisions about metrics, methods, thresholds, and mitigation, although they may choose to largely adopt the guidance in the *Technical Advisory* as written. Further, the OPR guidance is primarily tied to statewide goals for greenhouse gas (GHG) reduction, and does not attempt to balance or resolve potential conflicts between state and lead agency goals, such as those expressed in local agency general plans and/or climate action plans.

The *CEQA Statute & Guidelines* and the associated OPR *Technical Advisory* are largely consistent with the legislative direction noted above. Specifically, the use of VMT as a metric focuses on the total *amount* of driving, rather than the driving *experience*. This new view presents an impact filter intended to promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses. VMT can help identify how projects (land development and infrastructure) influence accessibility (i.e., access to places and people), noise, and emissions; thus, its selection as a metric is aligned with the objectives of SB 743.

While final implementation steps for SB 743 have not yet been completed by most lead agencies, enough information is available to inform lead agencies about how to prepare for the upcoming transition to VMT. Based on the background context outlined above, the remainder of this document provides information about key decisions each of C/CAG's member agencies will need to make regarding VMT metrics, calculation methods, impact thresholds, and impact mitigation.

State of SB 743 Implementation

As **Appendix B** summarizes, the California lead agencies that adopted VMT thresholds by Spring 2020 and have had experience reviewing CEQA projects using those thresholds are as follows:

- City/County of San Francisco
- City of Oakland
- City of Elk Grove
- City of Los Angeles
- City of Palo Alto
- City of San Jose
- City of Woodland
- CSU System: All 23 Campuses
- San Bernardino County

Most early adopters were larger jurisdictions such as the City/County of San Francisco, City of Oakland, City of Los Angeles, and City of San Jose. These jurisdictions implemented screening thresholds by partial VMT or total VMT. Of these jurisdictions, only the City/County of San Francisco chose not to maintain LOS

as an analysis requirement. Also included in **Appendix B** is a sample of VMT threshold options currently under consideration, or recently adopted in Summer 2020 by Santa Barbara County, the City of South San Francisco, the City of San Bruno, and Nevada County. As will be discussed in the following chapters, there are many possible VMT thresholds, but two prevailing threshold options are most prevalent: 1) a project-by-project baseline conditions VMT screening by land use (similar to or identical to the OPR *Technical Advisory*), or 2) a jurisdiction-specific VMT threshold based on long-term expectations for air quality and greenhouse gas emissions. In addition, once a threshold is selected, a jurisdiction may choose to complete VMT impact analysis as part of its General Plan EIR and make specific use of *CEQA Statute & Guidelines* Section 15183 to streamline project specific CEQA analysis.

Summary of Regional Transportation Policies

In the Bay Area, the regional Sustainable Community Strategy (SCS) is Plan Bay Area, developed and managed by the Metropolitan Transportation Commission (MTC), and updated roughly every five years. All metropolitan regions in California are required to prepare a sustainable communities strategy under Senate Bill (SB) 375; these strategies are intended to provide an integrated plan for housing, land use, and transportation that will meet the GHG reduction targets set by the California Air Resource Board. In short, Plan Bay Area serves as the bridge between statewide GHG reduction targets and local land use and transportation decisions.

Plan Bay Area includes several policy and land use strategies to meet these statewide goals. Generally, it focuses on supporting growth in designated Priority Development Areas (PDAs), which include many areas near transit, in dense urban or suburban centers, or that have otherwise been designated as having high potential for growth by local jurisdictions. In doing so, the plan is intended to indicate how the region can accommodate expected population growth, job growth, and transportation demands into the future. In many ways, Plan Bay Area can be seen as the "budget" for how regional growth can occur without resulting in GHG and VMT generation above what our goals aim to achieve.

Caltrans Guidance

Caltrans has released draft guidance endorsing the VMT thresholds published in the OPR *Technical Advisory*. Caltrans does acknowledge that each lead agency has the discretion to set its own significance thresholds, and they will be reviewing the evidence presented by any agency that uses a threshold that differs from those in the *Technical Advisory*.

Separately, Caltrans has released draft Interim Guidance on "*Determining CEQA Significance for GHG Emissions for Projects on the State Highway System*" that *recommends that any increase in GHG emissions would constitute a significant impact*. This has been referred to as the "Net Zero VMT Threshold." While Caltrans has thus far signaled that this threshold would be applied only to transportation projects, it does raise a question about whether a "net zero VMT" threshold should also be applied to land use projects and plans.

Local Framework and Summary of Existing Policies

A jurisdiction's General Plan includes underlying expectations of how population and employment will change between the base year and future year scenarios. Because VMT is a composite metric that is an output of combining long-term population and employment growth projections with long-term transportation network infrastructure, each jurisdiction effectively already has a VMT growth "budget" that has already been planned for and determined to be acceptable in its General Plan or similar document.

In San Mateo County, most jurisdictions have used vehicle level of service to determine whether projects and plans would result in significant impacts under CEQA. In many cities and towns, standards for LOS are set forth in the General Plan or Comprehensive Plan, and have been used to identify projects for inclusion in local capital improvement programs.

Table 1 summarizes how two common planning documents interface with these transportation metrics and policies, specifically examining the General Plans and Climate Action Plans of each town or city in San Mateo County. As shown in **Table 1**, most cities set a LOS standard in their General Plan, with LOS D being the most common. However, only eight jurisdictions specifically mention VMT in their current General Plan circulation element.

In addition to General Plans, many jurisdictions discuss VMT and transportation concerns in Climate Action Plans (CAPs). Many jurisdictions have developed these plans to reach statewide GHG reduction goals, such as those set forth in Assembly Bill (AB) 32[9] and Senate Bill (SB) 375[10]. Understanding the VMT inputs, VMT metric and vehicle fleet GHG emissions rates assumed in a Climate Action Plan is often a helpful and needed source for establishing a VMT threshold. This is because the VMT metric used in a CAP may influence the VMT threshold metric and the CAP's assumed emissions profile for the vehicle fleet influences how much a VMT reduction is needed to meet GHG reduction goals. **Table 1** indicates whether a CAP includes VMT reduction measures such as those discussed in Chapter 6 of this report.

While goals set in a jurisdiction's Climate Action Plan could potentially help determine a corresponding VMT reduction goal, additional analysis and accounting of those plans is needed by the lead agency. For jurisdictions with an up-to-date CAP or other sustainability policies, there may be overlap in forecasting used for those reports and the type of forecasting and documentation necessary to implement SB 743. However, many times a CAP may include only "boundary" VMT methods or estimate a 'fair share' portion of the project generated VMT in a way that is inconsistent with how the City wishes to perform its impact analysis, in which case additional comparison between the goals of the CAP and the City's VMT threshold may be needed.

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[9] Assembly Bill 32 (2006) requires statewide greenhouse gas reductions to 1990 levels by 2020 and continued reductions beyond 2020.

[10] Pursuant to Senate Bill 375 (2008), the California Air Resources Board establishes greenhouse gas reduction targets for MPOs to achieve based on land use patterns and transportation systems specified in Regional Transportation Plans and Sustainable Community Strategies. At the time the Technical Advisory was released, target reductions by 2035 for the largest MPOs ranged from 13% to 16%. The current targets for these MPOs are 19%.

Table 1: Overview of Guiding Documents for Jurisdictions in San Mateo County

Jurisdiction	Year of most recent Circulation Element update	Does General Plan set LOS Standards?	Does General Plan discuss VMT?	Has the City adopted a CAP?	Does CAP include VMT reduction measures?	Other Notes
Atherton	2019; final draft under review	Highways: LOS E Arterials/Collectors: LOS D Local Streets: LOS C	No	No	-	-
Belmont	2017	No	No	Yes	Yes	
Brisbane	2015	Arterials: LOS D	No	No	-	-
Burlingame	2019	No	Yes, directs adoption of VMT-based threshold	Yes	Yes	
Colma	2014	LOS C or D; E or F tolerated during peak demand periods	No	Yes	Yes	
Daly City	2013	LOS D	No	Yes	No; primarily inventory	
East Palo Alto	2018	LOS D	No, however, does provide direction to implement updates based on SB 743	Yes	Yes	
Foster City	2016	LOS D	Yes, discussed as climate measure	Yes	Yes	
Half Moon Bay	2013	LOS C; LOS E acceptable on SR-92 and CA-1 during peak periods	No	No	-	-
Hillsborough	2014	LOS C, except at key intersections / near schools during peak periods	No	Yes	No	
Menlo Park	2016	LOS D, except on Middlefield Road during peak periods	Yes	Yes	Yes	

Jurisdiction	Year of most recent Circulation Element update	Does General Plan set LOS Standards?	Does General Plan discuss VMT?	Has the City adopted a CAP?	Does CAP include VMT reduction measures?	Other Notes
Millbrae	1998	Not available online	-	In progress (draft dated January 2020)	Yes	
Pacifica	Update in progress; public draft in 2014	LOS D	Yes, sets goal to reduce overall VMT	Yes	Yes	
Portola Valley	2015	No	No	No	-	
Redwood City	2010	LOS D, except in downtown area, where no minimum standard is set	Yes	Yes	Yes	Provides VMT reduction targets in CAP
San Bruno	2009	Policy states to 'maintain acceptable level of service', but no single standard set	Yes, for employers only	No	-	-
San Carlos	2009	"mid-range" D; V/C < 0.85 and delay < 45 seconds	Yes	Yes	Yes	
San Mateo	Update in progress; last amended 2015	"mid-range" D; delay < 45 seconds	Yes, but does not adopt specific policies or goals	Yes	Yes	CAP calls for 28% reduction in VMT per capita by 2030
South San Francisco	1999 (update ongoing; no public draft)	LOS D	Yes	No	-	-
Woodside	2012	No	No	No	-	General Plan includes a sustainability chapter that includes a policy to reduce vehicle trips
Unincorporated San Mateo County	1986	LOS C preferred; LOS D or E acceptable under some conditions	No	No	-	-

Source: Fehr & Peers, 2020

C/CAG VMT Estimation Tool

As part of C/CAG's support for local jurisdictions, it is developing a baseline VMT screening tool designed to identify projects that may seek CEQA relief (e.g., not need to conduct a complete VMT analysis). The City/County Association of Governments VMT Estimation Tool (C/CAG VMT Estimation Tool) will screen projects that are exempt from further VMT analysis using project generated VMT thresholds and transportation priority areas, estimate the project generated VMT rate, and estimate VMT reductions for land use projects in San Mateo County. The types of land use projects addressed will include residential, office, and industrial land uses, those land uses in combination with each other, and those land uses with or without local serving retail space. The C/CAG VMT Estimation Tool will be modular such that C/CAG, along with cities in San Mateo County and the County of San Mateo, can include specific VMT screening criteria or model data within the Tool. The Tool will be scalable such that it can be used for a range of project sizes and location within any jurisdiction in San Mateo County.

The C/CAG VMT Estimation Tool is intended to evaluate the VMT for proposed land use projects by determining whether the project is located within a low VMT generating area, estimating the project generated VMT, and evaluating the project generated VMT after potential reduction measures have been applied. The travel forecasting data that the C/CAG VMT Estimation Tool uses is static, meaning that any data in this tool does not affect the data used from the source travel forecasting model.

The C/CAG VMT Estimation Tool is planned to include three separate modules:

- **VMT Screening** – The location of the project is used to determine if the project site is within a low VMT generating area, including low VMT generating traffic analysis zones (TAZ) or parcels and transit priority areas (TPA).
- **Project Generated VMT** – A combination of the project's location and project details is used to estimate VMT generated from the project, which is expressed as a VMT rate (i.e., VMT per population generating the VMT). This process can use the C/CAG-VTA travel forecasting model's TAZ level VMT generation rates to estimate the project's VMT.
- **VMT Reductions** – A series of VMT mitigation measures are applied to potentially reduce the project generated VMT. The project VMT is compared to the applicable VMT threshold to determine whether it falls below the threshold at the start, or whether it is reduced below the threshold after applying additional VMT reduction measures. The VMT threshold used in this module is calculated in the VMT Screening module.

C/CAG Policy on Traffic Impact Analysis

C/CAG is the Congestion Management Agency for San Mateo County; it is responsible for the performance and standards of the Congestion Management Program (CMP) roadway network. For consistency, C/CAG has prepared a *Policy of Traffic Impact Analysis (TIA) To Determine Traffic Impacts on the Congestion Management Program (CMP) Roadway Network Resulting from Roadway Changes, General Plan Updates, and Land Use Development Projects* to provide a clear and consistent technical approach for projects that could have transportation effects (adverse and beneficial) on the transportation system and

services. The resulting reports provide essential information for decision-makers and the public when evaluating individual development and transportation infrastructure projects, and require a LOS analysis for purposes of assessing project effects on the CMP roadway network.

Chapter 3. VMT Metrics

The *CEQA Statute & Guidelines* state that each lead agency can identify the metrics and methods used to evaluate environmental effects, so a jurisdiction can choose from a variety of VMT metrics. Typical CEQA practice focuses on environmental effects that occur on a typical weekday, so all references to VMT in the remainder of this white paper are intended to mean VMT that occurs on a typical weekday. Weekday VMT can be broken down into components related to trips for specific purposes (for example, commute trips or shopping trips). Total VMT will tend to scale with the level of activity in a location; that is, the more people who live or work in a particular zone, the higher the total VMT associated with that zone.

Many jurisdictions find it useful to express VMT as an efficiency metric (e.g., VMT per person or VMT per employee). This form of the metric is unrelated to the level of activity in a particular location and more about how efficiently the people at that location travel. A project that contributes to a more efficient use of the transportation system would reduce the total VMT per person as compared to a no-project scenario. One example of an efficiency metric is home-based VMT per resident, which looks at how much vehicle travel residents in one place generate, compared to a regional average.

Recommendations in OPR Technical Advisory

The OPR *Technical Advisory* recommends the use of efficiency metrics for presentation in CEQA analysis, particularly the following:

- **Residential Land Use:** Home-based (light-duty vehicle) VMT per capita, or household generated VMT per capita.
- **Office Land Use:** Home-based work (light-duty vehicle) VMT per employee, work tour VMT per employee, or total employee VMT per employee.[11]

OPR recommends a total VMT metric for retail uses, particularly the following:

- **Retail Land Use:** Total VMT (all vehicles) within an area affected by a project.

As the OPR examples show, the VMT metric specification can include all or a portion of all trip purposes, populations, and vehicle types. The OPR recommendations illustrate two VMT metric option concepts:

1. Total VMT (used in the OPR metric for the retail land use), as compared to partial VMT (used in the OPR metrics for office and residential land uses).

[11] The primary difference between these options is how many employee trips are included in the VMT metric. Home-based work VMT includes only vehicle trips directly between work and home or home and work. A work tour includes all chain trips from work to home to work including intermediate trips such as traveling from home, to a child's school, to work. Total employee VMT would include all work tour VMT, as well as any additional trips by vehicle (e.g., to travel off-site for lunch and back) made by the employee. Different travel forecasting models may present one or more of these metrics based on their structure and functionality.

2. Project-Generated VMT (used in the OPR metrics for office and residential land uses), as compared to project's effect on VMT (used in the OPR metric for the retail land use).

What Form of VMT Metrics Could be Used?

VMT can be expressed in a variety of forms, depending on specific objectives of the analysis. Examples of these forms include:[12]

- **Total Project Generated VMT:** VMT including all vehicle trips, vehicle types, and trip purposes. This can be expressed as total project generated VMT or total project generated VMT per service population (residents plus employees and other populations like students and visitors that generate the total project generated VMT).[13]
- **Partial Home-Based VMT:** VMT generated by light-duty vehicles for all trips that begin or end at a residential land use. This is used in describing the VMT effects of residential land uses and is often expressed as home-based VMT per capita.
- **Partial Home-Based Work VMT:** VMT generated by light-duty vehicles only for commute trips (that is, trips that have one end at a workplace and one end at a residence). This is used in describing the VMT effects of workplaces, and is often expressed as home-based work VMT per employee.
- **Total Boundary VMT:** VMT that occurs within a selected geographic boundary (e.g., city, county, or region) by any type of vehicle. This captures all on-road travel occurring on a roadway network for any purpose, and includes local trips as well as trips that pass through the area without stopping.

VMT Metric Options: Total VMT and Partial VMT

Total VMT metrics include all types of VMT captured by a travel forecasting model, regardless of the type of vehicle or the trip's purpose. In practice, this means the metric includes visitor trips, medium-duty and heavy-duty vehicles, public transit buses, and other types of vehicle miles that might not be captured in the most common partial VMT metrics.

To the extent that SB 743 is designed to promote infill development, and there is substantial evidence that building projects proposed in a particular area will have similar VMT effects to Existing Conditions in that area, a total VMT analysis may not be necessary, or total VMT may be estimated using simpler approaches than a unique travel demand forecasting model run (methodology options are discussed in Chapter 4). However, for projects that are likely to change project generated VMT rates because of its size,

[12] The definitions in this white paper describe VMT metrics that can be extracted from a trip-based travel forecasting model such as the C/CAG-VTA travel forecasting model. A tour-based travel forecasting model like the Metropolitan Transportation Commission's (MTC) model estimates different VMT metrics (e.g., household generated VMT per capita, total VMT per employee, or work tour VMT per employee).

[13] While service population most typically includes residents and employees, it may also include any other variables used to estimate trip generation: for instance, at a school site, the service population may include both employees and students. The precise definition of the service population will vary based on model specifications and land use.

complex project attributes that effect vehicle travel, or because they would be a unique or new land use for the study area, a total VMT metric will likely be the most appropriate way to assess project effects. In addition, total VMT metrics derived from a transportation forecasting model are necessary to measure a project's *effect* on VMT, or how the project changes the total VMT in each geographic area. This Total Boundary VMT is discussed further in a later section, Project's Effect on VMT.

Total VMT is also useful for consistency with other EIR sections, namely greenhouse gases, air quality, and energy consumption. Each of these sections uses total VMT as an input for its analysis, although they may consider VMT on an annual rather than daily basis.

Partial VMT refers to the use of only particular trip purposes and/or vehicle types for assessing a project's impacts. The efficiency metrics recommended by OPR for use in analyzing office and residential projects are partial VMT metrics, because they include only light-duty passenger vehicles and only trips for a specific purpose or made by a specific population. The benefits of these partial VMT metrics include the following: they allow for sketch-level analysis using findings from a prior model run; they are easier to understand and visualize; and for single land uses that are similar to existing development patterns, they are likely reflective of the same impact patterns as would be present with analysis of total VMT. Understanding where built environment conditions lead to VMT-efficient residential and workplace activity is substantial evidence that could help support conclusions that adding similar land uses to those areas would create similar outcomes. This can be considered analogous to collecting vehicle counts at a nearby existing project and developing custom local rates. For projects that may be subject to further scrutiny, only reporting a portion of VMT from select trip purposes and limiting the VMT to light-duty vehicles could be considered an incomplete analysis of VMT.

Project applicants may also have concerns with the separation of land uses because it may produce VMT forecasts that dilute the benefits of their projects. For example, mixed-use projects help reduce VMT by shortening vehicle trip lengths or reducing vehicle trips because of the convenience of walking, bicycling, or using transit between project destinations. To quantify these effects with models used in current practice requires analyzing the project.

VMT Metric Options: Project-Generated VMT and Project's Effect on VMT

There are several different VMT metrics that must be included in a complete VMT analysis. One of them, "project's effect on VMT," typically requires use of a travel forecasting model to evaluate potential areawide VMT changes caused by the project.

- **Project-Generated VMT:** The sum of the VMT from, to, and within a project site.
- **Project's Effect on VMT (within a selected geographic boundary):** An evaluation of the change in total on-road vehicle travel within a geographic area boundary, between without and

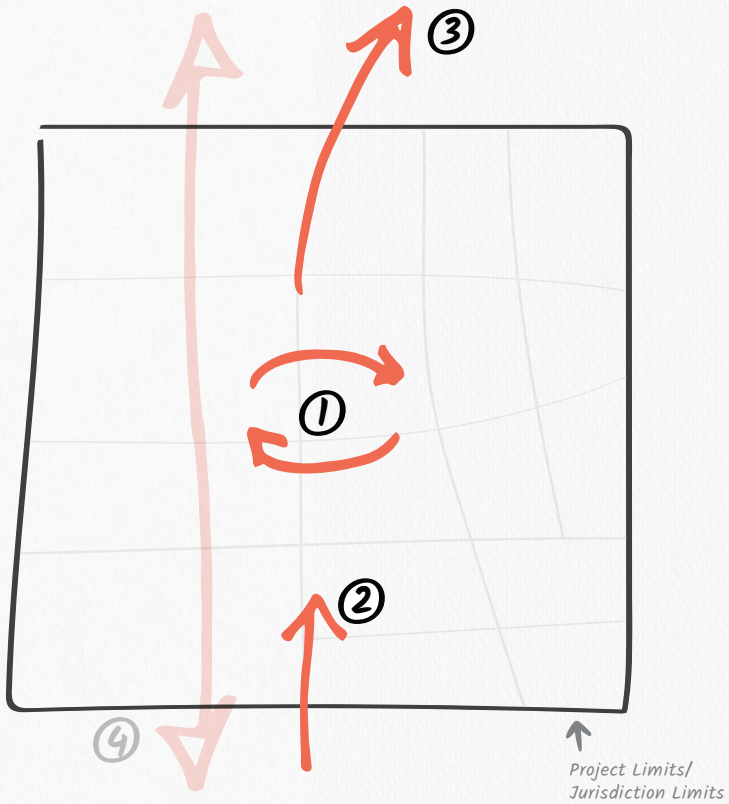
with project conditions.[14] The boundary for a project's analysis should be selected based project characteristics such as size and location. The analysis would typically be done at a citywide, countywide, or regional scale.

The project-generated VMT and project's effect on VMT (using boundary VMT) accounting methods are presented in **Figure 1** as a generic representation of the VMT metrics. Both metrics are needed for a comprehensive view of a project's VMT effects. As discussed in the OPR *Technical Advisory*, ". . . new retail development redistributes shopping trips rather than creating new trips,"[15] estimating the total change in VMT (i.e., the difference in total VMT in the area affected with and without the project) is the best way to analyze a retail project's transportation impact."

[14] An often-cited example of how a project can affect VMT is the addition of a grocery store in a food desert. Residents of a neighborhood without a grocery store have to travel a great distance to an existing grocery store. Adding the grocery store to that neighborhood will shorten many of the grocery shopping trips and reduce the VMT to/from the neighborhood.

[15] Lovejoy, et al. (2013) *Measuring the impacts of local land-use policies on vehicle miles traveled: The case of the first big-box store in Davis, California,* The Journal of Transport and Land Use.

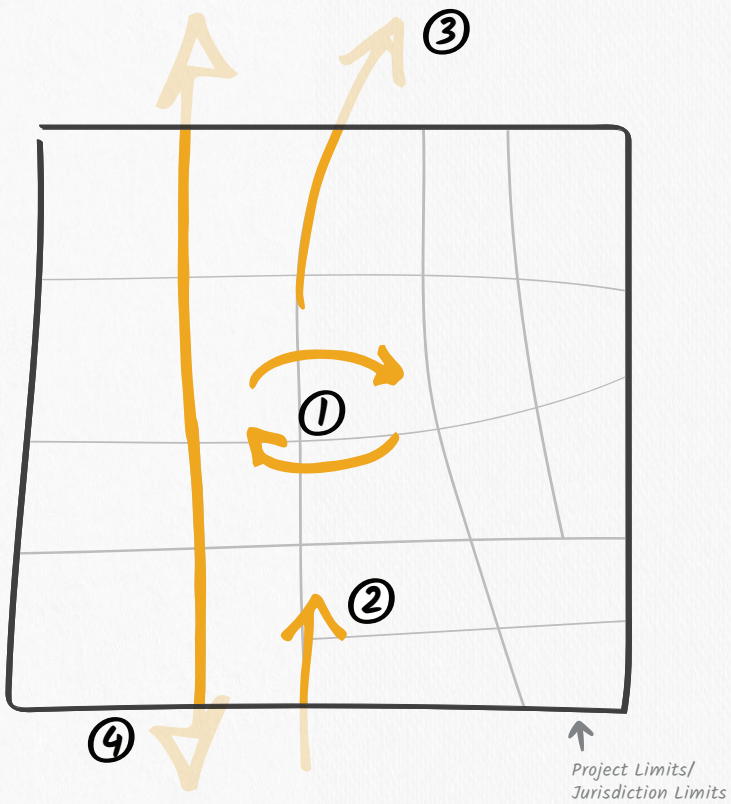
Project Generated VMT



① 2x Internal to Internal (2xII) VMT
② External to Internal (XI) VMT
③ Internal to External (IX) VMT
④ External to External (XX) VMT

Notes: External to External (XX) trips (shown as transparent arrow 4) are excluded from this VMT metric. Adjustments to project generated VMT made to include the full length of trips that leave the jurisdiction to capture inter-jurisdiction travel.

Project Effect on VMT
(Boundary VMT)



① Internal to Internal VMT
② External to Internal (XI) VMT
③ Internal to External (IX) VMT
④ External to External (XX) VMT

Notes: Boundary VMT is all the VMT on the streets within the Project Limits / Jurisdiction Limits. Transparent portions of arrows 2, 3 and 4 are not included in the VMT metric.

Figure 1

Measuring Vehicle Miles Traveled (VMT)

Project-generated VMT is calculated by summing the "VMT from" and "VMT to" the project site (or a larger area when the project is a plan such as a Specific Plan or General Plan). These calculations are usually performed using outputs from a travel forecasting model. Most travel forecasting models will output information on the project generated VMT associated with the land use in each traffic analysis zone (TAZ); that total is typically as follows:

$$Project\ Generated\ VMT = VMT\ From + VMT\ To = (II + IX) + (II + XI) = 2 * II + IX + XI$$

- **Internal-Internal (II):** The full length of all trips made entirely within the project area is counted.
- **Internal-External (IX):** The full length of all trips with an origin within the project area and destination outside of the area is counted.
- **External-Internal (XI):** The full length of all trips with an origin outside of the project area and destination within the area is counted.

There are two additional adjustments that should be made to reach a total project generated VMT. First, because most VMT calculation methods multiply the number of trip ends by the trip length, the internal-internal VMT in the project area is double counted; convention generally divides the internal-internal VMT by two to compensate for this. Second, an adjustment to the project generated VMT should be made to include the full length of trips that leave the travel forecasting model area to fully capture interregional travel (an example may be a trip from the Bay Area to Sacramento; Sacramento is not included in any of the Bay Area travel models). The total can be further broken down into components related to trips for specific purposes (for example, commute trips or shopping trips).

When describing VMT metrics in impact analysis, lead agencies should report project changes in absolute terms and consider whether an "efficiency form" of the metric, such as total project generated VMT per service population, is meaningful for impact analysis. Since emissions and energy impact analysis require absolute amounts of VMT as an input, total weekday VMT in absolute terms is the minimum requirement. The efficiency form of the metric is a VMT generation rate similar to a vehicle trip rate. In addition, since total VMT will increase or fluctuate with population and employment growth, changes in economic activity, and expansion of new vehicle travel choices (i.e., Uber, Lyft, autonomous vehicles, etc.), expressing VMT measurement in an efficiency metric form allows for more direct comparisons to baseline conditions when it comes to land use projects, and land use plans.

Project's effect on VMT is estimated within a selected geographic boundary (e.g., city, county, or region) and captures all VMT on the roadway network, including both local trips and longer-distance travel that does not have an origin or destination within the area. It is often referred to as boundary VMT. It is a more complete evaluation of the potential effects of the project because it captures the combined effect of new VMT, shifting of existing VMT to/from other neighborhoods, and/or shifts in existing VMT to alternate travel routes or modes. The absolute change in VMT between a without project and with project condition can be compared directly if the land use totals are equal between scenarios. If the land use totals are different, the VMT should be divided by the service population (typically residents plus employees but

may include other VMT generators like students and visitors) to distinguish the effects of population and/or employment growth from the effects of changes in personal travel behavior.

The land use changes for small projects in a jurisdiction are relatively small compared to the total residential population and employment of the city, and the typical project is unlikely to have widespread regional VMT effects. Therefore, if using a travel model to estimate a smaller project's effect on VMT, the selected geographic region should be either a jurisdiction or a smaller study area. However, the selected area should remain large enough to capture the VMT changes associated with the project. Additional considerations for smaller projects are discussed further in the VMT Calculation Methods chapter (Chapter 4).

VMT Metrics for Other Resource Areas

As referenced earlier in this discussion of VMT metrics, a common practice for greenhouse gases, air quality, and energy consumption impact analysis is to use the following VMT, produced using a local or regional travel forecasting models:

- **Project generated VMT:** Total project generated VMT with adjustments for trips that travel outside the model area and disaggregated by speed bin.[16] (This VMT metric may vary based on a local jurisdictions General Plan, Climate Action Plan, and regional air district requirements.)
- **Project's effect on VMT within a select geography:** Boundary VMT on all roadways within a geographic area disaggregated by speed bin. Emissions vary by speed bin; disaggregating VMT by speed bin allows different emissions factors to be applied at different speeds, which allows for the preparation of a more refined emissions analysis.

Summary of VMT Metric Options

The following summary table (**Table 2**) clarifies the VMT metric, definition, VMT accounting specification, and potential use as an input for other CEQA sections, including greenhouse gases, air quality, and energy consumption impact analysis. Except for total project generated VMT per service population, each VMT metric listed in this table are described in the *Technical Advisory: On Evaluating Transportation Impacts in CEQA* (December 2018); see pages 5, 6 and 23, and Appendix 1 of the *Technical Advisory*. It is suggested that each of these VMT metrics be included so that all forms of VMT needed for screening and complete analysis are available (including boundary VMT by speed bin for air quality, GHG, and energy impact analysis).

[16] Total VMT by speed bin is the VMT on the roadway for a given speed range (typically a five-mile-an-hour increment of speed from 0 to ~80 miles per hour). Emissions rates of criteria pollutants and greenhouse gases, and energy consumption vary based on vehicle speed. Thus, segmenting VMT by speed bin provides a more precise estimate of these emissions.

Table 2: Summary of Common VMT Metrics

VMT Metric[1]	Definition	Location of VMT Accounting Specification in this White Paper	Recommended by OPR	VMT used for other CEQA Sections?
Total Project Generated VMT	Daily VMT of all vehicle trips, vehicle types, and trip purposes for all project land uses, presented as a total project generated VMT.	Project Generated VMT Accounting on page 15	Yes, for land use plans, and discussed in Appendix 1 of the OPR *Technical Advisory*.	Yes
Total Project Generated VMT per Service Population[2, 3] (also "Total Project Generated VMT Rate")	Daily VMT of all vehicle trips, vehicle types, and trip purposes for all project land uses, divided by the sum of residents plus employees in the analysis area generating the VMT.	Project Generated VMT Accounting on page 15 using Total VMT per Service Population.	No, although may be helpful for mixed-use projects and comparing land use scenarios, particularly when using a travel forecasting model.	Yes
Partial Home-Based VMT per Resident[4] (also "Home-Based VMT Rate")	VMT generated by light-duty vehicles for all trips that begin or end at a residential land use, divided by residents.	Project Generated VMT Accounting on page 17 using Home-Based VMT per Resident.	Yes, for residential projects on page 5 and Appendix 1 of OPR *Technical Advisory*.	No
Partial Home-Based Work VMT per Employee[4] (also "Home-Based Work VMT Rate")	VMT by light-duty vehicles only for work trips (that is, trips that have one end at a workplace and one end at a residence), divided by number of employees.	Project Generated VMT Accounting on page 16 using Home-Based Work VMT per Employee.	Yes, for office projects on page 6 and Appendix 1 of OPR *Technical Advisory*.	No
Project's Effect on VMT within the Boundary of a Specific Area (also "Total Boundary VMT")	VMT that occurs within a selected geographic boundary (e.g., City, County, or region) by any type of vehicle. This captures all on-road vehicle travel on a roadway network for any purpose, and includes local trips as well as trips that pass through the area without stopping.	Boundary VMT on page 19	Yes, for retail projects and transportation projects on pages 5, 6 and 23 and Appendix 1 of the OPR *Technical Advisory*.	Yes

Notes:

1. Each VMT metric is an option for baseline and/or cumulative impact analysis.
2. Total project generated VMT is derived from this VMT rate.
3. The project generated VMT accounting is similar to an origin-destination accounting used for many Climate Action Plans.
4. A partial VMT estimate.

Source: Fehr & Peers, 2020.

Options, Limitations, and Considerations: VMT Metrics

Common Options

- Total Project Generated VMT
- Total Project Generated VMT per Service Population**
- Household Generated VMT per Resident (requires an activity/tour-based travel forecasting model)
- Home-Based VMT per Resident (a partial VMT estimate)
- Home-Based Work VMT per Employee (a partial VMT estimate)
- Project's Effect on VMT using Boundary VMT for a specific area

Common Limitations

Metrics other than total VMT and total VMT per service population typically only represent partial VMT (i.e., some vehicle types and trip purposes are excluded in the models used to estimate VMT). This may be acceptable for screening purposes but not for a complete VMT impact analysis. Project generated VMT metrics cannot capture how a project changes behavior of non-project residents or employees.

Considerations

The expectations of a CEQA impact analysis to strive to provide a complete picture of the effects of a project on the environment are highlighted within the *CEQA Statute & Guidelines*. For lead agencies, VMT metrics and method should consider current practice for air quality, greenhouse gases, and energy consumption impact analysis. In general, VMT is used as an input for these other analyses, and current practice is to produce VMT estimates and forecasts that comply with *CEQA Statute & Guidelines* expectations.

*** Service population includes population plus employment and may include students or visitors; it is intended to include all independent variables used in estimating trips.*

Specifications of C/CAG VMT Estimation Tool: VMT Metrics

The C/CAG VMT Estimation Tool will include the following, forms of VMT needed for screening office, residential and industrial land uses:

- Total project generated VMT per service population
- Home-based VMT per resident
- Home-based work VMT per employee

A more complete VMT analysis will likely require use of the C/CAG-VTA travel forecasting model.

Chapter 4. VMT Calculation Methods

What Methods are Available to use in Estimating and Forecasting VMT?

VMT forecasts are generated using various forms of travel forecasting models that range from simple spreadsheets based on historic travel trends to complex computer models that account for numerous factors influencing travel demand. Possible travel forecasting models/tools include the following:

- **Travel Forecasting Models:** A travel forecasting model is a computer model used to estimate travel behavior for a specific horizon year based on land use and transportation network supply inputs. VMT is one output of a travel forecasting model run. The Caltrans Statewide Travel Forecasting Model, Metropolitan Transportation Commission (MTC) Regional Travel Forecasting Model, and C/CAG-VTA Travel Forecasting Model are all examples of travel forecasting models.
- **Non-Model "Accounting Methods:"** In some cases where a travel model is not available or not appropriate, VMT can be estimated using sketch models or spreadsheet tools. VMT can also be estimated directly by multiplying the number of trips by an average trip length. Trips can be estimated using the results of local trip generation surveys or trip generation rate data published by the Institute of Transportation Engineers (ITE). Trip lengths can be extracted from models or from standardized averages or travel pattern data from the regional or sub-regional planning organization. Using trip length averages does not consider changes to the roadway network or traffic congestion, or the project's potential effects on overall travel patterns. These non-model "accounting methods" could also be paired with a travel model and used between major model updates or to estimate project generated VMT for small projects that would "get lost" in a model. The forthcoming C/CAG VMT Estimation Tool is an example of a VMT screening tool that uses outputs from a travel forecasting model and conducts off-model VMT reduction calculations to test potential transportation demand management strategies to reduce VMT.

Model Selection for Calculating VMT

An ideal tool for an SB 743 VMT analysis is a travel forecasting model that has been appropriately calibrated and validated for local project size and scale and has trip length data that accounts for trips that extend beyond the model boundary. Many travel forecasting models also account for travel patterns due to congestion, public transit, and non-motorized transit (walking and biking).

Travel Forecasting Models

The National Cooperative Highway Research Program *(NCHRP) Report 765, Analytical Travel Forecasting Approaches for Project-Level Planning and Design*, Transportation Research Board (TRB) (2014) is a detailed

resource with many applicable sections. A few highlights related to forecasting expectations for models are listed below:

- A travel forecasting model should be sensitive to the policies and projects that the model is expected to help evaluate.
- Project-level travel forecasts should be validated following the guidelines of the *Travel Model Validation and Reasonableness Checking Manual*, *Second Edition,* from the Federal Highway Administration (FHWA).
- The model should be recalibrated frequently to ensure that validation standards are continuously met.

If used as the primary basis for calculating VMT, selection of an appropriate travel forecasting model is an important step. It is important for consistency because the model used to develop VMT thresholds should also be used to evaluate a project's direct and cumulative VMT impacts. The OPR *Technical Advisory* emphasizes this point (*Technical Advisory: On Evaluating Transportation Impacts in CEQA*, page 6).

> *"It is critical, however, that the agency be consistent in its VMT measurement approach throughout the analysis to maintain an "apples-to-apples" comparison. For example, if the agency uses a home-based VMT for the threshold, it should also be [sic] use home-based VMT for calculating project VMT and VMT reduction due to mitigation measures."*

The C/CAG-VTA travel forecasting model includes a more detailed representation of the transportation network and land use patterns in San Mateo County, and is the model that has most often been used for most project-specific applications in San Mateo County. A comparison of the available travel forecasting models is shown in **Appendix C**.

Using a travel forecasting model has some advantages over other methods, such as using sketch models or spreadsheet tools, because a travel model is better able to account for both project generated VMT and the project's effect on total area-wide VMT. A spreadsheet tool cannot evaluate project's effect on VMT. Both project generated and the project's effect on total VMT (as noted earlier) are important in a CEQA analysis. In addition, travel forecasting models can help identify the effects of transportation projects on VMT: for instance, would adding an additional vehicle lane induce new VMT, or cause people to drive who otherwise would not drive a vehicle?

A travel forecasting model should have a base year and a future year, which are needed to evaluate project and cumulative impacts. As noted above, lead agencies have discretion to choose their analysis methods. However, if they prefer to establish thresholds that rely on regional averages of baseline VMT, then the travel forecasting model must cover a large enough area. The OPR *Technical Advisory* cites the importance of not truncating trip lengths based on travel forecasting model or political boundaries:

> ***Considerations for All Projects****. 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.*

> *CEQA requires environmental analyses to reflect a "good faith effort at full disclosure." (CEQA Statute & Guidelines, § 15151.) Thus, where methodologies exist that can estimate the full extent of vehicle travel from a project, the lead agency should apply them to do so. Where those VMT effects will grow over time, analyses should consider both a project's short-term and long-term effects on VMT.* (Quote from page 6 of the *Technical Advisory: On Evaluating Transportation Impacts in CEQA*, December 2018).

Most regional travel forecasting models used by metropolitan planning organizations (MPOs) have sufficient geographic coverage to produce these estimates, although they typically truncate trip lengths at the model boundary (usually meaning that inter-regional VMT is not fully captured without adjustments in the VMT forecasts). This can be an important limitation for cities or counties at the edge of the travel forecasting model boundary.

In addition to concerns related to truncating trips, most models cannot analyze transportation effects at the parcel or project level because the smallest unit of land use in a travel model is the traffic analysis zone.[17] These TAZ boundaries are not artificial; however, substantial effort is applied when designing a TAZ system boundaries and land use inputs. While a project may involve either one or several parcels, the smallest unit for a VMT analysis should be conducted on (absent supporting substantial evidence of statistical validity) is the TAZ. As such, it does present a limitation for analysis of smaller areas at the sub-TAZ level. The response to this type of limitation is to modify the model to add detail and split TAZs.

Should an analyst identify noise or anomalies in the VMT results, further testing and investigation will be needed to diagnose and understand the cause and prepare an appropriate solution. The solution may result in minor refinements to the TAZ structure (as noted above), updating land use or transportation network inputs, or more comprehensive improvements to ensure that the travel model is sufficiently accurate and sensitive to local-scale applications.

The TAZ size also influences the types of streets vehicle traffic is typically assigned to. For a regional forecasting model, an arterial or minor arterial is the lowest street level that traffic is assigned to; for a sub-regional/local travel forecasting model, it is typically a collector or possibly local streets. As such, for most travel forecasting model uses, VMT on smaller streets is not calculated.

Lead agencies should be aware that regional models 'off the shelf' are often not sufficiently accurate or sensitive to local-scale applications such as individual land use project analysis. Calibration and validation of the model within the project study area are typically needed, including refinements and modifications to better represent the project and its effects.

The OPR *Technical Advisory* states that sketch-level models may be used for project VMT analysis if the trip lengths are replaced with those from the local or regional model that was used to establish the lead agency's VMT thresholds. To be fully consistent, the trip generation estimates of the sketch model would

[17] As defined by *NCHRP Report 716, Travel Demand Forecasting: Parameters and Techniques*, TRB, 2012, "TAZ boundaries are usually major roadways, jurisdictional borders, and geographic boundaries and are defined by homogeneous land uses to the extent possible."

also have to be replaced. Unfortunately, most travel forecasting models do not use typical project land uses as trip generation inputs, making this substitution difficult.

Non-Model Spreadsheets and Sketch Planning Tools

Sketch planning tools are generally designed for project-scale applications to estimate VMT or to evaluate VMT reduction strategies associated with transportation demand management (TDM). Given their project-scale focus, a major limitation for all these tools is that they are not capable of producing region-wide or city-wide average VMT metrics for purposes of threshold setting. In addition, they may not be able to account for land use that is substantially different from existing land uses.

The OPR *Technical Advisory on Evaluating Transportation Impacts in CEQA* contains the following specification for models and methods (page 5 of OPR *Technical Advisory*).

> *Models and methodologies used to calculate thresholds, estimate project VMT, and estimate VMT reduction due to mitigation should be comparable. For example:*
>
> - *A tour-based assessment of project VMT should be compared to a tour-based threshold, or a trip-based assessment to a trip-based VMT threshold.*
> - *Where a travel demand model is used to determine thresholds, the same model should also be used to provide trip lengths as part of assessing project VMT.*
> - *Where only trip-based estimates of VMT reduction from mitigation are available, a trip-based threshold should be used, and project VMT should be assessed in a trip-based manner.*

If jurisdictions use travel forecast model outputs from the C/CAG-VTA Bi-County travel forecasting model ("C/CAG-VTA travel forecasting model"), then the same model (or its inputs/outputs) would need to be used for project analysis. As a result, current sketch tools "off-the-shelf" would not be appropriate to estimate project generated VMT for SB 743 purposes. The sketch models would require modification, such as using VMT generation rate outputs from the local or regional travel forecasting model used to set thresholds. A potential off-the-shelf application for some of these tools is to test VMT reduction strategies. Even for this type of application, care must be taken by the analyst to understand what VMT reduction strategies may have already been captured in the C/CAG-VTA travel forecasting model to avoid double counting.

This review evaluated eleven sketch model tools using the following criteria. We also incorporated information from reviews conducted through academic research by UC Davis and UC Berkeley.

1. Defensibility – How defensible is the use of this tool in terms of the accuracy of its outputs and frequency of use by other agencies.
2. Sensitivity – How sensitive is to the tool to the specific land use contexts and TDM strategies (e.g., does the tool allow the user to import details related to the context surrounding the project site and the proposed TDM mitigation measures).

3. Utility – How easy is the tool to use to evaluate VMT and TDM strategies.

The eleven sketch model tools reviewed are listed below.

- **CalEEMod** – is a statewide computer model designed to estimate emissions of criteria air pollutant and greenhouse gas (GHG) associated with land use projects. This model also provides VMT estimates that are a part of the emissions modeling process.[18]
- **Sketch 7** – is a spreadsheet tool that estimates percent reductions to VMT based on the 7 Ds (i.e., density, diversity, distance, design, destination, demographics, and development scale).
- **VMT Impact Tool/Salon** – is a spreadsheet tool created by Deborah Salon at UC Davis for the California Air Resources Board that quantifies how much VMT will change in response to changes in land use and transportation system variables at a policy level.
- **GreenTRIP Connect** – is an online tool for residential projects that allows users to evaluate the VMT and GHG emissions of their project and to test a limited set of built-in TDM strategies.
- **MXD/MXD+** – is a mixed-use development trip generation tool developed for U.S. EPA that adjusts ITE daily trip generation estimates to reflect built environment effects. MXD+ incorporates the ITE mixed-use trip generation method to produce a.m. and p.m. peak hour trip generation estimates for mixed use projects. To estimate VMT, the trip generation results from MXD/MXD+ must be multiplied by trip lengths from observed data or regional/local travel forecasting models.
- **UrbanFootprint (UF)** – is a scenario planning tools that produces VMT estimates relying on the MXD trip generation methodology. Trip lengths are calculated within the model but do not reflect network-based routing.
- **Envision Tomorrow** – is a scenario planning tool that produces VMT estimates.
- **California Smart-Growth Trip Generation Adjustment Tool** – is a spreadsheet tool that provides the number of trips generated by land use projects implementing smart growth principles.
- **TRIMMS** – is a visual basic application spreadsheet model that estimates mode share and VMT changes brought about by several TDM strategies.
- **VMT+** – is a web-based application that estimates VMT and emissions using ITE trip rates and user-defined trip and land use inputs.
- **TDM+** – is a spreadsheet tool that estimates the percent reduction in VMT due to the implementation of one or many different TDM strategies identified in the *Quantifying Greenhouse Gas Mitigation Measures*, CAPCOA, 2010.

Table 3 provides a summary of the tool review. Each of the sketch models reviewed, except for the CA Smart Growth Tool and MXD/MXD+, provide direct estimates of project generated VMT or calculates the percent change in VMT. None of the models can produce city-wide or region-wide VMT estimates for

[18] CalEEMod uses ITE trip generation rates, but does not currently have a license to use ITE trip generation rates, which could affect the usefulness of this sketch tool.

threshold setting, fully evaluating the project's effect on VMT, or evaluating cumulative VMT impacts. Only CalEEMod, GreenTRIP Connect, TRIMMS, and TDM+ evaluate the impacts of TDM strategies for VMT mitigation.

Table 3: Overview of Sketch Planning Tools

Sketch Tool	Output	Technical & Legal Defensibility	Parameter Sensitivity	Administrative Utility	Comments	User Experience: Benefits (UC Davis[1])	User Experience: Drawbacks (UC Davis[1])	Conclusions (UC Berkeley[2])	Conclusion
CalEEMod	VMT	++ Widespread use, used by SCAQMD	+ Many parameters, but limited context, transit as mitigation, no internalization, TDM reduction needs work	++ Relatively easy to use, but no flexibility	Trinity Consultants product, may not be able to make changes. CalEEMod uses ITE trip generation rates, but does not currently have a license to use ITE trip generation rates.	Many, customizable inputs; program interface reduces back-end error	Many, customizable inputs; defaults and land use categories may misrepresent project and/or context area	Easier data demands; difficult to determine location attributes, especially to avoid double counting; documentation did not provide enough guidance on method selection	Not recommended
Sketch 7	% Change in VMT	+ HH VMT	+ No internalization, no TDM reduction, no trip purpose	+ Produces % change in VMT, generic place types		Straightforward inputs & interface; system-level outputs; outputs include walk, bike, and transit trips	Spreadsheet interface can become "buggy", break; regional TAZ data used to calibrate tool may be difficult to obtain	[Not reviewed]	Not recommended
VMT Impact Tool/Salon	% Change in VMT	+ HH VMT	+ No internalization, no TDM reduction, no trip purpose	+ Produces % change in VMT	Scenario testing for census tract level & above; not project-level	[Not reviewed]	[Not reviewed]	[Not reviewed]	Not recommended
GreenTRIP Connect	VMT; Change in VMT	+ Recent	+ Affordable housing, TDM credit for 4 strategies	++ Good user interface, but residential/affordable only	Would need to work with TransForm	Simple user interface; straightforward outputs	Measures only residential travel, even in mixed-use projects	[Not reviewed]	Candidate for TDM impacts; great interface, would need to integrate more land uses and strategies; rural results may not be valid
UrbanFootprint	VMT	+++ Used by SCAG for RTP/SCS	++ Many parameters, no TDM reduction, mixed-used is not by land use	+ Open source, overly complex for this use	Primarily scenario planning; need to check with Calthorpe re editing open source code	[Not reviewed]	[Not reviewed]	[Not reviewed]	Not recommended
Envision Tomorrow	VMT	+ Added parameters diluted research	++ Many parameters, no TDM reduction	+ Open source, complex spreadsheet tool	Primarily scenario planning; owned by Fregonese	[Not reviewed]	[Not reviewed]	[Not reviewed]	Not recommended
CA Smart Growth Tool	Trips	++	+ No trip purpose, no TDM reduction	+ Does not generate VMT		Few, intuitive inputs with direction of where to find them	Calculates trips one land use at a time, and in limited context areas; calculates trips, not VMT	[Not reviewed]	Not recommended
TRIMMS	VMT	++ Used by SJCOG	++ TDM reduction	+ Only does TDM reduction for employees (not LU)	Has a few elements that do not exist in CAPCOA; integrate into another tool?	[Not reviewed]	[Not reviewed]	[Not reviewed]	Not recommended
MXD+	Trips; VMT	+++	++ Many parameters, no TDM reduction	++		Simple inputs categories; straightforward outputs	Important input data may be difficult to find	High data input demands; obtaining data required GIS capability[3]	Not recommended
VMT+	VMT	+ Surpassed by MXD+	+ Limited parameters	++ Easily used		[Not reviewed]	[Not reviewed]	[Not reviewed]	Not recommended
TDM+	% Change in VMT	+++ CAPCOA-based	++	++ May want to add more TDM measures	Only does TDM reductions; needs to be coupled with VMT estimator	[Not reviewed]	[Not reviewed]	[Not reviewed]	Best option for TDM impacts; no rural option

Sources: Fehr & Peers, 2019; UC Davis, 2017; UC Berkeley, 2018.

Notes: [1]Amy Lee, Kevin Fang, and Susan Handy; "Evaluation of Sketch-Level Vehicle Miles Traveled (VMT) Quantification Tools," National Center for Sustainable Transportation, August 2017.
[2]Elisa Barbour, Dan Chatman, Sarah Doggett, Stella Yip, and Manuel Santana; "SB 743 implementation: Challenges and Opportunities [Draft Final]," June 5, 2018.
[3]Analysis based on earlier, public spreadsheet tool; more advanced proprietary versions available.

Options, Limitations, and Considerations: VMT Calculation Methods

Common Options

1. Caltrans Statewide Travel Demand Model
2. Metropolitan Transportation Commission (MTC) Regional Travel Forecasting Model
3. C/CAG-VTA Travel Forecasting Model
4. Non-model "accounting methods," such as sketch planning tool or spreadsheet**

Common Limitations

1. Statewide and regional models have limited sensitivity and accuracy for local scale applications off the shelf.
2. Regional and local models often truncate trips at model boundaries.
3. Sketch and spreadsheet tools do not capture the 'project effect on VMT.'

Considerations

Selection of an appropriate travel forecasting approach is an important step because the tool used to develop VMT thresholds must also be used to evaluate a project's direct and cumulative VMT impacts. Regional or local models should be calibrated and validated for local project-scale sensitivity/accuracy (including appending trip length data for trips with external trip ends) before using these models to analyze both project generated VMT and project effect on VMT.

***Sketch planning tool or spreadsheet method has limitations if using a citywide or regional average for a threshold.*

Specifications of C/CAG VMT Estimation Tool: VMT Calculation Methods

Use the C/CAG-VTA travel forecasting model to estimate baseline and cumulative VMT estimates used in the C/CAG VMT Estimation Tool. Should a jurisdiction have its own travel model, the baseline and cumulative VMT estimates could be added to the tool as an alternate data source.

In addition to the tools shown in **Table 3**, C/CAG is currently in the process of developing a web application that will screen and estimate project generated VMT and VMT reductions for land use projects in San Mateo County. The types of land use projects would include residential, office, and industrial land uses, those land uses in combination with each other, and those land uses with or without ancillary retail space. The C/CAG VMT Evaluation Tool will be modular, such that C/CAG, along with the cities and towns in San Mateo County and the County of San Mateo can include their specific VMT screening requirements or VMT data within the C/CAG VMT Evaluation Tool. The web application will be scalable such that it can be used for a range of project sizes and locations within any jurisdiction in San Mateo County. This web application will include the partial home-based VMT per resident and partial home-based work VMT per employee, and has the potential to include total VMT per service population, boundary VMT, and a project's effect on VMT screening.

Chapter 5. VMT Data for Baseline and Cumulative Conditions

While each agency has the discretion to determine which VMT metrics and methods make sense for its community, C/CAG has prepared a standardized analysis of baseline and cumulative conditions to help with the implementation process. Each jurisdiction should consult with CEQA experts and legal counsel regarding their own CEQA practices and updates to local policies.

VMT Modeling Methods and Reference Years

The C/CAG-VTA travel forecasting model last updated in mid-2020 was used to prepare baseline and cumulative VMT estimates for the following VMT metrics at the City-level, County-level, and Region-level; in all cases, and consistent with the recommendations in the OPR *Technical Advisory*, adjustments have been applied to account for the distance of travel outside of the model area. **Appendix F** provides further detail on the external station adjustments, traffic analysis zone correspondence for each jurisdiction, service population summary, and jurisdictional boundary used to calculate each jurisdiction's boundary VMT.

- Total Project Generated VMT – Daily VMT of all vehicle trips, vehicle types, and trip purposes for all project land uses, presented as a total project generated VMT. Also summarized is the Total VMT per service population (i.e., sum of residents plus employees).
- Total VMT per service population – Daily VMT of all vehicle trips, vehicle types, and trip purposes for all project land uses, divided by the sum of residents plus employees in the analysis area generating the VMT.
- Home-Based VMT per Resident – VMT generated by light-duty vehicles (i.e., private cars and trucks) for all trips that begin or end at a residential land use, divided by residents.
- Home-Based Work VMT per Employee – VMT by light-duty vehicles only for work trips (that is, trips that have one end at a workplace and one end at a residence), divided by number of employees.
- Project's Effect on VMT within the Boundary of a Specific Area (Boundary VMT) – VMT that occurs within a selected geographic boundary (e.g., City, County, or region) by any type of vehicle. This captures all on-road vehicle travel on a roadway network for any purpose and includes local trips that occur within the boundary as well as trips that pass through the area without stopping.

A review of the C/CAG-VTA travel forecasting model is presented in **Chapter 4** and **Appendix C**. This version of the C/CAG-VTA travel forecasting model uses 2015 as its base year, and 2040 as its cumulative horizon year. The data presented below are based on model runs completed in December 2020 with adjustments made to include centroid connectors, and travel outside of the model area. Travel outside the model area adds less than 5% to the total project generated VMT values. This adjustment to travel outside

of the model area does not apply to the home-based per resident or home-based work per employee values because the VMT estimates are extracted from the intra-regional mode choice model.

Vehicle miles traveled (VMT) is the result of the land use and transportation network inputs for a given model year. The land use input for this VMT analysis is the service population that generates the VMT. The service population is the sum of the number of employees plus residents within the boundary area. **Appendix F** includes a summary of the service populations used in the VMT metrics for each city and town boundary in San Mateo County, unincorporated San Mateo County, all San Mateo County, and the Bay Area region (e.g., Sonoma, Marin, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo County, and San Francisco counties).

The jurisdictional boundary used to calculate each jurisdiction's boundary VMT (the VMT on the roadways within a jurisdictional boundary) is approximated by the outer edge of the traffic analysis zones (TAZs) selected for the project generated VMT metrics (e.g., total project generated VMT, home-based VMT, and home-based work VMT).

Baseline and Cumulative Total Project Generated VMT Data

The following tables illustrate the baseline and cumulative VMT for San Mateo County, the Bay Area Region, and each jurisdiction within San Mateo County (cities, towns, and unincorporated county areas). The descriptive statistics that follow are:

- VMT Metrics for San Mateo County, with Quintiles by TAZ
- Total Project Generated VMT – San Mateo County and Bay Area Region
- Total Project Generated VMT – Local Jurisdictions
- Home-Based VMT per Resident – San Mateo County and Bay Area Region
- Home-Based VMT per Resident – Local Jurisdictions
- Home-Based Work VMT per Employee – San Mateo County and Bay Area Region
- Home-Based Work VMT per Employee – Local Jurisdictions
- Boundary VMT – San Mateo County and Bay Area Region
- Boundary VMT – Local Jurisdictions

Due to the size of the county and local travel characteristics, there are differences in VMT metrics depending on the geographic area within the county. Therefore, the VMT metric results are summarized in the following three geographic groupings:

1) Coastside and Unincorporated County,
2) I-280 and Hillside Corridor, and
3) US 101/Caltrain Corridor areas.

Descriptive Statistics of VMT Data

Table 4 shows a summary of VMT for five different metric types, including quintile break points for individual TAZs. Each column represents the quintiles for that metric; therefore, different TAZs are shown for each column for a given quintile. These descriptive statistics provide additional context for individual TAZs, and identify which areas may qualify as having particularly low or particularly high values for each metric. For example, **Table 4** can be used to compare values for an individual location to countywide locations with more detail than simply a percentage difference from the average.

For example, **Table 4** shows that, while the baseline countywide average home-based VMT per resident is 12.6 VMT, 40% of TAZs generate VMT below 11.5 VMT per resident and 20% generate VMT above 15.7 VMT per resident.

Table 4: Descriptive VMT Metrics for San Mateo County, with Quintiles by TAZ

Descriptive Statistic	Total Zone Generated VMT	Service Population	Total VMT per Service Population	Home-Based VMT per Resident	Home-Based Work VMT per Employee
Baseline (Existing) Conditions 2015					
Countywide Average[1]	97,825	3,212	31.2	12.6	19.8
20th %ile TAZ	30,416	1,275	20.1	9.1	14.9
40th %ile TAZ	62,685	2,367	25.4	11.5	17.2
60th %ile TAZ	93,596	3,496	30.0	13.2	20.9
80th %ile TAZ	144,971	4,705	38.7	15.7	24.8
Cumulative Conditions 2040					
Countywide Average[1]	123,019	3,987	31.5	12.3	22.6
20th %ile TAZ	35,791	1,434	19.7	8.7	15.8
40th %ile TAZ	65,722	2,764	24.9	10.7	19.7
60th %ile TAZ	106,323	4,046	30.0	12.5	23.7
80th %ile TAZ	158,838	5,676	38.9	15.2	28.1

Note:

1. The "Countywide Average" is the countywide total divided by the number of TAZs (for total zone generated VMT and service population) and divided by the total population for the remaining metrics.

Source: Fehr & Peers, 2021.

By 2040, the countywide average home-based VMT per resident is forecast to decrease slightly from 12.6 to 12.3 VMT per resident. On the other hand, the countywide home-based work VMT is expected to increase from 19.8 to 22.6 VMT per worker. These increases reflect:

- anticipated changes in regional job and housing patterns
- continuation of the current pattern of San Mateo County having somewhat lower-than-average household VMT compared to the region, and

- somewhat higher home-based-work VMT compared to the region may continue.

Total Project Generated VMT

The results of the baseline and cumulative total project generated VMT metrics are presented in **Table 5** for San Mateo County and the region, and in **Table 6** for the local jurisdictions.

As shown in **Table 5**, San Mateo County has a 30.5 total VMT per service population rate under Existing Conditions is estimated to increase by 1.3% to 30.9 total VMT per service population rate under Cumulative Conditions. This increase in the total project generated VMT rate at the County-level indicates that on average the total VMT generated in San Mateo County will increase at a faster rate than the increase in service population generating the VMT. This contrasts with the regional condition of maintaining the same 28.8 total VMT per service population under Existing Conditions and Cumulative Conditions.

Table 5: Total Project Generated VMT – San Mateo County and Bay Area Region

Jurisdiction	Baseline (Existing) Conditions 2015			Cumulative Conditions 2040			Percent Change[1]
	Total Project Generated VMT	Service Population	Total VMT per Service Population	Total Project Generated VMT	Service Population	Total VMT per Service Population	
San Mateo County	34,532,300	1,134,030	30.5	43,425,560	1,407,320	30.9	1.3%
Bay Area Region	324,552,740	11,272,480	28.8	413,599,660	14,379,630	28.8	0.0%

Notes: Population and VMT values rounded to nearest 10.

1. Percent change is between 2015 and 2040 total VMT per service population VMT metric values and is rounded to the nearest tenth of a percent.

Source: Fehr & Peers, 2021.

The total project generated VMT presented in **Table 6** represents the total VMT "budget" based on each local jurisdiction's General Plan transportation network and land use growth assumptions. Most jurisdictions within San Mateo County generate between 23 and 37 total VMT per service population under Existing Conditions and 23 to 39 total VMT per service population under Cumulative Conditions. Portola Valley, Half Moon Bay, and unincorporated San Mateo County generate more than 40 total VMT per service population under Existing Conditions and Cumulative Conditions.

Many of the jurisdictions are projected to increase their total VMT at a greater rate than their service population, which will cause their total VMT per service population to increase between 2015 and 2040. This general upward trend in the total VMT per service population in San Mateo County jurisdictions may influence how specific VMT thresholds and a VMT mitigation actions would apply under baseline and cumulative conditions. There were some jurisdictions that showed a downward trend including Brisbane, Colma, East Palo Alto, Menlo Park, San Bruno, San Carlos, and San Mateo.

Table 6: Total Project Generated VMT – Local Jurisdictions

Jurisdiction	Baseline (Existing) Conditions 2015			Cumulative Conditions 2040			Percent Change[1]
	Total Project Generated VMT	Service Population	Total VMT per Service Population	Total Project Generated VMT	Service Population	Total VMT per Service Population	
Coastside and Unincorporated County							
Half Moon Bay	704,470	17,270	40.8	890,040	21,610	41.2	1.0%
Pacifica	1,219,780	44,670	27.3	1,323,350	46,530	28.4	4.0%
Unincorporated San Mateo County	2,898,850	72,630	39.9	3,325,880	78,840	42.2	5.8%
I-280/Hillside Corridor							
Colma	218,250	6,060	36.0	228,290	6,880	33.2	-7.8%
Hillsborough	399,030	12,960	30.8	461,040	13,840	33.3	8.1%
Portola Valley	395,130	5,970	66.2	447,150	6,560	68.2	3.0%
Woodside	578,070	18,700	30.9	754,290	20,160	37.4	21.0%
US 101/Caltrain Corridor							
Atherton	192,690	8,010	24.1	218,370	8,680	25.2	4.6%
Belmont	955,690	34,920	27.4	1,210,630	43,700	27.7	1.1%
Brisbane	527,130	15,420	34.2	1,396,730	41,740	33.5	-2.0%
Burlingame	2,194,760	60,500	36.3	2,867,530	73,470	39.0	7.4%
Daly City	3,008,310	129,690	23.2	3,614,390	148,950	24.3	4.7%
East Palo Alto	816,100	33,410	24.4	1,016,260	42,900	23.7	-2.9%
Foster City	1,830,930	57,040	32.1	2,029,700	62,980	32.2	0.3%
Menlo Park	2,098,900	68,260	30.7	2,850,290	94,820	30.1	-2.0%
Millbrae	854,080	28,600	29.9	1,195,440	37,880	31.6	5.7%
Redwood City	4,394,760	140,520	31.3	5,866,100	183,340	32.0	2.2%
San Bruno	1,589,730	55,310	28.7	1,877,190	65,840	28.5	-0.7%
San Carlos	1,579,040	53,980	29.3	1,486,570	51,500	28.9	-1.4%
San Mateo	5,001,720	158,530	31.6	6,329,290	214,000	29.6	-6.3%
South San Francisco	3,074,880	111,580	27.6	4,037,020	143,100	28.2	2.2%

Notes: Population and VMT values rounded to nearest 10.

1. Percent change is between 2015 and 2040 total VMT per service population VMT metric values and is rounded to the nearest tenth of a percent.

Source: Fehr & Peers, 2021.

Home-Based VMT per Resident

The results of the baseline and cumulative home-based VMT metrics are presented in **Table 7** for the San Mateo County and the region, and in **Table 8** for the local jurisdictions.

As shown in **Table 7**, San Mateo County has a 13.8 home-based VMT per resident rate under Existing Conditions that is estimated to decrease by 7.2% to 12.8 home-based VMT per resident rate under Cumulative Conditions. This decrease in the home-based VMT per resident rate at the County-level indicates that on average the home-based VMT generated in San Mateo County will increase at a slower rate than the increase in residential population generating the VMT. This contrasts with the regional condition of maintaining the same 14.6 home-based VMT per resident under Existing Conditions and Cumulative Conditions.

Table 7: Home-Based VMT per Resident – San Mateo County and Bay Area Region

Jurisdiction	Baseline (Existing) Conditions 2015			Cumulative Conditions 2040			Percent Change[1]
	Home-Based VMT	Residents	Home-Based VMT per Resident	Home-Based VMT	Residents	Home-Based VMT per Resident	
San Mateo County	10,564,320	762,860	13.8	11,907,300	928,940	12.8	-7.2%
Bay Area Region	109,839,580	7,509,900	14.6	140,833,730	9,662,100	14.6	0.0%

Notes: Population and VMT values rounded to nearest 10.

1. Percent change is between 2015 and 2040 home-based VMT per resident VMT metric values and is rounded to the nearest tenth of a percent.

Source: Fehr & Peers, 2021.

As shown in **Table 8**, most jurisdictions within San Mateo County generate between 8 and 18 home-based VMT per resident under Existing Conditions and 6 to 19 home-based VMT per resident under Cumulative Conditions. Portola Valley, Half Moon Bay, and unincorporated San Mateo County generate more than 19 home-based VMT per resident.

Many of the jurisdictions are projected to decrease their home-based VMT at a greater rate than their increase in residential population, which will cause their home-based VMT per resident to decrease between 2015 and 2040. There is a general downward trend in the home-based VMT per resident in San Mateo County jurisdictions may influence how specific VMT thresholds and a VMT mitigation actions would apply under baseline and cumulative conditions. There were some jurisdictions that showed an upward trend including Atherton, East Palo Alto, Hillsborough, Menlo Park, Portola Valley, San Carlos, Woodside, and unincorporated San Mateo County.

Table 8: Home-Based VMT per Resident – Local Jurisdictions

Jurisdiction	Baseline (Existing) Conditions 2015			Cumulative Conditions 2040			Percent Change[1]
	Home-Based VMT	Residents	Home-Based VMT per Resident	Home-Based VMT	Residents	Home-Based VMT per Resident	
Coastside and Unincorporated County							
Half Moon Bay	243,070	11,890	20.4	298,350	15,560	19.2	-5.9%
Pacifica	629,290	38,930	16.2	587,160	39,670	14.8	-8.6%
Unincorporated San Mateo County	1,088,550	55,330	19.7	1,198,360	59,180	20.2	2.5%
I-280/Hillside Corridor							
Colma	12,510	1,540	8.1	16,790	2,740	6.1	-24.7%
Hillsborough	205,120	11,370	18.0	215,220	11,650	18.5	2.8%
Portola Valley	178,080	4,730	37.6	191,880	4,930	38.9	3.5%
Woodside	285,360	16,690	17.1	291,380	16,420	17.7	3.5%
US 101/Caltrain Corridor							
Atherton	88,310	7,070	12.5	101,010	7,540	13.4	7.2%
Belmont	370,350	26,970	13.7	462,640	34,040	13.6	-0.7%
Brisbane	73,560	4,690	15.7	130,350	9,880	13.2	-15.9%
Burlingame	413,220	29,560	14.0	410,890	32,240	12.7	-9.3%
Daly City	1,236,630	107,150	11.5	1,314,370	124,670	10.5	-8.7%
East Palo Alto	356,440	28,980	12.3	464,090	37,410	12.4	0.8%
Foster City	499,560	32,690	15.3	531,130	36,360	14.6	-4.6%
Menlo Park	372,830	32,440	11.5	645,950	52,030	12.4	7.8%
Millbrae	293,710	22,520	13.0	286,160	26,840	10.7	-17.7%
Redwood City	1,117,930	82,540	13.5	1,247,190	100,850	12.4	-8.1%
San Bruno	537,400	42,760	12.6	561,650	51,450	10.9	-13.5%
San Carlos	448,950	32,220	13.9	457,560	32,530	14.1	1.4%
San Mateo	1,308,770	103,860	12.6	1,617,470	147,010	11.0	-12.7%
South San Francisco	804,790	68,930	11.7	877,700	85,940	10.2	-12.8%

Notes: Population and VMT values rounded to nearest 10.

1. Percent change is between 2015 and 2040 home-based VMT per resident VMT metric values and is rounded to the nearest tenth of a percent.

Source: Fehr & Peers, 2021.

Home-Based Work VMT per Employee

The results of the baseline and cumulative home-based work VMT metrics are presented in **Table 9** in San Mateo County and the region, and in **Table 10** for the local jurisdictions.

As shown in **Table 9**, San Mateo County has a 16.8 home-based work VMT per employee rate under Existing Conditions that is estimated to increase by 10.1% to 18.5 home-based work VMT per employee rate under Cumulative Conditions. This increase in the home-based work VMT per resident rate at the County-level indicates that on average the home-based work VMT generated in San Mateo County will increase at a faster rate than the increase in employment population generating the VMT. At the regional-level the home-based work VMT per employee rate increases by 5.2% from 15.4 under Existing Conditions to 16.2 under Cumulative Conditions.

Table 9: Home-Based Work VMT per Employee – San Mateo County and Bay Area Region

Jurisdiction	Baseline (Existing) Conditions 2015			Cumulative Conditions 2040			Percent Change[1]
	Home-Based Work VMT	Employees	Home-Based Work VMT per Employee	Home-Based Work VMT	Employees	Home-Based Work VMT per Employee	
San Mateo County	6,218,090	371,170	16.8	8,873,080	478,380	18.5	10.1%
Bay Area Region	58,052,360	3,762,580	15.4	76,188,660	4,717,530	16.2	5.2%

Notes: Population and VMT values rounded to nearest 10.

1. Percent change is between 2015 and 2040 home-based work VMT per employee VMT metric values and is rounded to the nearest tenth of a percent.

Source: Fehr & Peers, 2021.

As shown in **Table 10**, most jurisdictions within San Mateo County generate between 10 and 23 home-based work VMT per employee under Existing Conditions and 13 to 27 home-based work VMT per employee under Cumulative Conditions. Portola Valley, and Woodside generate more than 26 home-based work VMT per employee.

Every jurisdiction, except East Palo Alto, is projected to increase their home-based work VMT at a greater rate than their increase in employee population, which will cause their home-based work VMT per employee to increase between 2015 and 2040. This upward trend in the home-based work VMT per employee in San Mateo County jurisdictions may influence how specific VMT thresholds and a VMT mitigation actions would apply under baseline and cumulative conditions.

Table 10: Home-Based Work VMT per Employee – Local Jurisdictions

Jurisdiction	Baseline (Existing) Conditions 2015			Cumulative Conditions 2040			Percent Change[1]
	Home-Based Work VMT	Employees	Home-Based Work VMT per Employee	Home-Based Work VMT	Employees	Home-Based Work VMT per Employee	
Coastside and Unincorporated County							
Half Moon Bay	94,470	5,380	17.6	132,270	6,050	21.9	24.4%
Pacifica	102,640	5,740	17.9	152,470	6,860	22.2	24.0%
Unincorporated San Mateo County	370,360	17,300	21.4	459,920	19,660	23.4	9.3%
I-280/Hillside Corridor							
Colma	48,440	4,520	10.7	56,410	4,140	13.6	27.1%
Hillsborough	35,170	1,590	22.1	57,370	2,190	26.2	18.6%
Portola Valley	43,460	1,240	35.0	60,680	1,630	37.2	6.3%
Woodside	53,510	2,010	26.6	113,280	3,740	30.3	13.9%
US 101/Caltrain Corridor							
Atherton	19,570	940	20.8	25,320	1,140	22.2	6.7%
Belmont	144,880	7,950	18.2	197,450	9,660	20.4	12.1%
Brisbane	151,190	10,730	14.1	474,790	31,860	14.9	5.7%
Burlingame	505,190	30,940	16.3	793,260	41,230	19.2	17.8%
Daly City	290,370	22,540	12.9	415,870	24,280	17.1	32.6%
East Palo Alto	90,250	4,430	20.4	108,510	5,490	19.8	-2.9%
Foster City	407,140	24,350	16.7	477,900	26,620	18.0	7.8%
Menlo Park	624,210	35,820	17.4	805,130	42,790	18.8	8.0%
Millbrae	101,300	6,080	16.7	198,510	11,040	18.0	7.8%
Redwood City	1,009,390	57,980	17.4	1,443,760	82,490	17.5	0.6%
San Bruno	188,410	12,550	15.0	273,400	14,390	19.0	26.7%
San Carlos	350,240	21,760	16.1	318,820	18,970	16.8	4.3%
San Mateo	947,900	54,670	17.3	1,308,850	66,990	19.5	12.7%
South San Francisco	640,000	42,650	15.0	999,110	57,160	17.5	16.7%

Notes: Population and VMT values rounded to nearest 10.

1. Percent change is between 2015 and 2040 home-based work VMT per employee VMT metric values and is rounded to the nearest tenth of a percent.

Source: Fehr & Peers, 2021.

Boundary VMT

The results of the baseline and cumulative boundary VMT metrics are presented in **Table 11** for San Mateo County and the region, and in **Table 12** for the local jurisdictions.

As shown in **Table 11**, boundary VMT is a VMT metric that measures the VMT on the jurisdictions roadway system. The boundary VMT on local streets and freeways is expected to grow in San Mateo County by more than 30%. The Bay Area region boundary VMT rate is expected to grow by 1.5%.

Table 11: Boundary VMT – San Mateo County and Bay Area Region

Jurisdiction	Baseline (Existing) Conditions 2015			Cumulative Conditions 2040			Percent Change[1]
	Boundary VMT	Service Population	Boundary VMT per Service Population	Boundary VMT	Service Population	Boundary VMT per Service Population	
San Mateo County[2]	18,053,040	1,134,030	15.9	23,619,710	1,407,320	16.8	30.8%
Bay Area Region[3]	154,598,560	11,272,480	13.7	199,295,450	14,379,630	13.9	1.5%

Notes: Population and VMT values rounded to nearest 10.

1. Percent change is between 2015 and 2040 boundary VMT values and is rounded to the nearest tenth of a percent.
2. Boundary VMT for local streets (including centroid connectors) and freeways within Santa Mateo County.
3. Boundary VMT for local streets (including centroid connectors) and freeways within the Bay Area region.

Source: Fehr & Peers, 2021.

Each jurisdiction except Menlo Park are expected to increase their boundary VMT rate by more than the 6.5% amount that is implied by the statewide goals. As shown in **Figure 2** below from the statewide VMT scenario prepared by CARB, VMT can grow by 6.5% in California and still achieve its GHG emissions goals.[19] If a jurisdiction were to establish its VMT thresholds consistent with state policies, the long-term expectation would be that boundary VMT on streets and freeways would increase by no more than 6.5% as shown in **Figure 2** below. It is important to note that a boundary VMT metric should use a boundary large enough to capture the full effects of a jurisdictions VMT.

[19] California Air Resources Board's *2017 Climate Change Scoping Plan Update: The Strategy for Achieving California's 2030 Greenhouse Gas Target* (January 2019).

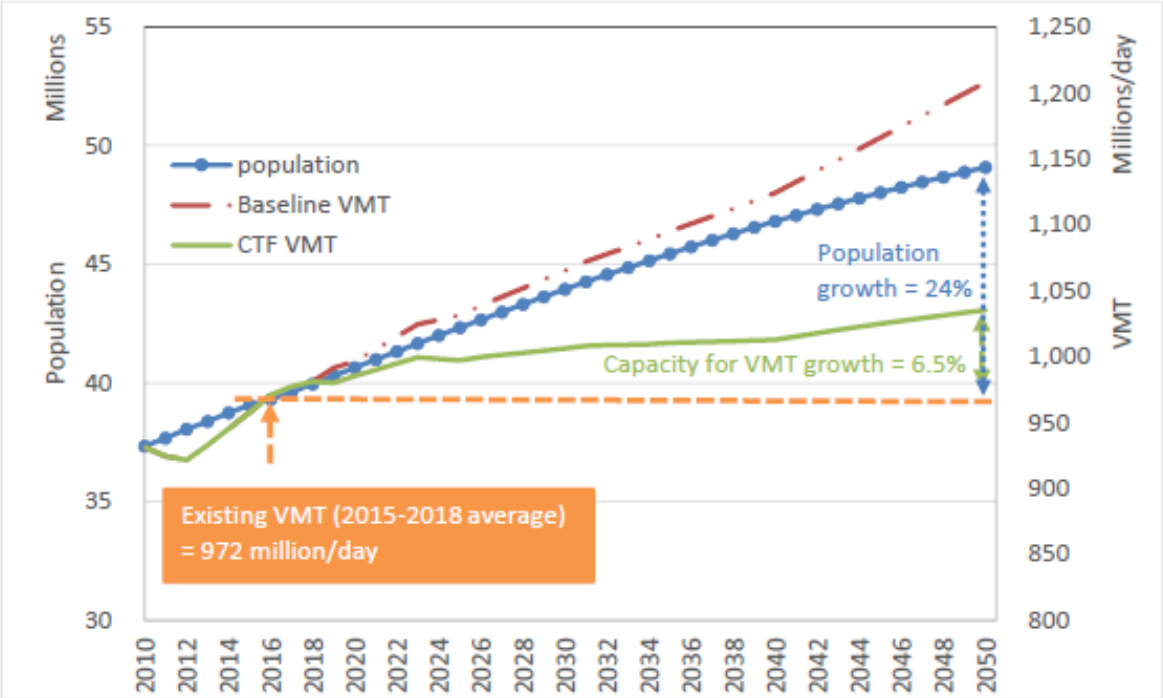


Figure 2: California Total Project Population Growth and VMT Growth

As shown in **Table 12**, most jurisdictions within San Mateo County will see more than a 15% increase in the boundary VMT within its jurisdiction. Brisbane, Half Moon Bay, and Unincorporated County will likely experience more than a 50% increase in the boundary VMT.

Table 12: Boundary VMT – Local Jurisdictions

Jurisdiction[1]	Baseline (Existing) Conditions 2015			Cumulative Conditions 2040			Percent Change[2]
	Boundary VMT	Service Population	Boundary VMT per Service Population	Boundary VMT	Service Population	Boundary VMT per Service Population	
Coastside and Unincorporated County							
Half Moon Bay	128,380	17,270	7.4	217,500	21,610	10.1	69.4%
Pacifica	348,870	44,670	7.8	441,270	46,530	9.5	26.5%
Unincorporated San Mateo County	2,246,450	72,630	30.9	4,157,730	78,840	52.7	85.1%
I-280/Hillside Corridor							
Colma	111,610	6,060	18.4	135,980	6,880	19.8	21.8%
Hillsborough	461,000	12,960	35.6	558,970	13,840	40.4	21.3%
Portola Valley	36,610	5,970	6.1	47,530	6,560	7.2	29.8%
Woodside	888,610	18,700	47.5	1,096,390	20,160	54.4	23.4%
US 101/Caltrain Corridor							
Atherton	119,140	8,010	14.9	140,470	8,680	16.2	17.9%
Belmont	807,520	34,920	23.1	961,990	43,700	22.0	19.1%
Brisbane	729,820	15,420	47.4	1,101,120	41,740	26.4	50.9%
Burlingame	915,290	60,500	15.1	1,140,630	73,470	15.5	24.6%
Daly City	1,330,550	129,690	10.3	1,617,310	148,950	10.9	21.6%
East Palo Alto	645,990	33,410	19.3	790,170	42,900	18.4	22.3%
Foster City	352,780	57,040	6.2	399,090	62,980	6.3	13.1%
Menlo Park	1,219,700	68,260	17.9	1,263,490	94,820	13.3	3.6%
Millbrae	503,560	28,600	17.6	593,360	37,880	15.7	17.8%
Redwood City	1,517,030	140,520	10.8	1,857,980	183,340	10.1	22.5%
San Bruno	985,470	55,310	17.8	1,178,200	65,840	17.9	19.6%
San Carlos	903,370	53,980	16.7	1,067,620	51,500	20.7	18.2%
San Mateo	2,341,860	158,530	14.8	2,922,680	214,000	13.7	24.8%
South San Francisco	1,459,430	111,580	13.1	1,930,210	143,100	13.5	32.3%

Notes: Population and VMT values rounded to nearest 10.

1. Boundary VMT for local streets (including centroid connectors) and freeways within each jurisdiction.
2. Percent change is between 2015 and 2040 boundary VMT values and is rounded to the nearest tenth of a percent.

Source: Fehr & Peers, 2021.

Baseline VMT Data From Other Sources

As a point of comparison for the C/CAG-VTA travel forecasting model baseline data, VMT data for San Mateo County was compiled from two existing sources: the 2012 California Household Travel Survey (CHTS) and the California State Travel Demand Model (CSTDM).

California Household Travel Survey

Table 13 shows VMT results from the CHTS. The survey was conducted in 2012. Sample sizes for each city are small; therefore, data is summarized on a county-wide scale only. Only at the full county level was the sample size sufficient for producing a complete set of statistically valid outputs. Also, because the survey is based on households, statistics are presented separately for VMT per resident and VMT per employee. All non-household travel (such as deliveries, freight, etc.) are excluded from the CHTS data, as the survey focuses on households only.

Table 13: CHTS (2012) VMT Estimates

Metric	San Mateo County
Average Daily VMT per resident	15.3 miles
Average Daily Home-based VMT per resident	10.4 miles
Percentage of residential VMT that is home-based	59%
Average Home-based Work Trip Length (for San Mateo County employees)	9.2 miles
Sample Persons	2,478 residents / 714 commute trips to San Mateo County

Source: Caltrans 2013 (https://www.nrel.gov/transportation/secure-transportation-data/tsdc-california-travel-survey.html), Fehr & Peers 2020.

CHTS data generally show slightly higher levels of daily total VMT per resident compared to C/CAG-VTA travel forecasting model outputs. This likely reflects that CHTS data for San Mateo County households includes trips made by residents that both begin and end outside of San Mateo County. The home-based VMT per resident, which includes only trips that begin or end at a resident's home, is below the home-based VMT per resident produced by the C/CAG-VTA travel forecasting model (13.6 VMT per resident). Nonetheless, model outputs are around 30% higher than the home-based VMT presented by CHTS data, and around 11% lower than the total daily VMT per resident indicated by the CHTS data. This indicates that the model results are likely a reasonable mid-point for purposes of estimating household travel activity in San Mateo County.

For employees working in San Mateo County, the C/CAG-VTA travel forecasting model produces average daily home-based work (i.e., commute) VMT of around 16.7 daily VMT. CHTS data presents only average home-based work trip lengths, summarized in **Table 13** for only employees working in San Mateo County. CHTS data are one-way; presuming a typical employee who drives to work commutes round-trip each

way, CHTS trip lengths are approximately 10% higher than home-based work trips shown in the C/CAG-VTA travel forecasting model (16.9 VMT per employee per day).

California State Travel Demand Model

Table 14 shows VMT results from the CSTDM. Base year of the model is 2010. Travel analysis zone (TAZ) boundaries in the model do not match directly to the boundaries of each city or population center. Thus, actual VMT will vary from these estimates. Also, the CSTDM does not provide the level of detail available in the C/CAG-VTA travel forecasting model; as such, data are presented in the memorandum at the county-level only.

Table 14: CSTDM (2010) VMT Estimates

Metric	San Mateo County
Total home-based work VMT	5,303,891
Total Employees	348,024
Home-based work VMT per employee	15.2
Total Home-based VMT	8,020,962
Residents	716,715
Home-based VMT per resident[1]	11.2

Note: [1] VMT per resident is expressed as a generation rate and not a ratio. For example, VMT per resident is how much VMT is generated by the residents of a location. It does not include VMT on the model roadway network that is generated by other sources such as external trips that do not stop in the County.

Source: Caltrans 2015 (https://dot.ca.gov/programs/transportation-planning/multi-modal-system-planning/statewide-modeling [Caltrans website updates may limit available data]), Fehr & Peers 2020.

CSTDM estimates for home-based trips in San Mateo County are around 18% below the per capita rates presented in the 2015 baseline C/CAG-VTA travel forecasting model runs. This likely indicates a lack of sensitivity to local travel patterns, as well as differences in the baseline model year between the two models. With respect to home-based work VMT per employee, a similar pattern applies, with CSTDM estimates roughly 10 percent below the base year (2015) VMT data from the C/CAG-VTA travel forecasting model.

A rough underestimate of VMT in the CSTDM compared to the C/CAG-VTA model is expected, partially due to the larger size of TAZs in the CSTDM. In particular, intra-TAZ trips, which are much more common in the CSTDM, are likely to underestimate trip lengths. As such, the C/CAG-VTA model remains a more reliable source for VMT in San Mateo County.

Chapter 6. VMT Impact Significance Thresholds

Because SB 743 introduces a new mandatory metric for use in CEQA analysis, lead agencies will need to determine what constitutes acceptable and unacceptable levels of VMT. This process is generally referred to as establishing significance thresholds, and is governed by *CEQA Statute & Guidelines* Section 15064.7, which states the following:

> *15064.7. THRESHOLDS OF SIGNIFICANCE. (a) Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects. A threshold of significance is an identifiable quantitative, qualitative, or performance level of an environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant. (b) Thresholds of significance to be adopted for general use as part of the lead agency's environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence. (c) When adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.*

In more general terms, this indicates that agencies are encouraged to formally adopt thresholds of significance for VMT, and that they have leeway to consider a wide variety of opinions from public agencies and experts. Ultimately, agencies have discretion to determine a threshold of significance, either on a case-by-case basis or through a more formal adoption process, provided that they can present substantial evidence that the threshold is set at a level that would normally be considered to have a significant environmental impact.

For projects that are not able to meet the established threshold, the VMT impact would be considered significant and unavoidable, preparation of an Environmental Impact Report (EIR) would be required, and approval of the project would require the adoption of a Statement of Overriding Considerations.

With regard to establishing thresholds for VMT, lead agencies have at least four options:

1) **Use Screening Criteria.**

   The concept of project screening is that some projects have characteristics that readily lead to the conclusion that they would not cause a VMT impact, and therefore could be screened out of doing a detailed VMT analysis. The *CEQA Statute & Guidelines* state that projects within ½ mile of

a major transit stop or a stop along a high-quality transit corridor (i.e., with at least 15-minute headways during peak hours) should be presumed to have no impact on VMT.

In addition, the OPR *Technical Advisory* presents a method for "map-based" screening, where projects located in low-VMT areas may require only a qualitative discussion of their VMT effects, provided they comply with best practices for infill development. The areas that would qualify as "low-VMT" areas would depend on how a jurisdiction defines its VMT metrics and thresholds. One method for conducting project screening is to develop a GIS-based mapping tool that shows the locations of the transit priority areas and the low-VMT areas, and allows the analyst to plot the project location to see if it meets the screening criteria.

Land use projects may also be screened out of further analysis if they are very small or can be demonstrated to primarily attract trips that would otherwise travel longer distance. Further, certain transportation projects, such as installation of bicycle/pedestrian/transit infrastructure, or projects designed to address a localized operational issue, can be presumed not to contribute to increased VMT.

2) **Rely on the OPR Technical Advisory suggestion to set thresholds consistent with State of California goals for air quality, greenhouse gas, and energy conservation.**

The OPR *Technical Advisory* contains suggested VMT thresholds. The basic suggested threshold is that each project achieves a VMT level that is at least 15% below regional baseline conditions. In the case of a jurisdiction in San Mateo County, its "region" would be the nine-county Bay Area, although comparison to a baseline for Santa Clara County may also be considered for jurisdictions near Santa Clara County.

3) **Use a threshold adopted or recommended by another public agency consistent with lead agency air quality, GHG reduction, and energy conservation goals.**

The *CEQA Statute & Guidelines* offer the option for an agency to use a threshold that is adopted or recommended by another agency, as long as that decision is supported by substantial evidence. Other state agencies, such as Caltrans and the California Air Resources Board (CARB), have technical expertise that is relevant to this topic.

CARB has produced several reports and studies that speak to the level of VMT reduction, in conjunction with many other measures that would lead to the achievement of California's GHG goals. Recent CARB publications have identified that new land use projects could contribute to these statewide goals by achieving total project generated VMT levels of at least 14.3% below the existing baseline (the CARB report does not specify whether this "baseline" is the regional average or some other baseline). For light-duty vehicles only, CARB cites a 16.8% reduction below baseline (2018) average VMT. However, the CARB analysis assumes that all of the regions in the state will meet the GHG reduction targets set in their Regional Transportation Plans and Sustainable Communities Strategies (RTP/SCS); thus far, indications are that not all regions are meeting those

targets, and vehicular travel in California (at least prior to the COVID-19 pandemic) has been increasing rather than decreasing over the past several years. Further, the CARB analysis does not account for any future increases in the use of Transportation Network Companies (such as Uber and Lyft) or commercial delivery services, nor does it envision the potential for development of autonomous vehicles or any other emerging transportation innovations. Therefore, there is evidence that the VMT reduction values from the CARB publication may not be enough to actually meet the State's GHG goals. Should current VMT generation trends persist, the threshold may need to increase to 25% below baseline (2018) average of jurisdiction (all vehicles).

Caltrans has released draft guidance endorsing the VMT thresholds published in the OPR *Technical Advisory*. Caltrans does acknowledge that each lead agency has the discretion to set its own significance thresholds, and they will be reviewing the evidence presented by any agency that uses a threshold that differs from those in the *Technical Advisory*.

Separately, Caltrans has released draft Interim Guidance on "*Determining CEQA Significance for GHG Emissions for Projects on the State Highway System*" that *recommends that any increase in GHG emissions would constitute a significant impact*. This has been referred to as the "Net Zero VMT Threshold." While Caltrans has thus far signaled that this threshold would be applied only to transportation projects, it does raise a question about whether a "net zero VMT" threshold should also be applied to land use projects and plans.

4) Develop jurisdiction-specific VMT threshold consistent with the existing General Plan.

Agencies may decide to set their own thresholds, which should be supported by substantial evidence and should support the three objectives laid out in SB 743: 1) reducing GHG emissions, 2) encouraging infill development, and 3) promoting active transportation. The process of setting thresholds should consider the policies and standards set in the RTP/SCS (i.e., Plan Bay Area), and should consider how much priority a jurisdiction wants to place on the statewide GHG reduction goals. A targeted study could determine what level of VMT in a jurisdiction would be consistent with the VMT forecasts presented in Plan Bay Area and would represent a jurisdiction's "fair share" of the State's GHG reduction goals.

Another option for setting a local threshold is to consider what level of VMT reduction is feasible to achieve in the local context. Analysis tools are available to estimate the amount of VMT reduction that can be achieved from different types of mitigation strategies deployed in different settings (as described further in **Chapter 6**). Applying these tools to the range of settings that exists in a jurisdiction would yield an estimate of the amount of VMT mitigation that could feasibly be achieved, and that figure could then be incorporated into a VMT threshold. Setting a threshold based on the feasibility of mitigation may not be fully supported by past CEQA practices; Fehr & Peers advises consulting legal counsel and continuing to follow legal developments before adopting this approach.

Establishing CEQA thresholds for VMT requires complying with the statutory language added by SB 743, as well as guidance contained in *CEQA Statute & Guidelines* Sections 15064, 15064.3, and 15064.7. The excerpts in **Appendix D** highlight the amendments to the two *CEQA Statute & Guidelines* sections that were certified by the California Natural Resources Agency and the Office of Administrative Law at the end of 2018.

In addition, a jurisdiction must determine significance thresholds for each of the three project types: land use projects, land use plans, and transportation projects.

Context for Setting VMT Impact Thresholds

California law[20] states that the criteria for determining the significance of transportation impacts must promote: (1) reduction of greenhouse gas emissions; (2) development of multimodal transportation networks; and (3) a diversity of land uses.

Determining an appropriate VMT significance threshold may ultimately depend on whether the courts treat VMT more like air pollution and less like a quantitative performance measure. If VMT causes adverse effects to human health similar to air pollution, then the threshold should be tied to substantial evidence (i.e., scientific studies) that relate VMT to human health (or human welfare or safety). If this effect varies by place type[21], then different thresholds may be appropriate for different place types (e.g., rural versus urban). Currently, the limited scientific evidence related to VMT changes and their potential for causing adverse effects on human health is the CARB *2017 Scoping Plan*. This analysis did not differentiate by area type so a change in rural VMT has no different effect on humans than a change in urban VMT. The VMT would still generate the same amount of GHG emissions (and air pollutant emissions plus other indirect adverse effects) that would still have the same contribution to climate change.

On the other hand, if VMT is treated more like a qualitative performance measure, then lead agencies would have discretion to establish thresholds based in part on context (i.e., amount of VMT on local streets). Past practice allowed lead agencies to set LOS thresholds based largely on the local community's sensitivity to travel delay. This is consistent with CEQA Guidelines Section 15064: "…An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting. For example, an activity which may not be significant in an urban area may be significant in a rural area." Rural areas that were more sensitive to vehicle congestion were allowed to establish LOS thresholds that equated to lower levels of delay. Using this analogy, a lead agency could set VMT thresholds based on a community's sensitivity to the amount of vehicle travel or its associated effects.

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[20] Section 21099 of California Public Resources Code establishes the required changes to the guidelines implementing CEQA as mandated in Senate Bill 743. Section 21099(b)(1) includes a requirement that the criteria for determining the significance of transportation impacts must "promote the reduction of greenhouse emissions, the development of multimodal transportation networks, and a diversity of land uses".

[21] A place type is a categorization system of neighborhood surrounding specific parcels in terms of land use density, general vehicle accessibility and access to transit, and land use. These factors have been shown to have a substantial effect on a location's ability to support low-VMT travel.

Is the use of VMT Impact Screening Desired?

There are several instances where CEQA statute allows for projects to be "screened" out of more detailed analysis. The screening process refers to a relatively quick assessment of the project based on screening criteria discussed below; if the project passes the screening assessment, it can be presumed to have a less-than-significant impact on VMT. Screening may be based on project location, project characteristics, or a combination of both. Lead agencies are responsible for deciding if projects may be screened themselves from further analysis by determining, based on substantial evidence, which screening criteria they want to use for which project types, and where to set a screening "threshold."

Projects Located Near Frequent and High Capacity Transit

CEQA Statute & Guidelines § 15064.3(b) explicitly states that projects within ½ mile of a high-quality transit corridor or major transit station should be presumed to have no impact on VMT. A major transit station is a rail or ferry terminal, or the location where two high-frequency bus lines intersect. A major transit corridor is defined as a corridor with high-frequency bus service in the peak hour. A jurisdiction has discretion whether to define these areas as ½-mile walksheds or 'as the crow flies.'

Projects Located in Low-VMT Generating Area

In addition, the OPR *Technical Advisory* presents a method for "map-based" screening, where projects located in low-VMT generating areas (expressed as a VMT rate such as VMT per capita) may require only a qualitative discussion provided they comply with planning best practices for infill development. A low VMT generating area is generally defined as one where the VMT per capita under existing conditions (based on a model run) is below the impact threshold adopted by the lead agency. The rationale behind screening based on location in a low-VMT generating area is that future residents, employees, and visitors are likely to have similar travel patterns to the current populations in the study area and that it is, therefore, reasonable to assume that a new project will have the same low-VMT generation rate as exists in the area. In other words, the new project would generate new VMT but it would be less than would be generated in other locations because the project is located in a low-VMT generating area, which has the net benefit of incrementally reducing the city, county and/or regional project generated VMT rate compared to locating the project in another area. Therefore, if a project includes elements that are substantially different from existing development patterns, additional analysis may be necessary even if the area has a low level of VMT generation under existing conditions.

Local-Serving Retail Projects

Local-serving retail is unlikely to have a substantial influence on local VMT. Smaller retail uses such as grocery stores, dry cleaners, pharmacies, and convenience stores tend to attract visitors from nearby neighborhoods. As an example, consider the effect of a new grocery store in an area without one. Residents of a neighborhood without a grocery store have to travel a great distance to an existing grocery store. Adding the grocery store to that neighborhood will shorten many of the existing grocery shopping trips and reduce the VMT to/from the neighborhood, although it is unlikely to attract visitors who are

already near an existing grocery store. While the definition of local-serving retail is somewhat subjective, a reasonable screening criterion may be a grocery store, pharmacy, or shopping center that does not exceed 50,000 square feet of retail space.

Specific Transportation Projects

Some transportation projects are highly unlikely to create VMT impacts, and can be presumed to have a less than significant impact on VMT. These include projects that reduce the number of lanes on a roadway ("road diets"), bicycle and pedestrian infrastructure projects, traffic calming projects, minor signal timing adjustments, and other roadway projects that are not intended to add vehicle capacity or reduce vehicle delay.

Projects with No Net VMT Increase

Some projects may be reasonably expected to have no net effect on the total boundary VMT on the roadway system. These would include like-for-like land use replacement projects, development of a site with a less-intensive land use than the existing land use, or any other project that is not expected to cause a change in travel behavior to or from the project site.

Affordable Housing Projects

The OPR *Technical Advisory* indicates that 100 percent affordable housing projects in infill locations may be screened from further analysis based on evidence that affordable housing both generates less VMT per capita than market-rate housing, and may help improve jobs-housing balance. A jurisdiction may wish to develop its own screening criteria for residential projects (or residential portions of mixed-use projects) containing a particular amount of affordable housing, based on local circumstances and evidence.

Small Projects

A jurisdiction may continue to issue guidance regarding when a full transportation impact analysis is necessary by, for instance, allowing the screening of small projects from VMT analysis, or requiring only qualitative VMT assessment for small projects. Screening based on small projects may wish to use the criteria cited in the OPR *Technical Advisory* (page 12) to screen projects that generate or attract fewer than 110 trips per day. Based on research for small project triggers[22], this may equate to nonresidential (e.g., office) projects of 10,000 square feet or less and residential projects of 20 units or less. A jurisdiction may also screen local-serving retail projects (projects with less than 50,000 square feet of retail) on the basis that they attract trips that would otherwise travel longer distances.

[22] Refer to technical memorandum on small project triggers in **Appendix E**.

Options, Limitations, and Considerations: Screening

Common Options

Projects that reduce VMT or are located within transit priority areas (TPAs) should be presumed to have a less than significant impact on VMT. Additional screening options identified in the OPR *Technical Advisory* for:

1. Map based screening for residential and office projects
2. Local-Serving Retail Projects
3. Transportation projects that do not add vehicle capacity
4. Projects that would not result in a net increase of VMT
5. Affordable housing projects
6. Small projects

Common Limitations

Screening does not provide information about the actual VMT changes associated with the project.

Considerations

Screening is most appropriate if consistent with applicable general plan and supported by substantial evidence.

Specifications of C/CAG VMT Estimation Tool: Screening

The C/CAG VMT Estimation Tool will provide for:

- Low VMT generation screening of small- to medium-size office, residential and industrial projects.
- A Metropolitan Transportation Commission (MTC) transit priority areas (TPAs) screen layer from 2017. This is a 1/2-mile buffer around existing major transit corridor (along El Camino Real and the 120 and 130 bus stops) or a major transit stop** (i.e., along Caltrain, BART and the South San Francisco ferry terminal).
- A local screening criteria (to provide a jurisdiction the option to use its own screening criteria.)

***"Major transit stop" is defined in Public Resources Code 21064.3 as a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.*

What is the VMT Impact Significance Threshold for Land Use Projects and Land Use Plans Under Baseline Conditions?

Specific VMT thresholds for residential, office (work-related), and retail land uses from the OPR *Technical Advisory* are summarized below.

- **Residential projects:** A proposed project exceeding a level of 15% below existing (baseline) VMT per capita may indicate a significant transportation impact. Existing VMT per capita may be measured as regional VMT per capita, as a citywide VMT per capita, or as geographic sub-area VMT per capita.
- **Office projects:** A proposed project exceeding a level of 15% below existing (baseline) regional VMT per employee may indicate a significant transportation impact.
- **Retail projects:** A net increase in total (boundary) VMT may indicate a significant transportation impact.
- **Mixed-use projects:** Lead agencies can evaluate each component of a mixed-use project independently and apply the significance threshold for each land use type included (e.g., residential and retail). Alternatively, a lead agency may consider only the project's dominant use. In the analysis of each use, a project should take credit for internal capture.
- **Other non-residential project types:** OPR recommends using the quantified thresholds above, thus a proposed project exceeding a level of 15% below existing regional VMT per employee for the proposed non-residential project type or resulting in a net increase in total (boundary) VMT may be considered significant. Lead agencies, using more location-specific information, may develop their own more specific thresholds, which may include other land use types.
- **Redevelopment projects:** Where a project replaces existing VMT-generating land uses, if the replacement leads to a net overall decrease in VMT, the project would have a less-than-significant transportation impact. If the project leads to a net overall increase in VMT, then the thresholds described above should apply.

As shown above, OPR does not make consistent recommendations for employment land use projects. In some cases, OPR recommends a 15% reduction in per capita VMT, in some cases no increase in boundary VMT, and in some cases OPR leaves threshold selection to jurisdiction discretion. Evidence is lacking on what justifies different treatments across different land use types. Lead agencies that use the above thresholds should be prepared to justify their reasoning and be able to explain it to project applicants, decision-makers, and the public.

The OPR *Technical Advisory* suggests that a VMT per capita of 15 % below existing development may be an appropriate threshold for a significant impact. While there is ongoing discussion surrounding the substantial evidence behind this threshold, its documentation within an OPR document provides some level of substantial evidence that it represents an appropriate threshold. The 15% reduction for the office

and residential land uses specified in the *Technical Advisory* is for light-duty vehicle project generated VMT (i.e., passenger cars and light trucks). This presumption was included in the CARB modeling of MPO regional transportation plan/sustainable communities strategies (RTP/SCSs). The CARB *Scoping Plan* and *Mobile Source Strategy* identifies that a 14.3% reduction in total VMT per capita or a 16.8% reduction in light-duty vehicle VMT per capita from 2018 baseline levels is necessary to meet state GHG reduction goals by 2050. These reduction values are based on a fair share estimate of new development's responsibility for VMT reduction and assume that all California residents in the year 2050 will be traveling at the reduced VMT levels. If existing residents (meaning those present in 2018) do not change their travel behavior and the full reduction in VMT must instead be allocated only to new growth, then the reduction goal for new developments would be much higher. Further, if VMT per capita trends continue to increase as noted in the *2018 Progress Report California's Sustainable Communities and Climate Protection Act*, California Air Resources Board, November 2018, then these reduction percentage values will have to increase. This number is discussed further in **Appendix D**.

OPR's *Technical Advisory* also recommends measuring VMT in absolute terms, which measures the total VMT in an area with and without the project. This approach is consistent with traditional CEQA analyses which measures impacts in comparison to existing conditions and with OPR's *CEQA Statute & Guidelines* amendments and OPR *Technical Advisory*, which state that (1) "Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact." (*CEQA Statute & Guidelines* § 15064.3(b)(1).) (2) "Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact." (*CEQA Statute & Guidelines* § 15064.3(b)(2).) (3) "Where development decreases VMT, lead agencies should consider the impact to be less than significant," (OPR *Technical Advisory*, p. 16.), (4) "Where a project replaces existing VMT-generating land uses, if the replacement leads to a net overall decrease in VMT, the project would lead to a less-than-significant transportation impact." (OPR *Technical Advisory*, p. 17.)

It should be noted that the recommendation above for mixed-use projects to focus the VMT analysis on the "dominant use" may present new challenges. The term "dominant use" is not defined in the CEQA statute or CEQA Statute & Guidelines. Because there are many ways to define it, taking this approach could create more legal arguments for challenging projects.

A jurisdiction has several possible thresholds to consider. One of the options is based on State goals pertaining to air quality, GHG reduction, and energy conservation, while another option would be based on an existing City General Plan. Background on VMT thresholds and additional discussion of potential options are presented in **Appendix D**. A jurisdiction must determine whether it wishes to analyze VMT impacts based on guidance from statewide agencies or its General Plan. If a jurisdiction chooses to use statewide guidance, it must determine which agency's threshold to use, and its standards for determining "substantial evidence" for setting a threshold at that level. The primary consideration in determining what constitutes substantial evidence revolves around which goals a jurisdiction focuses on (GHG emissions, promoting infill development, or promoting active transportation) and how trends in VMT are projected forward to meet those goals.

Also, once available, the C/CAG-VTA travel forecasting model will be used to prepare baseline and cumulative VMT estimates for each of the VMT metrics described in the previous chapter (see **Chapter 5**). A separate document will be prepared with a more detailed discussion of the baseline VMT estimates and possible VMT thresholds.

Set a Threshold Based on State Goals

This option sets a threshold consistent with a lead agency's air quality, GHG reduction, and energy conservation goals, assuming they are aligned with (or even exceed) State of California goals. Debate still exists about whether State goals as expressed in State plans, Governor executive orders, etc., constitute environmental thresholds. Nevertheless, OPR, CARB, and Caltrans have articulated quantitative estimates for VMT/GHG reduction needed to achieve State GHG reduction goals.

Given the CARB regulatory responsibility related to emissions and the Caltrans owner/operator responsibility for the state highway system, their published guidance for VMT impact analysis should be recognized and at least discussed in transportation impact analysis. Including this information will help inform decision makers and the public how the State of California and these specific agencies view the VMT effects of projects. One benefit of relying on state agencies for a threshold recommendation is a *CEQA Statute & Guidelines* provision in Section 15064.7(c) that indicates "a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts."

At this time, there are four published percent reduction targets, and a possible Caltrans-recommended threshold:

- OPR: 15% below baseline average for a city or region (light-duty vehicles only).[23]
- CARB: 14.3% below baseline (2018) average of jurisdiction (all vehicles, assuming that MPOs meet SB 375 targets).
- CARB: 16.8% below baseline (2018) average of jurisdiction (light-duty vehicles only, assuming that MPOs meet SB 375 targets).
- CARB: 25% below baseline (2018) average of jurisdiction (all vehicles, assuming that MPOs do not meet SB 375 targets).
- Net zero VMT (the threshold that Caltrans has indicated they are likely to recommend for transportation projects that affect the state highway system[24]).

The OPR *Technical Advisory* makes specific VMT threshold recommendations for analyzing the impact of project generated VMT compared to baseline conditions but also recommends that VMT analysis consider a project's long-term effects on VMT. The OPR *Technical Advisory* states (p. 6):

[23] The OPR and CARB thresholds do not consider the long-term influence of transportation network companies, internet shopping, new mobility options, or autonomous vehicles.

> *[W]here methodologies exist that can estimate the full extent of vehicle travel from a project, the lead agency should apply them to do so. Where those VMT effects will grow over time, analyses should consider both a project's short-term and long-term effects on VMT.*

Another factor for consideration is whether the project is consistent with the applicable RTP/SCS (i.e., Plan Bay Area). Although OPR recommends that such consistency not be the sole basis for impact analysis (p. 22), it can be considered in conjunction with other factors especially whether a project would jeopardize the RTP's air quality conformity, which is tied directly to VMT. These recommendations raise key questions for lead agencies, as addressed in the next section.

Set a Threshold Consistent with Existing General Plan

This option relies on the VMT growth "budget" established in the general plan and associated EIR. A General Plan establishes how much growth is anticipated in the jurisdiction, where that growth will occur and in what forms, and the transportation network modifications necessary to support that growth. VMT is a composite metric that results from this combination of General Plan land use and transportation decisions. Therefore, each adopted General Plan in California effectively already has a VMT growth budget implied within that plan that the adopting agency has accepted.

This could be a starting point for threshold expectations and can be quantified using the lead agency's travel forecasting model, if one exists, or from regional travel forecasting models used to develop the region's RTP/SCS. The incremental difference between base year and future year VMT generated by the jurisdiction in these models represents currently accepted VMT levels. The VMT can be expressed in absolute terms or as an efficiency metric, such as total VMT per service population to create a VMT impact threshold tied exclusively to the General Plan. Projects can be evaluated using the appropriate travel forecasting model to determine whether they cause an increase in the incremental total VMT growth for the jurisdiction or would generate VMT at a higher rate than anticipated by the General Plan for the relevant traffic analysis zone(s).

The main limitation of this approach is if a jurisdiction's adopted General Plan was developed prior to State of California approval of a variety of new laws related to climate change and GHG reduction. As such, the General Plan may not be consistent with State expectations for emissions and VMT reductions and all the other local community objectives.

Additional Considerations for Land Use Plans

Rather than analyzing VMT for each proposed land use project individually, a jurisdiction may choose to complete VMT impact analysis as part of its General Plan EIR and make specific use of *CEQA Statute & Guidelines* Section 15183 (See **Appendix D** for additional discussion). Setting a threshold for the General Plan itself and analyzing VMT impacts in the General Plan EIR could exempt projects consistent with the General Plan from further VMT impact analysis. The jurisdiction may adopt a threshold that is based on substantial evidence, use it in its General Plan EIR, determine if VMT impacts are significant, mitigate to the extent feasible, and adopt a statement of overriding consideration if determined to be appropriate. The lead agency can then tier off the General Plan EIR for projects consistent with the General Plan without doing additional VMT impact analysis.

Options, Limitations, and Considerations: Baseline VMT Thresholds

- Lead agency discretion consistent with general plan and expectations for 'project scale' VMT reductions not accounted for in General Plan EIR and supported by substantial evidence.
- OPR 15 % below baseline average for a city or region (light-duty vehicles only, based on initial assessment of feasibility and requirements to meet statewide GHG goals).** This could potentially also be applied to below a baseline average for a place type.
- CARB 14.3% below baseline (2018) average of jurisdiction (all vehicles, presuming that MPOs meet SB 375 targets). This could potentially also be applied to below a baseline average for a place type.
- CARB 16.8 % below baseline (2018) average of jurisdiction (light-duty vehicles only, presuming that MPOs meet SB 375 targets). This could potentially also be applied to below a baseline average for a place type.
- ARB 25 % below baseline (2018) average of jurisdiction (all vehicles, presuming that MPOs do not meet SB 375 targets). This could potentially also be applied to below a baseline average for a place type.
- Pending Caltrans-recommended threshold (net zero VMT)

Common Limitations

Difficult for lead agencies to determine what level of VMT change is unacceptable when viewed solely through a transportation lens.

Uncertainty of VMT trends contributes to difficulty in setting thresholds. Connecting a VMT reduction expectation to baseline helps to reduce uncertainty associated with future conditions.

Specifications of C/CAG VMT Estimation Tool: VMT Metrics

Member Agencies will be able to specify their threshold options for each applicable VMT metric. Common threshold options are represented in a percent reduction from baseline year, and include: -0%, -14.3%, -15%, -16.8%, and -25%. These percent reductions could be applied to the town/city, county and regional VMT metrics. A user will have the option to select baseline year to establish threshold.

Considerations

Since VMT is already used in air quality, GHG, and energy impact analysis, lead agencies should review thresholds for those sections to help inform new thresholds exclusively for transportation purposes. Lead agencies should carefully consider how they value state goals for VMT/GHG reduction in light of other General Plan and community objectives. Translating State of California goals into VMT thresholds should consider substantial evidence such as California Air Resources Board 2017 Scoping Plan - Identified VMT Reductions and Relationships to State Climate Goals, January 2019, CARB.
Absent development of a specific VMT threshold, lead agencies may rely on those of other state agencies. The ARB thresholds are supported by substantial evidence related to state air quality and GHG goals, but do not consider recent VMT trends or the potential influence of emerging mobility options such as autonomous vehicles (AVs).

***The OPR and CARB thresholds do not consider the long-term influence of transportation network companies, internet shopping, new mobility options, or autonomous vehicles.*

What is the VMT Impact Significance Threshold for Land Use Projects and Land Use Plans Under Cumulative Conditions?

An impact under CEQA begins with a change to the existing environment, and therefore Existing (or Baseline) Conditions and Existing with Project Conditions must be evaluated. Because VMT will fluctuate with population and employment growth, changes in economic activity, and changes in travel modes including the expansion of new vehicle travel choices (i.e., the emergence of transportation network companies such as Uber and Lyft, autonomous vehicles, etc.), an impact analysis must also consider the cumulative effects of the proposed project, these changes, and all other projects. Therefore, evaluations of Cumulative Conditions and Cumulative with Project Conditions are needed to identify potential cumulative impacts.

Pages 5 and 6 of the OPR *Technical Advisory* recommend considering a project's short-term, long-term, and cumulative effects on VMT. The first reference is on page 5, related to retail projects, while the references on page 6 are for all projects (see excerpts below with most relevant portions underlined).

> ***Retail Projects***. *Generally, lead agencies should analyze the effects of a retail project by assessing the change in total VMT*[11] *because retail projects typically re-route travel from other retail destinations. A retail project might lead to increases or decreases in VMT, depending on previously existing retail travel patterns.* (Quote from page 5 of the *Technical Advisory on Evaluating Transportation Impacts in CEQA*, December 2018; footnote 11 in this quote is a reference to see Appendix 1 of the OPR *Technical Advisory*, which discusses evaluation of Total VMT – OPR is referring to boundary VMT.).
>
> ***Considerations for All Projects***. *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. CEQA requires environmental analyses to reflect a "good faith effort at full disclosure." (CEQA Statute & Guidelines, § 15151.) Thus, where methodologies exist that can estimate the full extent of vehicle travel from a project, the lead agency should apply them to do so. Where those VMT effects will grow over time, analyses should consider both a project's short-term and long-term effects on VMT.* (Quote from page 6 of the *Technical Advisory on Evaluating Transportation Impacts in CEQA*, December 2018).
>
> ***Cumulative Impacts***. *A project's cumulative impacts are based on an assessment of whether the "incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." (Pub. Resources Code, § 21083, subd. (b)(2); see CEQA Statute & Guidelines, § 15064, subd. (h)(1).)* (Quote from page 6 *of* the *Technical Advisory on Evaluating Transportation Impacts in CEQA*, December 2018).

The inclusion of project's effect for retail has raised the question about whether it would also be appropriate for other land uses. A complete analysis that considers the project's effect on VMT is important because land use projects can influence the routing of existing trips and the VMT generation of surrounding land uses. Combined with the expectations established in the *CEQA Statute & Guidelines* and CEQA case law, ignoring the project's effect on VMT may not fully disclose the potential effects on the environment.

Cumulative VMT Threshold Options

As noted earlier, a Cumulative VMT threshold should be able to evaluate the direct, indirect, and cumulative effects of a project on VMT and consider uncertainty of VMT trends, such as transportation network companies (TNCs), new mobility options, and autonomous vehicles (AVs). Below is a summary of three possible cumulative VMT threshold options:

- **Fair Share of Regional VMT Allocation:** Use a regional model to analyze the project's effect on VMT based on RTP/SCS (i.e., Plan Bay Area) consistency (projects should not increase the total project generated regional VMT forecast used to support the RTP/SCS air quality conformity and SB 375 GHG targets).
- **Cumulative VMT Thresholds is the Same as Baseline VMT Threshold**: A lead agency can use the baseline VMT threshold (used for a Project Conditions evaluation of the project) if the baseline VMT efficiency metric is trending downward under Cumulative Conditions.
- **Long-Term Air-Quality and GHG Expectations**: Establish a VMT reduction threshold for Cumulative Conditions consistent with long-term air pollution and GHG reduction expectations.

All three of these options require knowledge of the forecasting tools available to test the project's effect on land use supply and VMT. Overall, the evaluation of the project's effect on land use and VMT should use the most appropriate forecasting model and consider all substantial evidence including the California Air Resources Board *2017 Scoping Plan-Identified VMT Reductions and Relationships to State Climate Goals*, CARB and current research on the long-term effects of transportation network companies (TNCs), new mobility options, and autonomous vehicles (AVs). Any cumulative VMT forecasting should acknowledge that land use projects and plans typically do not influence regional land use control totals and that modeling scenarios should carefully consider the land use allocation between scenarios and/or the VMT metric used to establish the cumulative VMT threshold.

Options, Limitations, and Considerations: Cumulative VMT Thresholds

Common Options

For analysis of cumulative VMT effects, a jurisdiction can choose from the following options:

1. Use a regional travel model to analyze the project's effect on VMT based on RTP/SCS (i.e., Plan Bay Area) consistency (projects should not increase the regional total project generated VMT or total boundary VMT forecast used to support the RTP/SCS air quality conformity and SB 375 GHG targets).
2. A lead agency can use the project analysis above if based on an efficiency metric form of VMT and evidence exists to demonstrate that cumulative trends in VMT rates are declining.
3. Establish a VMT reduction threshold for cumulative conditions consistent with long-term air pollution and GHG reduction expectations.

Common Limitations

Uncertainty of VMT trends makes a cumulative impact finding less certain.

Ability for a lead agency to identify the project's effect on land supply and corresponding VMT. Land use projects change land supply and the allocation of future population and employment growth. As such cumulative analysis should maintain the same control totals of regional population and employment growth.

Requires knowledge of the forecasting tools available to test the project's effect on land supply and VMT.

Considerations

Analyze the project's effect on land supply and VMT using an appropriate valid model. For impact findings, consider all available substantial evidence including 2018 Progress Report, California's Sustainable Communities and Climate Protection Act, November 2018, CARB and current research on the long-term effects of transportation network companies (TNCs), new mobility options, and autonomous vehicles (AVs). Specific research examples include Fehr & Peers AV effect model testing.

Specifications of C/CAG VMT Estimation Tool: Cumulative VMT Thresholds

The C/CAG VMT Estimation Tool is a baseline VMT screening tool each jurisdiction will need to complete its own cumulative VMT analysis using the forthcoming cumulative VMT data and other available resources.

What is the VMT Impact Significance Threshold for Transportation Projects Under Baseline and Cumulative Conditions?

Transportation projects have the potential to change travel patterns and may lead to additional vehicle travel on the roadway network, also referenced as induced vehicle travel (OPR *Technical Advisory*, pp. 19-23, and Appendix 2). For roadway capacity expansion projects, under *CEQA Statute & Guidelines* Section 15064.3(b)(2), lead agencies have the discretion to determine the appropriate measure of transportation impacts. Lead agencies may consider retaining current practices, such as using LOS thresholds as identified in the General Plan, but should evaluate whether use of LOS still complies with the new *CEQA Statute & Guidelines* expectations in Sections 15064.3, 15064, and 15064.7. Lead agencies that do not choose to use VMT to measure the impacts of transportation projects will still need to analyze VMT as an input to air quality, GHG, and energy impact analysis. For transportation projects that increase roadway capacity, the VMT estimates and forecasts will also need to include induced travel effects that lead agencies may not have included in past practice. However, not all roadway projects will lead to induced travel.

Project types that would likely lead to a measurable and substantial increase in vehicle travel generally include addition of through lanes on existing or new highways, including general purpose lanes, HOV lanes, peak period lanes, auxiliary lanes, or lanes through grade-separated interchanges. OPR's *Technical Advisory* provides an extensive list of projects which are unlikely to lead to induced travel, including addition of roadway capacity on local or collector streets provided the project also substantially improves multimodal conditions. (OPR *Technical Advisory*, pp. 20-21.) Appendix 2 to OPR's *Technical Advisory* provides specific guidance on calculating induced vehicle travel.

Assuming VMT is used as the metric, transit (except for on-demand transit) and active transportation projects may be considered to have less than significant impact.

Options, Limitations, and Considerations: baseline and Cumulative Transportation Thresholds

Common Options

Lead agencies have discretion to choose their own metrics and thresholds for transportation project impact analysis. If VMT is selected, OPR recommends treating projects that reduce or have no impact on VMT to be presumed to have a less than significant impact.

Common Limitations

Continued use of LOS is uncertain because of *CEQA Guidelines* Section 15064.3(b)(2) and 15064.7(d)(2).
Transit, especially on-demand transit service, can generate new VMT, which should be considered as part of impact conclusions.

Considerations

Consult CEQA legal advice about whether lead agency discretion allows continued use of LOS and whether VMT is required. VMT is required as an input to air quality, GHG, and energy impact analysis and should include induced vehicle travel effects.

Specifications of C/CAG VMT Estimation Tool: baseline Transportation Thresholds

Not a feature of the C/CAG VMT Estimation Tool.

Chapter 7. VMT Mitigation Actions

Lead agencies making the transition to VMT are realizing the challenges of trying to mitigate VMT on a project-by-project basis. Much of this difficulty arises from the regional nature of VMT impacts, as well as the complexity of underlying factors influencing VMT generation.

Existing Programs

For large area plans such as general plans and specific plans, mitigation will typically focus on physical design elements related to the ultimate built environment, such as the density and mix of land uses as well as the availability and quality of the transportation network related to transit, walking, and bicycling.

For individual development projects, the primary methods of mitigating a VMT impact are to either:

1. change the project in a way that reduces VMT; or
2. implement a program designed to reduce VMT, such as a Transportation Demand Management (TDM) program.

The available research indicates that the effectiveness of TDM measures varies substantially depending on the context in which they are applied. TDM is most effective in urban areas where urban character (land use and built environment) and land use mix are most supportive of vehicle trip reduction. TDM programs are less effective in rural and suburban areas where the built environment and transportation network are more dispersed and where modes are typically limited to personal vehicles.

The current standard for calculating VMT reduction efficacy from TDM strategies is the California Air Pollution Control Officer Association (CAPCOA) 2010 report, *Quantifying Greenhouse Gas Mitigation Measures* (CAPCOA report). This resource evaluates the literature behind several TDM program elements, and provides methods for calculating a VMT reduction associated with each. There are several limitations in the available VMT reduction data for suburban and rural application that are worth noting here:

- **There is little to no evidence regarding the efficacy of TDM programs in rural areas.** For the more rural portions of San Mateo County, there may not be applicable programs with the level of evidence required to conclude that an impact can be reduced to less-than-significant levels.
- **Suburban areas have only moderate TDM options available for non-office land uses.** Overall, CAPCOA indicates that projects in suburban areas may be able to achieve up to a 15% reduction in VMT. However, achieving this level of reduction requires that the project either meet certain land use diversity and/or densities or adopt parking pricing, parking supply limits, or transit expansions—all of which may have a high financial or political cost.
- **Effectiveness of VMT reduction may diminish with each additional TDM strategy implemented.** Each of the CAPCOA TDM strategies can be combined with others to increase the effectiveness of VMT mitigation; however, the interaction between the various strategies is

complex and sometimes counterintuitive. Generally, with each additional measure implemented, a VMT reduction is achieved, but the incremental benefit of VMT reduction may diminish.

- **TDM program effectiveness is highly dependent on individual tenants.** For office or retail TDM programs, the level of commitment by individual tenants determines the level of success. For most projects, the tenants will be unknown at the time of environmental review, and tenants can change frequently over the life of the building; this makes it more difficult to forecast TDM reductions.
- **TDM program implementation requires ongoing monitoring.** If used as a mitigation measure, TDM programs will require ongoing monitoring for compliance. This may require additional staff time on the part of the lead agency.

Due to the above considerations, it may be prudent to indicate that TDM programs may be used as project mitigation, but that they cannot on their own reduce a transportation impact to a less-than-significant level, unless stringent monitoring requirements are adopted as part of the mitigation.

What VMT Reduction Mitigation Strategies are Feasible?

The effectiveness of different TDM strategies varies widely based on local context, scale of intervention, and availability of non-automotive transportation. TDM strategies are most effective when implemented in a policy environment that encourages land use location efficiency and infrastructure investments that support transit, walking, and bicycling. Measures that more typically come to mind when considering TDM, such as building-specific subsidy and marketing programs for transit or other non-drive-alone modes, or installation of bicycle racks, tend to be less effective than community-wide strategies and investments. Furthermore, programs tied to individual projects or buildings may vary in efficacy based solely on the final building tenants. **Figure 3** presents a conceptual illustration of the relative importance of scale.

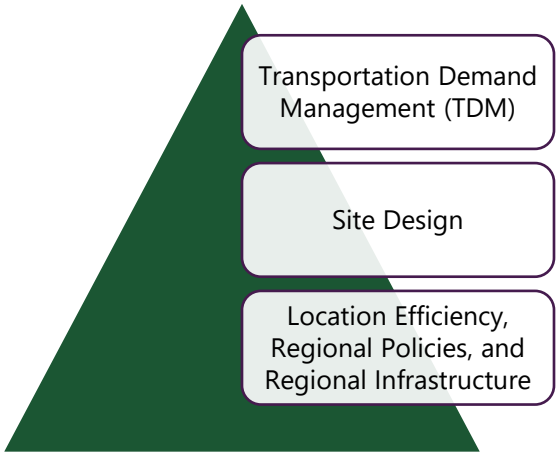


Figure 3: Transportation-Related GHG Reduction Measures

Of the 50 transportation measures presented in the CAPCOA report, 41 are applicable at building and site level (see **Appendix G** for more information). Building and site-based strategies are typically more easily included as mitigations for individual projects, as the project sponsor has a greater amount of control over the specific implementation and outcomes. The remaining nine CAPCOA strategies are functions of, or depend on, site location and/or actions by local and regional agencies or funders. **Table 15** summarizes the strategies according to the scope of implementation and the agents who would implement them.

Table 15: Summary of Transportation Related CAPCOA Measures

Scope	Agents	CAPCOA Strategies
Transportation Demand Management (TDM)	Employer, Manager	**26 total** strategies from five CAPCOA strategy groups: • **3** from 3.2 Site Enhancements group • **3** from 3.3 Parking Pricing Availability group • **15** from 3.4 Commute Trip Reduction group • **2** from 3.5 Transit Access group • **3** from 3.7 Vehicle Operations group
Site Design	Owner, Architect	**15 total** strategies from three strategy groups: • **6** from 3.1 Land Use group • **6** from 3.2 Site Enhancements group • **1** from 3.3 Parking group • **2** from 3.6 Road Access group
Location Efficiency, Regional Policies, and Regional Infrastructure	Developer, Regional and Local Agencies	**6 total** strategies from 3.1 Land Use group

Note: Disruptive trends, including but not limited to, transportation network companies (TNCs), autonomous vehicles (AVs), internet shopping, and microtransit may affect the future effectiveness of these strategies.
Source: Fehr & Peers, 2020

The specific mitigation measures for reducing VMT on a project level will vary widely based on project location, context, and land use type. Because of these considerations, each lead agency will need to consider which TDM mitigation methods are appropriate for use on projects in its jurisdiction, and what degree of effectiveness each is likely to have.

Generally, TDM measures can be grouped based on the level of substantial evidence, and the built environment that it is effective in. For most of San Mateo County, which is generally suburban in nature, a maximum feasible VMT reduction may be about 15 percent. However, for rural areas, this figure may be lower, while for areas immediately adjacent to regional transit it may be higher. Some basic information on these options will be presented under separate cover, and included in the C/CAG VMT Estimation Tool and its supporting documentation; however, individual lead agencies will need to coordinate with C/CAG to specify location-specific mitigation specifications to make only the VMT reduction measures they want to use in their jurisdiction available in the tool for parcels evaluated in its jurisdiction.

One way that measures may be presented and differentiated based on available evidence is through use of a "tiered" system. Generally, land use and parking changes have a high level of evidence for VMT reduction, while programmatic measures have a lower level of evidence or a lower level of certainty. One potential categorization of measures could be:

- Tier 1: Project Characteristics
    - Increase Residential Density
    - Increase Development Density
    - Affordable Housing
    - Increase Employment Density
- Tier 2: Multimodal Infrastructure
    - Increase Bike Access
    - Improve Connectivity
    - Increase Transit Accessibility
    - Traffic Calming
    - Pedestrian Networks
- Tier 3: Parking
    - Limited Parking Supply
    - Provide Bike Facilities
- Tier 4: TDM Programs
    - School Pool Programs
    - Bike Share Programs
    - Car Share Programs
    - Commute Trip Reduction (CTR) Marketing and Education
    - Employee Parking Cash-Out
    - Subsidized Transit Program
    - Telecommuting and Alternative Work Schedules
    - Free Door-to-Door Transit Fleet
    - Price Workplace Parking
    - Alternative Transportation Benefits
    - Neighborhood Schools

- Ride-Sharing Programs
- Transit Service Expansion
- Behavioral Intervention
- Unbundled Parking Costs from Property Cost (On Site Parking)
- Vanpool Incentives
- Voluntary Travel Behavior Change Program

This list and classification will be finalized upon discussions with the C/CAG Technical Advisory Group.

New VMT Mitigation Concepts

Today many jurisdictions in San Mateo County connect land development projects to transportation network improvements using a transportation fee and the Congestion Management Program (CMP). The transportation impact fee program collects a fair-share fee payment from new development to contribute to the cost of a capital improvement program (CIP) consisting of long-term transportation projects that facilitate vehicle travel as the residential population and employment population increases. The CMP is designed to monitor traffic congestion and transit performance while implementing strategies that manage traffic congestion and its impacts on air quality. Many jurisdictions with a transportation impact fee program do include some TDM requirements for projects deemed to affect the CMP network; those projects must prepare a TDM plan meeting certain specifications to help reduce the number of vehicle trips.

A jurisdiction's transportation impact fee and CMP would not qualify as VMT impact mitigation programs if both programs are largely focused on vehicle capacity expansion or congestion management objectives. The current focus of both programs is to expand roadway capacity to address vehicle LOS deficiencies. This strategy may have the result of inducing new vehicle travel that, in the long run, would diminish congestion relief benefits and generate new VMT and emissions. Refer to the following websites for more research information and technical details.

- https://ncst.ucdavis.edu/events/webinar-new-web-tool-calculate-induced-travel
- https://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_brief.pdf
- https://trrjournalonline.trb.org/doi/abs/10.3141/2653-02

Managing and reducing demand could accomplish the CMP goal, especially by focusing on reducing peak period VMT. The main source of congestion as defined by the CMP is that vehicles move too slowly (i.e., peak period speeds are lower than posted speed limits). This definition of congestion describes a symptom and fails to recognize that peak period travel consists of vehicles with poor seat utilization caused by not managing demand more effectively and mispricing travel. Many of the freeways, and arterials in San Mateo County routinely filled up during peak periods by vehicles with solo drivers (i.e., low seat utilization). Further, limited facilities exist that prioritize travel by high occupancy vehicles (except on freeways). Increasing vehicle speeds and substantially reducing delays requires much greater seat utilization in existing vehicles (i.e., private vehicles and public transit). This change would also reduce VMT. Hence, refocusing the CMP on the combination of congestion management and VMT reduction would result in a different CIP, which could qualify as VMT impact mitigation.

Four possible mitigation approaches are described in the following sections:

- VMT Cap
- VMT Based Impact Fee Program
- VMT Mitigation Bank
- VMT Mitigation Exchange

A VMT Cap can be developed and administered on a project-by-project basis, while the remaining three options (VMT Based Impact Fee Program, VMT Mitigation Bank, and VMT Mitigation Exchange) are broader programmatic approaches to impact mitigation. The concept of a 'program' approach to impact mitigation is commonly used in a variety of technical subjects including transportation, air quality, greenhouse gases, and habitat. Absent new program-level VMT mitigation approaches, rural and suburban lead agencies will have limited feasible mitigation options for project sites. Without feasible mitigation, significant VMT impacts would be significant and unavoidable (SAU). Under these circumstances a project must prepare an environmental impact report (EIR), thus adding time and cost to environmental review compared to an initial study/negative declaration (IS/ND). Program-based approaches may be able to overcome the limitation of project-site only mitigation. Additional details about VMT fees, VMT banks, and VMT exchanges, including implementation flow charts, are provided in **Appendix G**.

VMT Cap

A VMT cap is a project-specific limit on total project-generated VMT. Often a VMT cap is linked to the jurisdiction's citywide air quality, GHG reduction, and energy conservation goals. VMT estimates are not directly observed – they must be estimated using big data sources, a travel survey, zip code data of residents, employees, customers, or visitors, and/or a travel model. Like a vehicle trip cap, VMT caps often require a project applicant to implement a TDM program with monitoring and reporting standards. A VMT cap may also include specific consequences or penalties if the project fails to comply.

VMT Based Impact Fee Program

Although establishing any impact fee program is time consuming, it is a common and well-understood process governed by the Mitigation Fee Act. Using a VMT reduction goal linked to the agency's SB743 thresholds to establish the nexus would result in a capital improvement program (CIP) consisting mostly of transit, bicycle, and pedestrian projects. These types of fee programs are recognized as an acceptable form of CEQA mitigation if they can demonstrate that the CIP projects will be fully funded and implemented.

VMT Mitigation Exchange

A VMT Mitigation Exchange concept relies on a developer agreeing to implement a predetermined VMT-reducing project or proposing a new one, which could be located elsewhere in the community or possibly outside the community. The Exchange needs to have a facilitating entity that can match the VMT

generator (the development project) with a VMT-reducing project or action. The facilitating entity could be the lead agency or another entity that can provide the match and to ensure through substantial evidence that the VMT reduction is valid. A key unknown with this approach is the time period for the VMT reduction. For example, how many years of VMT reduction would be required to declare a VMT impact less than significant?

VMT Mitigation Banks

A VMT Mitigation Bank attempts to create a monetary value for VMT reduction, such that a developer could purchase VMT reduction credits. The money exchanged for credits could be applied to local, regional, or state level VMT reduction projects or actions. Like all VMT mitigation, substantial evidence would be necessary to demonstrate that the projects covered by the Bank would achieve expected VMT reductions and some form of monitoring may be required. This is more complicated than a VMT Mitigation Exchange and would require more time and effort to set up and implement. The verification of how much VMT reduction is associated with each dollar or credit would be one of the more difficult parts of the program.

Summary of Mitigation Action Options

Overall, CAPCOA indicates that projects in suburban areas may be able to achieve up to a 15% reduction in VMT. However, achieving this level of reduction requires that the project implement many individual project-level strategies (such as TDM and site design strategies) *and* be sited in an efficient, transit-adjacent location. In addition, project-level TDM strategies are often implemented by individual building tenants (i.e., employers), so their use requires ongoing monitoring and adjusting to account for changes in tenants and their travel behavior.

Due to these project-specific implementation barriers, ad-hoc project-by-project mitigation is less effective for reducing VMT compared with larger scale program-based approaches, such as an impact fee program that funds transit expansion, or land use and zoning changes at a citywide level. The emergence of these new mitigation concepts presents opportunities to reduce VMT at a townwide/citywide or regional scale, though the measured effects of these programs (and their ability to reach desired long-term land use outcomes) are largely unknown.

Options, Limitations, and Considerations: VMT Mitigation Actions

Common Options

Menu of built environment and transportation demand management (TDM) mitigation strategies contained in Quantifying Greenhouse Gas Mitigation Strategies, CAPCOA, 2010.

Common Limitations

Built environment strategies require modifying the project, which may create inconsistencies with the project description and financial feasibility. TDM strategies are often building-tenant-dependent, so their use requires ongoing monitoring and adjusting to account for changes in build tenants and their travel behavior. Ad-hoc project-by-project mitigation is less effective for reducing VMT than larger scale program-based approaches, such as an impact fee program.

Considerations

Develop a VMT mitigation program using any of the following approaches:

1. Impact fee program based on a VMT reduction nexus.
2. In-lieu fee program for VMT reducing actions.
3. VMT mitigation bank or exchange program.
4. TDM ordinance applying to all employers.

Specifications of C/CAG VMT Estimation Tool: VMT Reduction measures

The C/CAG VMT Estimation Tool will some or all of the following for a member agency's consideration:

- Tier 1: Project Characteristics
  - Increase Residential Density
  - Increase Development Density
  - Affordable Housing
  - Increase Employment Density
- Tier 2: Multimodal Infrastructure
  - Increase Bike Access
  - Improve Connectivity
  - Increase Transit Accessibility
  - Traffic Calming
  - Pedestrian Networks
- Tier 3: Parking
  - Limited Parking Supply
  - Provide Bike Facilities
- Tier 4: TDM Programs
  - School Pool Programs
  - Bike Share Programs
  - Car Share Programs
  - Commute Trip Reduction (CTR) Marketing and Education
  - Employee Parking Cash-Out
  - Subsidized Transit Program
  - Telecommuting and Alternative Work Schedules
  - Free Door-to-Door Transit Fleet
  - Price Workplace Parking
  - Alternative Transportation Benefits
  - Neighborhood Schools
  - Ride-Sharing Programs
  - Transit Service Expansion
  - Behavioral Intervention
  - Unbundled Parking Costs from Property Cost (On Site Parking
  - Vanpool Incentives
  - Voluntary Travel Behavior Change Program

Chapter 8. Implementation Actions for Lead Agencies

As stated above, the purpose of this white paper is to help C/CAG member agencies to meet the new requirements of CEQA under SB 743 by providing curated SB 743 implementation information that includes substantial evidence to support decisions for VMT metrics, VMT calculation methods, VMT impact thresholds, and VMT mitigation actions.

Each lead agency will consider the options in this white paper and based on its local context develop its own implementation approach. Below are four key steps each jurisdiction may take to implement SB 743.

1. Determine what values your community will use in setting VMT impact thresholds
2. Select VMT metrics and methods
3. Adopt significance thresholds for VMT impacts
4. Provide analysis guidance to project sponsors

Each of these steps may include both internal and external resources, and may involve jurisdiction staff, elected officials, and/or members of the public. The descriptions below summarize the most common approaches. The discussions below are high-level and illustrative only and do not constitute legal advice; jurisdictions should communicate and consult with legal counsel throughout the SB 743 implementation process. In addition, this document is intended for informational purposes and for use in setting local policy; C/CAG does not have specific guidance, recommendations, or mandates for thresholds set by individual jurisdictions.

Determine Basis for Setting VMT Impact Thresholds

A lead agency has discretion to set its significance threshold for VMT impacts, provided that the basis for that threshold is grounded in substantial evidence. In other CEQA categories, potential thresholds exist on a continuum. In some cases, a threshold represents a “bright line,” above which the scientific evidence indicates that there would be adverse effects on human health or the human or natural environment. An example of this sort of threshold can be found in Air Quality analysis: certain quantifiable levels of particulate matter emissions are generally established to be harmful to health and to constitute a significant impact.

An alternative to these bright line metrics is one that reflects community values. This sort of threshold relies on a local determination of how much VMT or what change in VMT is acceptable or unacceptable to the community. This is more like the prior use of LOS in CEQA analysis, where individual agencies could set standards for determining impacts at different levels. Different communities may perceive increased or decreased VMT in different ways, and the effects of the same amount of total VMT could affect a rural

community differently than an urban community. In this case, different VMT thresholds for each area may be appropriate.

To date, there is limited information on how state courts will interpret the basis for VMT impact thresholds, and how the court will interpret the need for evidence-based thresholds. Because there is limited case law for CEQA analysis of VMT, all lead agencies should consult legal counsel on establishing VMT thresholds. CEQA Statute & Guidelines suggest that thresholds should be based on facts and scientific evidence. One way to set an evidence-based VMT threshold is indirectly through other environmental sections such as air quality, GHG emissions and energy consumption. Because VMT affects each of these topic areas, and because statewide goals have been set by the Air Resource Board for VMT reduction, using such a threshold promotes internal consistency for CEQA documents. This is generally the approach presented in the OPR *Technical Advisory*.

If a lead agency wants to treat VMT similar to LOS and set a community-based threshold, they should consult with their legal counsel. Generally, this route would require the lead agency to demonstrate compliance with the CEQA statutory law, other legislative intents of CEQA, and state goals for GHG reduction, air quality conformity and energy consumption. The basic concept of using such a threshold would be that VMT is another mobility metric to measure the transportation network performance. In either case, the lead agency should consider the Caltrans *Draft Transportation Impact Study Guide* (February 2020), which by supporting the OPR *Technical Advisory* effectively sets a 'state VMT threshold' similar to existing state LOS thresholds. Should a jurisdiction choose to establish a local threshold lower than the 'state VMT threshold', they may need to present impact determinations for each.

In determining how to set a VMT threshold that reflects a jurisdiction's goals and values, lead agencies may wish to consider the following items:

- VMT budget expectations set in its General Plan and Climate Action Plan
- Relationship to statewide and regional GHG reduction goals
- Balancing needs for congestion management
- Supporting plans and policies to achieve the SB 743 legislative intent for infill development, promotion of active transportation and reduction in greenhouse gas emissions.
- Plans and policies supporting development near transit
- Any other policy goals related to VMT

Select VMT Metrics and Methods

As discussed in **Chapter 3** and **Chapter 4**, VMT metrics and methods should be discussed prior to adopting thresholds, to allow for an apples-to-apples comparison of project analysis to a baseline VMT level. For instance, agencies should determine which VMT metrics they will present, and how the baseline for those metrics will be calculated. Throughout this report, baseline and cumulative VMT figures reflect findings from the C/CAG-VTA travel forecasting model; however, other travel models are available for this purpose.

Some initial methods for VMT analysis should also be discussed at this time, largely as part of the travel model selection process. Key considerations may include whether the selected travel forecasting model accurately reflects both existing conditions in an agency's jurisdiction, as well as the potential changes from foreseeable upcoming projects. Lead agencies should be aware that regional models 'off the shelf' are often not sufficiently accurate or sensitive to local-scale applications such as individual land use project analysis. Calibration and validation of the model within the project study area are typically needed, including refinements and modifications to better represent the project and its effects.

Finally, under this action, lead agencies should consider how they wish to integrate the C/CAG VMT Estimation Tool into their analysis process.

Adopt Significance Thresholds for VMT Impacts

Once an agency has set its intent in terms of the basis for impacts (climate plan goals, statewide goals, community values, etc.) and also decided on its VMT metrics and methods, thresholds can be quantified. For instance, if a community has a Climate Action Plan goal to reduce total GHG emissions from transportation by an additional 25 percent by year 2040, this analysis could translate that target into a necessary reduction or VMT budget for new development.

This step will establish the substantial evidence for adoption of the final significance threshold. Agencies choosing to adopt either the OPR *Technical Advisory* guidance or modified reduction thresholds based on the CARB Scoping Plan can likely use the relevant reports as substantial evidence for their decision.

At this point, the community should also formally adopt VMT thresholds, through actions such as issuing guidance from the Planning Department, adopting a Council or Board resolution, or other similar measures. Until a general threshold has been adopted, individual projects will need to develop *ad hoc* VMT thresholds based on each project's unique characteristics and substantial evidence.

Provide Analysis Guidance to Project Sponsors

Some agencies may then choose to provide additional analysis guidance to project sponsors, to ensure that a VMT assessment for an environmental impact analysis is done consistently and completely for each project. This may take the form of a Transportation Impact Study (TIS) Guidelines document specific to the agency, memoranda or other documentation provided to sponsors, or TIS / EIR section templates. For instance, if an agency wishes for analysts to use the C/CAG VMT Estimation Tool for all projects below a certain size or in a certain area, that guidance could be documented at this point.

Appendix A: Summary Matrix of Decisions, Options, and Tool Specifications

Lead Agency Decisions	Common Options	Common Limitations	Considerations	Specifications of San Mateo County VMT Estimation Tool
What form of VMT metrics could be used?	1. Total Project Generated VMT 2. Total Project Generated VMT per Service Population[1] 3. Household generated VMT per Resident (requires an activity/tour-based travel forecasting model) 4. Home-Based VMT per Resident (a partial VMT estimate) 5. Home-Based Work VMT per Employee (a partial VMT estimate) 6. Project's Effect on VMT using Boundary VMT for a specific area	Metrics other than total project generated VMT and total project generated VMT per service population typically only represent partial VMT (i.e., some vehicle types and trip purposes are excluded in the models used to estimate VMT). This may be acceptable for screening purposes but not for a complete VMT impact analysis. Project-generated VMT metrics cannot capture how a project changes behavior of non-project residents or employees.	The expectations of a CEQA impact analysis to strive to provide a complete picture of the effects of a project on the environment are highlighted within the *CEQA Statute & Guidelines*. For lead agencies, VMT metrics and method should consider current practice for air quality, greenhouse gases, and energy consumption impact analysis. In general, VMT is used as an input for these other analyses and current practice is to produce VMT estimates and forecasts that comply with *CEQA Statute & Guidelines* expectations.	**VMT Metrics** The City/County Association of Governments (C/CAG) VMT Estimation Tool will include the following forms of VMT needed for screening and complete VMT analysis are available. 1. Total project generated VMT per service population 2. Home-based VMT per resident 3. Home-based work VMT per employee A more complete VMT analysis will likely require the C/CAG-VTA travel model.
What methods are available to use in estimating and forecasting VMT?	1. Caltrans Statewide Travel Demand Model 2. Metropolitan Transportation Commission (MTC) Regional Travel Forecasting Model 3. C/CAG-VTA Travel Forecasting Model 4. Non-model "Accounting Methods" such as sketch planning tool or spreadsheet[2]	Statewide and regional models have limited sensitivity and accuracy for local scale applications off the shelf. Regional and local models often truncate trips at model boundaries. Sketch and spreadsheet tools do not capture the 'project effect on VMT'.	Selection of an appropriate travel forecasting approach is an important step because the tool used to develop VMT thresholds must also be used to evaluate a project's direct and cumulative VMT impacts. Regional or local models should be calibrated and validated for local project-scale sensitivity/accuracy (including appending trip length data for trips with external trip ends) before using these models to analyze both 'project generated VMT' and 'project effect on VMT'.	**VMT Methods** Use the C/CAG-VTA travel forecasting model to estimate baseline and cumulative VMT estimates used in the C/CAG VMT Estimation Tool. Should a jurisdiction have its own travel model, the baseline and cumulative VMT estimates could be added to the tool as an alternate data source.

[1] Service population includes population plus employment and may include students or visitors; it is intended to include all independent variables used in estimating trips.
[2] Sketch planning tool or spreadsheet method has limitations if using a citywide or regional average for a threshold.

Lead Agency Decisions	Common Options	Common Limitations	Considerations	Specifications of San Mateo County VMT Estimation Tool
Is use of VMT impact screening desired?[3]	Projects that reduce VMT or are located within transit priority areas (TPAs) should be presumed to have a less than significant impact on VMT. Additional screening options identified in the OPR *Technical Advisory* for: 1. Map based screening for residential and office projects 2. Local-Serving Retail Projects 3. Transportation projects that do not add vehicle capacity 4. Projects that would not result in a net increase of VMT 5. Affordable housing projects 6. Small projects	Screening does not provide information about the actual VMT changes associated with the project.	Screening most appropriate if consistent with applicable general plan and supported by substantial evidence.	**VMT Land Use Project Screening** The C/CAG VMT Estimation Tool will provide for: • Low VMT generation screening of small- to medium-size office, residential and industrial projects. • A Metropolitan Transportation Commission (MTC) transit priority areas (TPAs) screen layer from 2017. This is a 1/2-mile buffer around existing major transit corridor (along El Camino Real and the 120 and 130 bus stops) or a major transit stop** (i.e., along Caltrain, BART and the South San Francisco ferry terminal). • A local screening criteria (to provide a jurisdiction the option to use its own screening criteria.) ***"Major transit stop" is defined in Public Resources Code 21064.3 as a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.*
What is the VMT impact significance threshold for land use projects and land use plans under baseline conditions?	1. Lead agency discretion consistent with general plan and expectations for 'project scale' VMT reductions not accounted for in general plan EIR and supported by substantial evidence. 2. OPR 15% below baseline average a city or region (light-duty vehicles only)[4] 3. CARB 14.3% below baseline (2018) average of jurisdiction (all vehicles) 4. CARB 16.8% below baseline (2018) average of jurisdiction (light-duty vehicles only) 5. Pending Caltrans-recommended threshold (net zero VMT)[5]	Difficult for lead agencies to determine what level of VMT change is unacceptable when viewed solely through a transportation lens. Uncertainty of VMT trends contributes to difficulty in setting thresholds. Connecting a VMT reduction expectation to baseline helps to reduce uncertainty associated with future conditions.	Since VMT is already used in air quality, GHG, and energy impact analysis, lead agencies should review thresholds for those sections to help inform new thresholds exclusively for transportation purposes. Lead agencies should carefully consider how they value state goals for VMT/GHG reduction in light of other general plan and community objectives. Translating state goals into VMT thresholds should consider substantial evidence such as California Air Resources Board 2017 Scoping Plan - Identified VMT Reductions and Relationships to State Climate Goals, January 2019, CARB. Absent development of a specific VMT threshold, lead agencies may rely on those of other state agencies. The CARB thresholds are supported by substantial evidence related to state air quality and GHG goals, but do not consider recent VMT trends or the potential influence of emerging mobility options such as autonomous vehicles (AVs).	**VMT Significance Threshold for Land Use Projects: Baseline Conditions** Member Agencies will be able to specify their threshold options for each applicable VMT metric. Common threshold options are represented in a percent reduction from baseline year, and include: • -0% • -14.3% • -15% • -16.8% • -25%. These percent reductions could be applied to the town/city, county and regional VMT metrics. A user will have the option to select baseline year to establish threshold.

[3] CEQA Guidelines Section 15064.3 states that projects that would reduce VMT or are located in a TPA should be presumed to have a less than significant impact on VMT. The OPR Technical Advisory contains other potential screening options.
[4] The OPR and CARB thresholds do not consider the long-term influence of TNCs, internet shopping, new mobility options, or autonomous vehicles.
[5] Caltrans has released draft Interim Guidance on "*Determining CEQA Significance for GHG Emissions for Projects on the State Highway System*" that recommends that any increase in GHG emissions would constitute a significant impact. This has been referred to as the "Net Zero VMT threshold". Caltrans has thus far signaled that this threshold would be applied only to transportation projects.

Lead Agency Decisions	Common Options	Common Limitations	Considerations	Specifications of San Mateo County VMT Estimation Tool
What is the VMT impact significance threshold for land use projects and land use plans under cumulative conditions?	1. Use a regional travel model to analyze the 'project's effect on VMT' based on RTP/SCS (i.e., Plan Bay Area) consistency (projects should not increase the regional total project generated VMT or total boundary VMT forecast used to support the RTP/SCS air quality conformity and SB 375 GHG targets). 2. A lead agency can use the project analysis above if based on an efficiency metric form of VMT and evidence exists to demonstrate that cumulative trends in VMT rates are declining. 3. Establish a VMT reduction threshold for cumulative conditions consistent with long-term air pollution and GHG reduction expectations.	Uncertainty of VMT trends makes a cumulative impact finding less certain. Ability for a lead agency to identify the project's effect on land supply and corresponding VMT. Land use projects change land supply and the allocation of future population and employment growth. As such cumulative analysis should maintain the same control totals of regional population and employment growth. Requires knowledge of the forecasting tools available to test the project's effect on land supply and VMT.	Analyze the project's effect on land supply and VMT using an appropriate valid model. For impact findings, consider all available substantial evidence including 2018 Progress Report, California's Sustainable Communities and Climate Protection Act, November 2018, CARB and current research on the long-term effects of transportation network companies (TNCs), new mobility options, and autonomous vehicles (AVs). Specific research examples include Fehr & Peers AV effect model testing.	**VMT Significance Threshold for Land Use Projects: Cumulative Conditions** The C/CAG VMT Estimation Tool is a baseline VMT screening tool each jurisdiction will need to complete its own cumulative VMT analysis using the forthcoming cumulative VMT data and other available resources.
What is the VMT impact significance threshold for transportation projects under baseline and cumulative conditions?	Lead agencies have discretion to choose their own metrics and thresholds for transportation project impact analysis. If VMT is selected, OPR recommends treating projects that reduce, or have no impact on, VMT to be presumed to have a less than significant impact.	Continued use of LOS is uncertain because of *CEQA Guidelines* Section 15064.3(b)(2) and 15064.7(d)(2). Transit, especially on-demand transit service, can generate new VMT, which should be considered as part of impact conclusions.	Consult CEQA legal advice about whether lead agency discretion allows continued use of LOS and whether VMT is required. VMT is required as an input to air quality, GHG, and energy impact analysis and should include induced vehicle travel effects.	**VMT Significance Threshold for Transportation Projects: Baseline Conditions** Not a feature of the C/CAG VMT Estimation Tool.

Lead Agency Decisions	Common Options	Common Limitations	Considerations	Specifications of San Mateo County VMT Estimation Tool

What VMT reduction mitigation strategies are feasible?	Menu of built environment and transportation demand management (TDM) mitigation strategies contained in Quantifying Greenhouse Gas Mitigation Strategies, CAPCOA, 2010.	Built environment strategies require modifying the project, which may create inconsistencies with the project description and financial feasibility. TDM strategies are often building tenant dependent so their use requires on-going monitoring and adjusting to account for changes in build tenants and their travel behavior.
		
		Ad-hoc project-by-project mitigation is less effective for reducing VMT than larger scale program-based approaches such as an impact fee program.
			Develop a VMT mitigation program using any of the following approaches.
			1. Impact fee program based on a VMT reduction nexus.
			2. In-lieu fee program for VMT reducing actions.
			3. VMT mitigation bank or exchange program.
			4. TDM ordinance applying to all employers.
				VMT Impact Mitigation Strategies
				
				The C/CAG VMT Estimation Tool will include some or all of the following for a member agency's consideration:
				• Tier 1: Project Characteristics
				  ○ Increase Residential Density
				  ○ Increase Development Density
				  ○ Affordable Housing
				  ○ Increase Employment Density
				• Tier 2: Multimodal Infrastructure
				  ○ Increase Bike Access
				  ○ Improve Connectivity
				  ○ Increase Transit Accessibility
				  ○ Traffic Calming
				  ○ Pedestrian Networks
				• Tier 3: Parking
				  ○ Limited Parking Supply
				  ○ Provide Bike Facilities
				• Tier 4: TDM Programs
				  ○ School Pool Programs
				  ○ Bike Share Programs
				  ○ Car Share Programs
				  ○ Commute Trip Reduction (CTR) Marketing and Education
				  ○ Employee Parking Cash-Out
				  ○ Subsidized Transit Program
				  ○ Telecommuting and Alternative Work Schedules
				  ○ Free Door-to-Door Transit Fleet
				  ○ Price Workplace Parking
				  ○ Alternative Transportation Benefits
				  ○ Neighborhood Schools
				  ○ Ride-Sharing Programs
				  ○ Transit Service Expansion
				  ○ Behavioral Intervention
				  ○ Unbundled Parking Costs from Property Cost (On Site Parking)
				  ○ Vanpool Incentives
				  ○ Voluntary Travel Behavior Change Program

Appendix B: VMT Threshold Examples

Adopted VMT Thresholds (as of March 2020)

Jurisdiction	Threshold	LOS Maintained?
City/County of San Francisco	Residential: 15% below regional VMT per capita Office: 15% below regional VMT per employee Retail: 15% below regional VMT per retail employee Mixed-Use: Evaluate each land use independently	No
City of Oakland	Residential: 15% below regional VMT per capita Office: 15% below regional VMT per employee Retail: 15% below regional VMT per retail employee	Yes
City of Elk Grove	All Land Use Types: 15% below city's 2015 baseline VMT of similar land uses	Yes
City of Los Angeles	Project VMT should be 15% below the existing average VMT in the relevant Planning Area. Existing VMT threshold ranges from 6.0 to 9.4 VMT per capita, and from 7.6 to 15.0 VMT threshold per employee, depending on the Planning Area.	Yes
City of San Jose	Residential: More stringent of: 1) 15% below citywide VMT per resident or 2) 15% below regional VMT per resident General Employment: 15% below existing regional VMT per employee Industrial Employment Uses: No higher than existing regional VMT per employee Retail Uses: Net increase in the total regional VMT Mixed-Use: Each land use component to be analyzed independently	Yes
City of Woodland	10% reduction in VMT per capita or VMT per service population compared to the General Plan 2035 VMT performance, or a 10% reduction compared to similar land uses	Yes
CSU System: All 23 Campuses	15% below regionwide average VMT	No
San Bernardino County	4% below existing average VMT per service population in unincorporated county (based on maximum achievable TDM reduction)	Yes

Sample of VMT Threshold Options Currently Under Consideration (as of March 2020)

Jurisdiction	Potential Threshold
Santa Barbara County	Option 1: Daily VMT is no higher than the baseline regional average VMT Option 2: Daily VMT is at least 16.8% below baseline conditions (refers to CARB target)
City of South San Francisco	15% below regional VMT per capita
City of San Bruno	14.3% below existing VMT per service population (based on CARB assessment)
Nevada County	Option 1: Total weekday VMT per service population is less than or equal to the baseline subarea average Option 2: Consistent with the jurisdiction's general plan and the Nevada County Regional Transportation Plan

Appendix C: Comparison of Available Travel Forecasting Models

FEHR PEERS

Appendix C – Travel Model Comparison

Date: April 24, 2020

To: Jeff Lacap, C/CAG

From: Teresa Whinery and Daniel Rubins, Fehr & Peers

Subject: Comparison of Available Travel Forecasting Models for Jurisdictions in San Mateo County

SJ19-1990

This memorandum discusses the features of two regional travel forecasting models that include San Mateo County. The first of these travel models, the Metropolitan Transportation Commission (MTC) Travel Model One ("MTC travel model"), is maintained primarily to comply with federal and state laws related to preparing regional transportation plans (RTPs), air quality conformity, and greenhouse gas (GHG) analysis for sustainable communities strategies (SCS). The second, the City/County Association of Governments of San Mateo County (C/CAG)-Santa Clara Valley Transportation Authority (VTA) Bi-County Model ("C/CAG-VTA travel forecasting model"), is maintained by the VTA on behalf of C/CAG, and is designed for transportation planning specifically in the Silicon Valley and San Francisco Peninsula areas.

Both models named above cover the entire nine-county Bay Area region. The C/CAG-VTA travel forecasting model also includes additional travel data pertaining to trips between the Bay Area and the Association of Monterey Bay Area Governments (AMBAG) region.

The MTC travel model is an activity-based (or tour-based) model, meaning it can track VMT separately for different categories of people (residents, workers, students). Our investigations and applications of the MTC travel model have revealed the use of input parameters that are not reasonably foreseeable, such as land use growth allocations inconsistent with local general plans, substantial increases in telecommuting or other TDM strategies, and implementation of travel pricing.

The C/CAG-VTA travel forecasting model includes a more detailed representation of the San Mateo County transportation network and land use patterns, and is the model that has traditionally been used for most project-specific applications in San Mateo County jurisdictions. However, the C/CAG-VTA travel forecasting model is a trip-based model, which means it is difficult to measure the VMT generated by residents and workers if those trips are not either home-based or home-based work.

Additional detail is summarized below for the MTC and C/CAG-VTA travel forecasting models based on Association of Bay Area Government (ABAG) 2017 land use projections (Plan Bay Area 2040 land use projections) and future regional transportation infrastructure consistent with *Plan Bay Area 2040* (July 2017). In addition, the end of this memorandum includes the following list of figures showing the comparison between the MTC and C/CAG-VTA travel forecasting models.

- Figure C-1: MTC Travel Forecasting Model Transportation Analysis Zone Coverage
- Figure C-2: C/CAG-VTA Travel Forecasting Model Transportation Analysis Zone Coverage
- Figure C-3: MTC Travel Forecasting Model Transportation Analysis Zones in San Mateo County
- Figure C-4: C/CAG-VTA Travel Forecasting Model Transportation Analysis Zones in San Mateo County
- Figure C-5: MTC Travel Forecasting Model Roadway Network in San Mateo County
- Figure C-6: C/CAG-VTA Travel Forecasting Model Roadway Network in San Mateo County

Once a model is selected, the travel forecasting model should be checked to confirm that it is regularly calibrated and validated, that it is reasonably sensitive to future changes that can affect VMT, and whether it has any geographic limitations (such as truncating trips at a jurisdictional boundary) that would need to be compensated for when using it to produce VMT forecasts.

Travel Analysis Zones

Land use and socioeconomic data are represented in models by Travel Analysis Zones, or TAZs. A comparison of various TAZ elements between the MTC and C/CAG-VTA travel forecasting models is provided in **Table 1**. In summary, the C/CAG-VTA travel forecasting model TAZ system has a higher resolution than the MTC travel model, in addition to more precise alignment with freeways, as well as city/town and natural boundaries. The MTC model TAZ system is less refined within San Mateo County, which could result in a higher percentage of internalized trips and a more incomplete accounting of VMT generated by projects in San Mateo County jurisdictions.

Table 1: Travel Analysis Zones (TAZ) Network Comparison

Criteria	MTC Travel Forecasting Model	C/CAG-VTA Travel Forecasting Model
Model Coverage	Nine-county Bay Area.	Nine-county Bay Area, AMBAG (3 counties), and portions of Central Valley.
San Mateo County	Coarse TAZ system, roughly matching Census Tract geography.	Smaller TAZ system than the MTC travel model, allowing for more land use detail in San Mateo County and Santa Clara County.
Alignment	Boundaries are generally aligned with natural and freeway boundaries, but does not match boundaries for all communities due to larger size of zones.	Boundaries are more precisely aligned to natural and manmade boundaries (e.g. city boundaries, freeways, main thoroughfares, etc.).
Land Use Input Type	Model utilizes separate year-specific land use input files for each scenario that include year-specific socio-economic data.	Model utilizes separate year-specific land use input files for each scenario that include year-specific socio-economic data.
Summary	The MTC travel model TAZ system is less refined within San Mateo County and significantly less refined within the unincorporated portions of the county, which could result in a higher percentage of internalized trips and a more incomplete accounting of localized VMT generated by projects in San Mateo County jurisdictions.	The C/CAG-VTA travel forecasting model TAZ system has a higher resolution, as well as more precise alignment with freeways and city/natural boundaries; may result in more complete VMT estimates. Coastal areas and rural areas (such as the foothills) have a coarser level of detail, but still more detail than the MTC travel model.

Source: MTC and C/CAG-VTA travel forecasting models, Fehr & Peers, 2020.

Highway Network

The highway networks between the MTC and C/CAG-VTA travel forecasting models were compared, as summarized in **Table 2**. Based on our review, the C/CAG-VTA travel forecasting model network is more detailed than the MTC travel model network, although both have a very coarse level of roadway representation for local roads in areas west of CA-85.

Table 2: Highway Network Comparison

Criteria	MTC Travel Forecasting Model	C/CAG-VTA Travel Forecasting Model
Level of Detail	Low-Medium: Network only includes major collectors and above streets.	Medium-High: Network includes some local streets and minor collectors, although level of detail varies throughout the County
Centroid Connectors	Collectors and residential streets are generally represented by centroid connectors.	Residential streets are generally represented by centroid connectors.
Attributes	Link: List of attributes include distance, number of lanes, improvement years, area type, facility type, free flow speed, travel time, capacity, etc. Speed/Capacity: Uses speed/capacity look-up table (limited capacity to modify link speed/capacity). Node: Nodes do not have detailed attributes.	Link: Similar to MTC travel model. Speed/Capacity: Similar to MTC travel model. Node: Similar to MTC travel model.
Network Type	Model utilizes separate year-specific highway network input files for each scenario.	Similar to MTC travel model
Non-Auto Modes	Non-motorized skims and transit accessibility.	Non-motorized skims and transit accessibility.
Summary	The network has a reasonable amount of detail but not a sufficient amount to assess VMT on a scale useful for most local jurisdictions	Model contains more detailed roadway networks in both San Mateo and Santa Clara counties. The network has more detail than the MTC travel model and the ability to estimate VMT to the minor arterial/collector level. Accuracy in coastal communities may still be less than ideal.

Source: MTC and C/CAG-VTA travel forecasting models, Fehr & Peers, 2020.

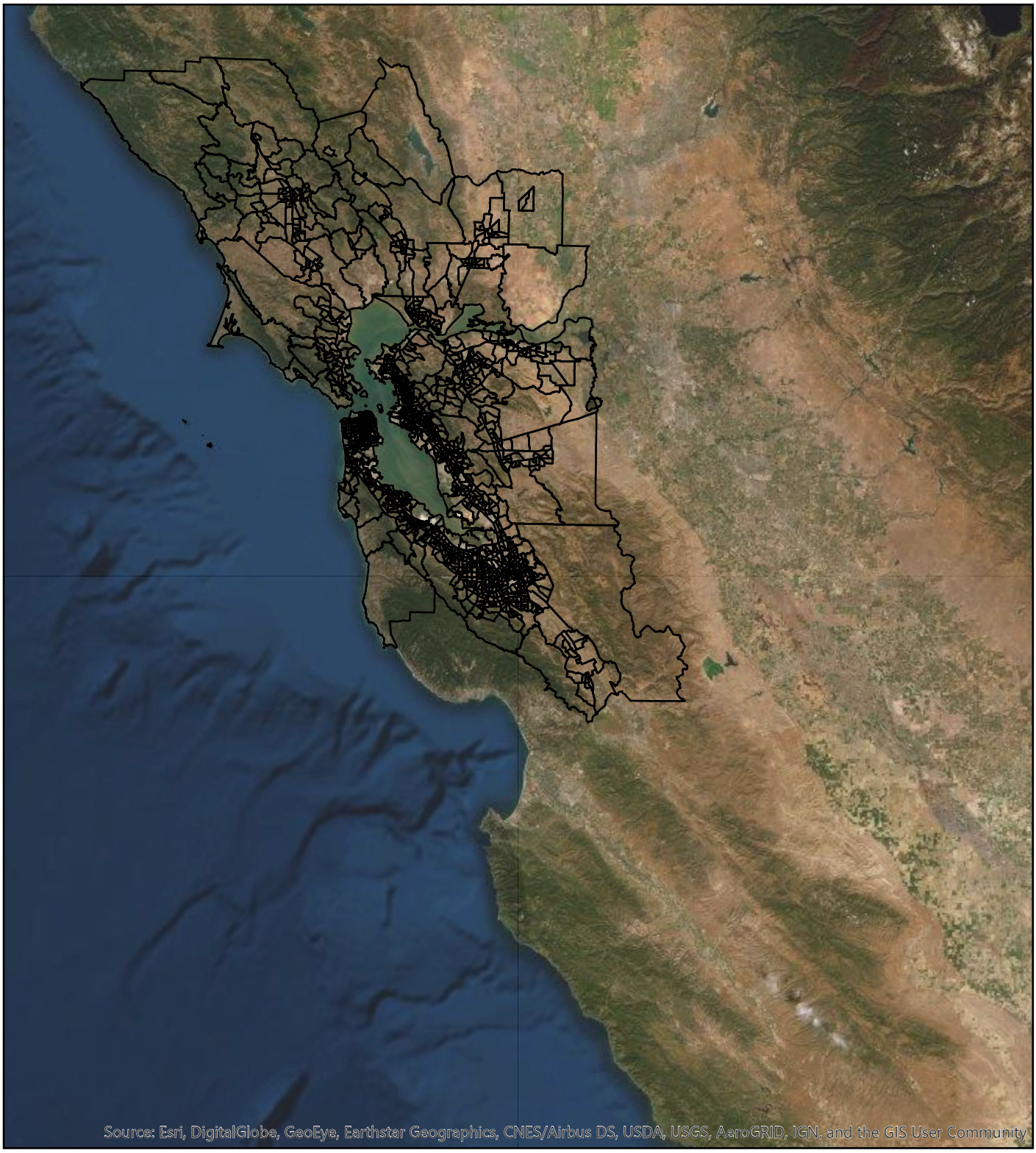
Model Methods

Table 3 provides a comparison of various model parameters, including run time, software requirement, and ease of use. In summary, the C/CAG-VTA travel forecasting model can be run in 8-12 hours on most computers by most consultants. However, because it is a trip-based model, it is difficult to measure VMT generated by residents and workers that is not home-based or work-based. The MTC travel model takes a minimum of 24 hours and can only be run on a server-based computer by a small handful of consultants; it is an activity-based model and can measure VMT generated by residents and workers separately, inclusive of all daily travel activity.

Table 3: Model Process Comparison

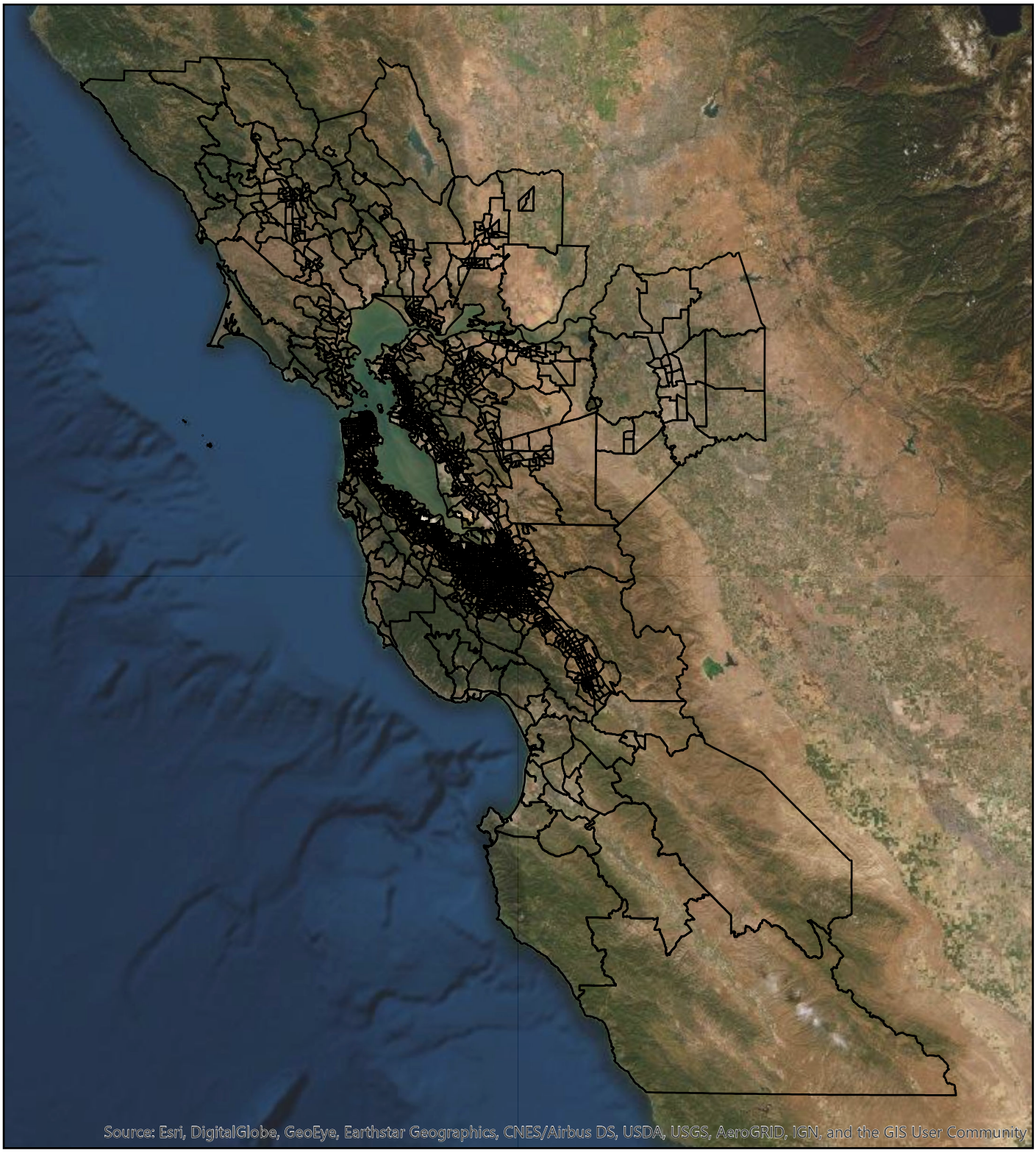
Criteria	MTC Travel Forecasting Model	C/CAG-VTA Travel Forecasting Model
Runtime	Base year model runtime of roughly 24 hours on a server-based computer with 32 computing cores and 128 GB of RAM.	Base year model runtime of roughly 8 to 12 hours on virtually any desktop machine.
Type	4-step model Activity-based model: socio-economic-based trip generation at the person-level that maintains a linkage of trips throughout the day to ensure modal consistency, making it capable of measuring VMT generated by residents and workers separately, as well as a total measure of VMT generation.	4-step model Trip-based model: socio-economic-based trip generation that gets generalized and aggregated into unlinked trips at the TAZ-level, making it difficult to measure VMT generated by residents and workers separately but fully capable of providing a total measure of VMT generation.
Model Software Platform	Citilabs – Cube/Voyager	Citilabs – Cube/Voyager
Other Required Software	Java R Python Windows Server	None
Use	Few consultants and no municipal agencies will have access to a server-based multi-core platform and the Java expertise required to run the model, limiting the pool of potential users of the model. There is not a fee to use the MTC travel model, but specialized software and knowledge is needed to run it properly.	C/CAG-VTA staff has access to edit the model, and both C/CAG and VTA member agencies use the model based on the terms of a model use agreement (a fee is charged to member agencies to acquire the travel model). Non-member agencies, consultants, and developers have limited access to the travel model.
Base Year	2015	2015
Forecast Years	2020 2030 2035 2040	2025 (an intermediate scenario) 2040
Summary	The MTC travel model can only be run on a server-based computer by a small handful of consultants and is capable of measuring VMT generated by residents and workers separately.	The C/CAG-VTA travel forecasting model can be run in 8 to 12 hours on virtually any desktop machine by most agency staff or consultants; a trip-based model type makes it difficult to measure VMT generated by residents and workers that is not home-based or work-based.

Source: MTC and C/CAG-VTA travel forecasting models, Fehr & Peers, 2020.



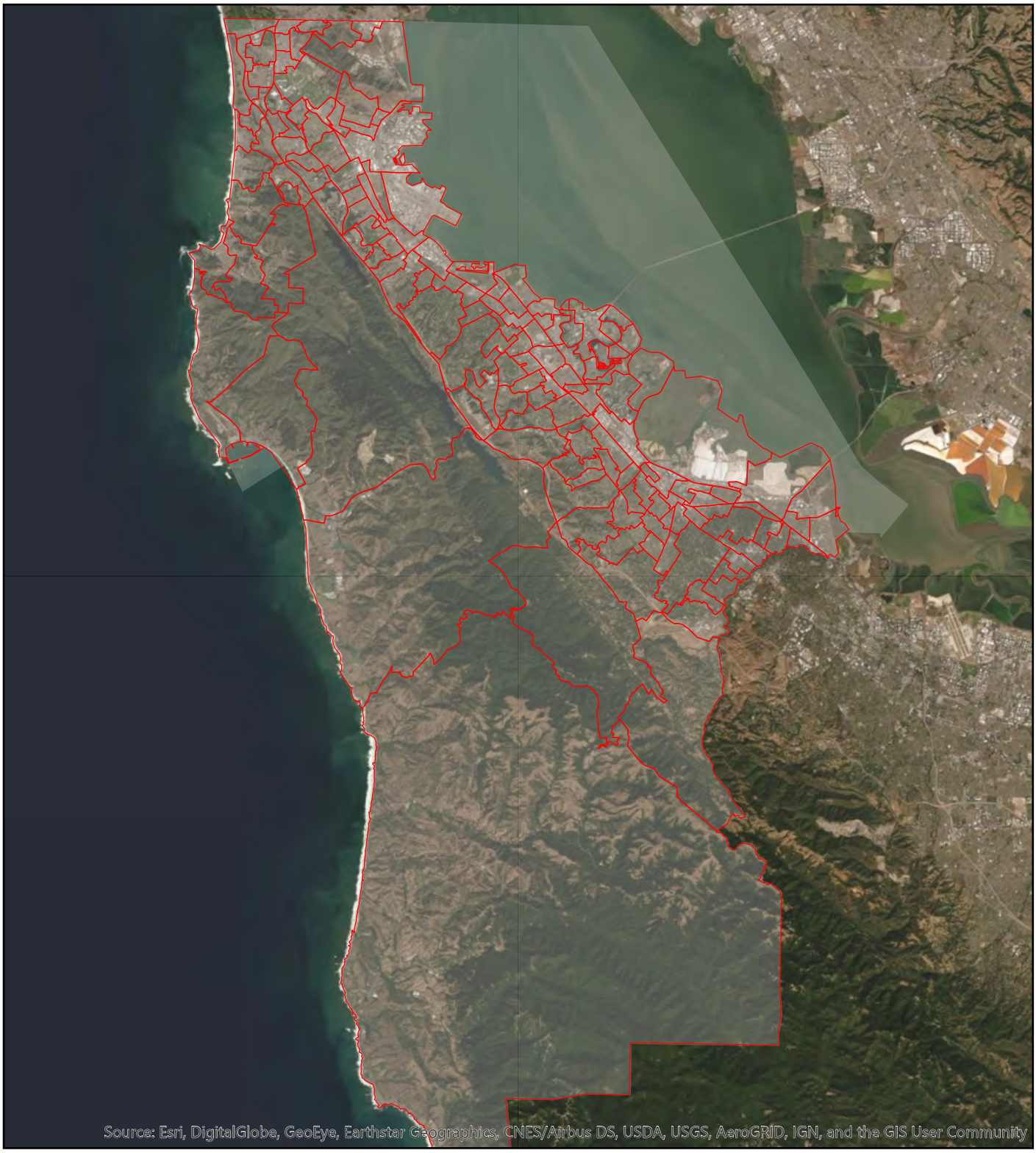
MTC Travel Forecasting Model Transportation Analysis Zones (TAZs)

Figure C-1: MTC Travel Forecasting Model Transportation Analysis Zone Coverage



VTA Travel Forecasting Model Transportation Analysis Zones (TAZs)

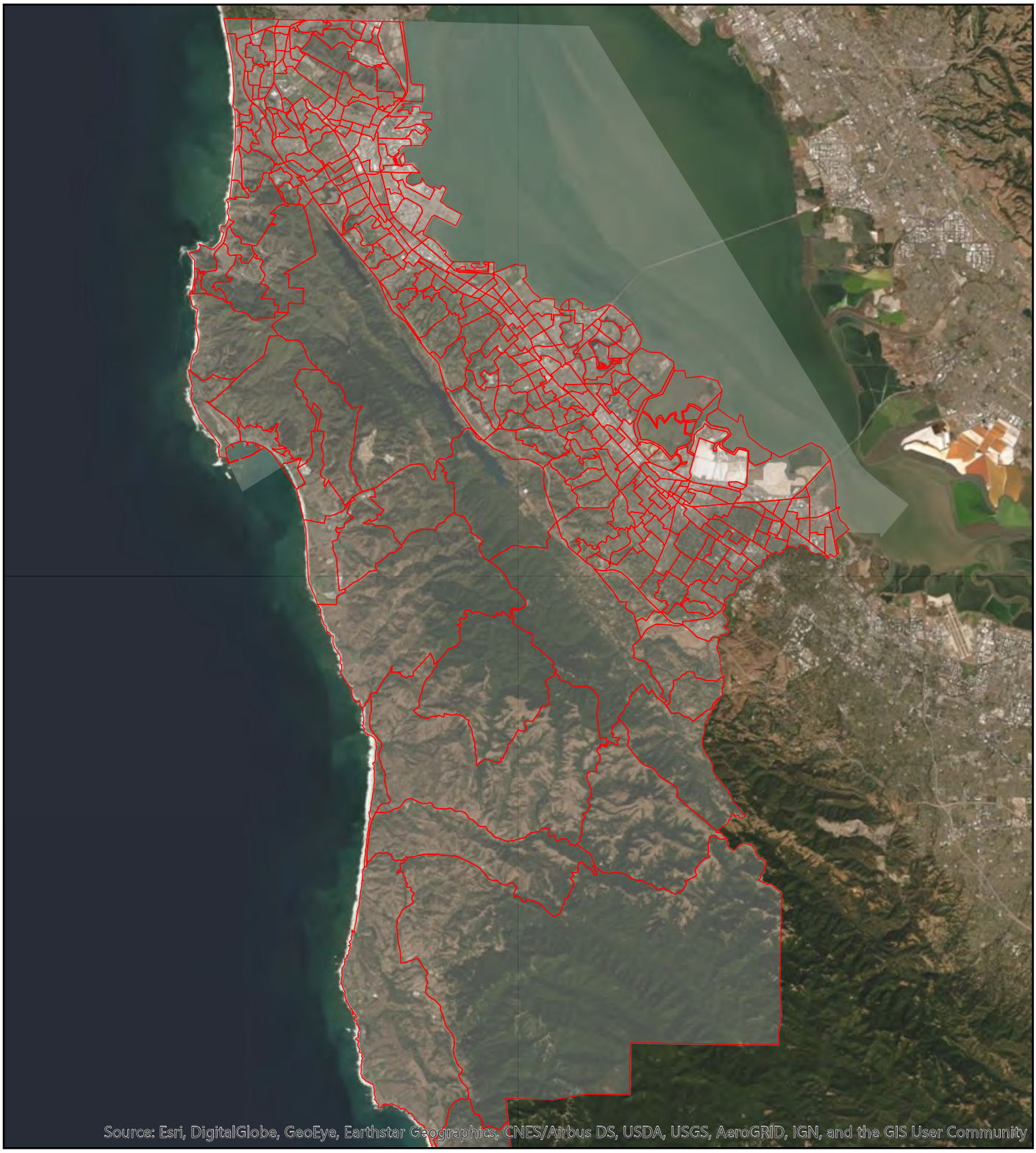
Figure C-2: C/CAG-VTA Travel Forecasting Model Transportation Analysis Zone Coverage



San Mateo County Boundary

MTC Travel Forecasting Model Transportation Analysis Zones San Mateo Boundary

Figure C-3: MTC Travel Forecasting Model Transportation Analysis Zones in San Mateo County



San Mateo County Boundary

VTA Travel Forecasting Model Transportation Analysis Zones San Mateo Boundary

Figure C-4: C/CAG-VTA Travel Forecasting Model Transportation Analysis Zones in San Mateo County

MTC Model Roadway Network

San Mateo County Boundary

Figure C-5: MTC Travel Forecasting Model Roadway Network in San Mateo County

VTA Model Roadway Network

San Mateo County Boundary

Figure C-6: C/CAG-VTA Travel Forecasting Model Roadway Network in San Mateo County

Appendix D: Additional VMT Thresholds Background and Options Discussion

FEHR PEERS

Appendix D – VMT Thresholds

Date: April 24, 2020

To: Jeff Lacap, C/CAG

From: Daniel Rubins and Teresa Whinery, Fehr & Peers

Subject: Additional Background on VMT Thresholds

SJ19-1990

The purpose of this memorandum is to provide additional background on CEQA thresholds to comply with new California Environmental Quality Act (CEQA) requirements under Senate Bill (SB) 743. The options are focused on land use plans and land use projects, which will be required to be analyzed using VMT as of July 1, 2020. For transportation projects, the jurisdictions in San Mateo County have the discretion to select its own VMT metrics and thresholds, and no change to current practice may be necessary; however, lead agencies should carefully review the latest CEQA Guidelines changes related to Sections 15064, 15064.3, and 15064.7. Changes to these sections affect the selection of significance thresholds and may influence future CEQA expectations, even for transportation projects.

VMT Thresholds

Background on CEQA Thresholds

Establishing CEQA thresholds for VMT requires complying with the statutory language added by SB 743, as well as guidance contained in CEQA Guidelines Sections 15064, 15064.3, and 15064.7. The excerpts below highlight the amendments to the two CEQA Guidelines Sections that were certified by the California Natural Resources Agency and the Office of Administrative Law at the end of 2018.

§ 15064. Determining the Significance of the Environmental Effects Caused by a Project.

(a) Determining whether a project may have a significant effect plays a critical role in the CEQA process.

(1) If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, the agency shall prepare a draft EIR.

(2) When a final EIR identifies one or more significant effects, the lead agency and each responsible agency shall make a finding under Section 15091 for each significant effect and may need to make a statement of overriding considerations under Section 15093 for the project.

(b) **(1)** The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data. An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting. For example, an activity which may not be significant in an urban area may be significant in a rural area.

(2) Thresholds of significance, as defined in Section 15064.7(a), may assist lead agencies in determining whether a project may cause a significant impact. When using a threshold, the lead agency should briefly explain how compliance with the threshold means that the project's impacts are less than significant. Compliance with the threshold does not relieve a lead agency of the obligation to consider substantial evidence indicating that the project's environmental effects may still be significant.

Source: *Final Adopted Text for the 2018 Amendments and Additions to the State CEQA Guidelines.* California Natural Resources Agency (p. 8), https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/2018_CEQA_FINAL_TEXT_122818.pdf

New Section 15064.3. Determining the Significance of Transportation Impacts.

(a) Purpose.

This section describes specific considerations for evaluating a project's transportation impacts. Generally, vehicle miles traveled is the most appropriate measure of transportation impacts. For the purposes of this section, "vehicle miles traveled" refers to the amount and distance of automobile travel attributable to a project. Other relevant considerations may include the effects of the project on transit and non-motorized travel. Except as provided in subdivision (b)(2) below (regarding roadway capacity), a project's effect on automobile delay shall not constitute a significant environmental impact.

(b) Criteria for Analyzing Transportation Impacts.

(1) Land Use Projects. Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.

(2) Transportation Projects. Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, such as in a regional transportation plan EIR, a lead agency may tier from that analysis as provided in Section 15152 .

(3) Qualitative Analysis. If existing models or methods are not available to estimate the vehicle miles traveled for the particular project being considered, a lead agency may analyze the project's vehicle miles traveled qualitatively. Such a qualitative analysis would evaluate factors such as the availability of transit, proximity to other destinations, etc. For many projects, a qualitative analysis of construction traffic may be appropriate.

(4) Methodology. 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. A lead agency may use models to estimate a project's vehicle miles traveled, and may revise those estimates to reflect professional judgment based on substantial evidence. Any assumptions used to estimate vehicle miles traveled and any revisions to model outputs should be documented and explained in the environmental document prepared for the project. The standard of adequacy in Section 15151 shall apply to the analysis described in this section.

(c) Applicability.

The provisions of this section shall apply prospectively as described in section 15007. A lead agency may elect to be governed by the provisions of this section immediately. Beginning on July 1, 2020, the provisions of this section shall apply statewide.

Note: Authority cited: Sections 21083 and 21099, Public Resources Code. Reference: Sections 21099 and 21100, Public Resources Code; *Cleveland National Forest Foundation v. San Diego Association of Governments* (2017) 17 Cal.App.5th 413; *Ukiah Citizens for Safety First v. City of Ukiah* (2016) 248 Cal.App.4th 256; *California Clean Energy Committee v. City of Woodland* (2014) 225 Cal. App. 4th 173.

Source: *Final Adopted Text for the 2018 Amendments and Additions to the State CEQA Guidelines.* California Natural Resources Agency (p. 11-13), https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/2018_CEQA_FINAL_TEXT_122818.pdf.

§ 15064.7. Thresholds of Significance.

(a) ~~**Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects**~~**.** A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.

(b) **Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects.** Thresholds of significance to be adopted for general use as part of the lead agency's environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence. **Lead agencies may also use thresholds on a case-by-case basis as provided in Section 15064(b)(2).**

(c) When adopting **or using** thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.

(d) Using environmental standards as thresholds of significance promotes consistency in significance determinations and integrates environmental review with other environmental program planning and regulation. Any public agency may adopt or use an environmental standard as a threshold of significance. In adopting or using an environmental standard as a threshold of significance, a public agency shall explain how the particular requirements of that environmental standard reduce project impacts, including cumulative impacts, to a level that is less than significant, and why the environmental standard is relevant to the analysis of the project under consideration. For the purposes of this subdivision, an "environmental standard" is a rule of general application that is adopted by a public agency through a public review process and that is all of the following:

(1) a quantitative, qualitative or performance requirement found in an ordinance, resolution, rule, regulation, order, plan or other environmental requirement;

(2) adopted for the purpose of environmental protection;

(3) addresses the environmental effect caused by the project; and,

(4) applies to the project under review.

Source: *Final Adopted Text for the 2018 Amendments and Additions to the State CEQA Guidelines*. California Natural Resources Agency (p. 14-15), https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/2018_CEQA_FINAL_TEXT_122818.pdf.

As noted in the CEQA sections above, lead agencies have the discretion to select thresholds on a case-by-case basis or develop and publish thresholds for general use. The remainder of this memo focuses on guidance related to adopting thresholds for general use.

When developing and adopting new thresholds, the CEQA Guidelines are clear that thresholds must be supported by substantial evidence. For SB 743, the specific metric of focus is the change a project will cause in VMT, which is an indirect measure of greenhouse gas emissions and air pollution. Since VMT is already used in the analysis of air quality, energy, and GHG impacts as part of CEQA compliance, the challenge for lead agencies is to answer the question, "What type or amount of change in VMT constitutes a significant impact for transportation purposes?" CEQA Guidelines Section 15064(b)(1) allows lead agencies the discretion to select their own thresholds and allow for differences in thresholds based on context such as urban versus rural areas.

OPR VMT Threshold Recommendations for Land Use Projects

SB 743 includes the following legislative intent statements, which were used to help guide OPR's VMT threshold recommendations.

- *New methodologies under the California Environmental Quality Act are needed for evaluating transportation impacts that are better able to promote the state's goals of reducing greenhouse gas emissions and traffic-related air pollution, promoting the development of a multimodal transportation system, and providing clean, efficient access to destinations.*
- *More appropriately balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of greenhouse gas emissions.*

To support these legislative intent statements, threshold recommendations are found in Section 15064.3 of the 2018 CEQA Guidelines amendments and the *Technical Advisory on Evaluating Transportation Impacts in CEQA,* California Governor's Office of Planning and Research (OPR) (December 2018). Specific excerpts and threshold highlights are provided below.

> <u>CEQA Guidelines Section 15064.3</u>
>
> *(b) Criteria for Analyzing Transportation Impacts.*
>
> *(1) Land Use Projects. Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.*

> *(2) Transportation Projects. Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, such as in a regional transportation plan EIR, a lead agency may tier from that analysis as provided in Section 15152.*
>
> *Technical Advisory on Evaluating Transportation Impacts in CEQA* (page 10)
>
> *Based on OPR's extensive review of the applicable research, and in light of an assessment by the California Air Resources Board quantifying the need for VMT reduction in order to meet the State's long-term climate goals, OPR recommends that a per capita or per employee VMT that is fifteen percent below that of existing development may be a reasonable threshold.*
>
> *Technical Advisory on Evaluating Transportation Impacts in CEQA* – Rural Projects Outside of Metropolitan Planning Organizations (MPOs) (page 19)
>
> *In rural areas of non-MPO counties (i.e., areas not near established or incorporated cities or towns), fewer options may be available for reducing VMT, and significance thresholds may be best determined on a case-by-case basis. Note, however, that clustered small towns and small town main streets may have substantial VMT benefits compared to isolated rural development, similar to the transit oriented development described above.*

The recognition that rural areas are different is consistent with the flexibility provided by CEQA Guidelines Section 15064(b)(1). In these areas, VMT per resident or per employee tends to be higher than in urban areas due to longer distances between origins and destinations and limited travel mode choices.

These (and the other) threshold recommendations in the *Technical Advisory* are intended to help achieve the State of California's GHG reduction goals and targets considered in development of OPR's *Technical Advisory,* as follows;

- Assembly Bill 32 (2006) requires statewide greenhouse gas reductions to 1990 levels by 2020 and continued reductions beyond 2020.
- Senate Bill 32 (2016) requires at least a 40% reduction in greenhouse gas emissions by 2030.
- Pursuant to Senate Bill 375 (2008), the California Air Resources Board establishes greenhouse gas reduction targets for MPOs to achieve based on land use patterns and transportation systems specified in Regional Transportation Plans and Sustainable Community Strategies. At the time the *Technical Advisory* was released, target reductions

by 2035 for the largest MPOs ranged from 13% to 16%. The current targets for these MPOs are 19%.

- Executive Order B-30-15 (2015) sets a GHG emissions reduction target of 40% below 1990 levels by 2030.
- Executive Order S-3-05 (2005) sets a GHG emissions reduction target of 80% below 1990 levels by 2050.
- Executive Order B-16-12 (2012) specifies a GHG emissions reduction target of 80% below 1990 levels by 2050 specifically for transportation.
- Senate Bill 391 requires the California Transportation Plan to support 80% reduction in GHGs below 1990 levels by 2050.
- The California Air Resources Board Mobile Source Strategy (2016) describes California's strategy for containing air pollutant emissions from vehicles and quantifies VMT growth compatible with achieving state targets.
- The California Air Resources Board's 2017 Climate Change Scoping Plan Update: The Strategy for Achieving California's 2030 Greenhouse Gas Target describes California's strategy for reducing greenhouse gas emissions from vehicles and quantifies VMT growth compatible with achieving state targets.
- The Caltrans Strategic Management Plan (2015) calls for a 15% reduction in VMT per capita compared to 2010 levels by 2020.
- Executive Order B-55-18 (2018) established an additional statewide goal of achieving carbon neutrality as soon as possible, but no later than 2045, and maintaining net negative emissions thereafter.

Lead agencies should note that the OPR-recommended VMT thresholds are focused upon GHG reduction goals. As OPR's *Technical Advisory* (p. 8) explains:

> *The VMT metric can support the three statutory goals: "the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." (Public Resources Code, § 21099, subdivision (b)(1), emphasis added.) However, in order for it to promote and support all three, lead agencies should select a significance threshold that aligns with state law on all three. State law concerning the development of multimodal transportation networks and diversity of land uses requires planning for and prioritizing increases in complete streets and infill development, but does not mandate a particular depth of implementation that could translate into a particular threshold of significance. Meanwhile, the State has clear quantitative targets for GHG emissions reduction set forth in law and based on scientific consensus, and the depth of VMT reduction needed to achieve those targets has been quantified. Tying VMT thresholds to GHG reduction also supports the two other statutory goals. Therefore, to ensure adequate analysis of transportation impacts, OPR recommends using quantitative VMT thresholds linked to GHG reduction targets when methods exist to do so.*

While this is one of the SB 743 legislative intent objectives, a less clear connection is made to the other legislative intent objectives to encourage infill development and promote active transportation. SB 743 [Section 21099(b)(1)] also makes it explicit that criteria for determining the significance of transportation impacts shall promote "*…the reduction of greenhouse gas emissions, the development of multimodal networks, and a diversity of land uses.*" If GHG impacts are already being adequately addressed in another CEQA section, then more evidence may be desired about VMT threshold relationships to the other criteria. In particular, how should lead agencies balancing the accommodation of housing needs that contribute to land use diversity but also contribute to VMT increases? Given the status of housing supply shortages and affordability in California, this is not a small issue. The use of VMT as a new impact metric will likely trigger more significant impacts in suburban and rural areas that have the highest VMT generation rates and limited or costly mitigation options. Adding more impact mitigation costs to suburban and rural housing projects may be counter to land use diversity and adequate/affordable housing goals.

Another important distinction within the *Technical Advisory* is how projects within different land use contexts are treated. The general expectation that a 15% reduction below that of existing development may be reasonable is proposed for projects within urban areas of metropolitan planning organizations (MPOs). For rural areas outside MPOs, the *Technical Advisory* explains that VMT mitigation options are limited so thresholds may need to be set on a case-by-case basis. This rationale may not provide the best evidence for threshold setting. The intent of threshold setting is to determine what change in VMT would constitute a significant impact considering the expectations set forth in the SB 743 statute language and the associated CEQA Guidelines. While land use context is a valid consideration when setting thresholds, so are these expectations.

The *Technical Advisory* also makes specific VMT threshold recommendations for analyzing the impact of project generated VMT on baseline conditions, but also recommends that VMT analysis consider a project's long-term effects on VMT and whether the project is consistent with the Plan Bay Area (the Bay Area's Regional Transportation Plan (RTP)/Sustainable Communities Strategies (SCS)). These recommendations raise key questions for lead agencies, as addressed in the next section.

Lead Agency Discretion in Setting VMT Thresholds

Prior to SB 743 implementation, CEQA Guidelines Section 15064.7 allowed lead agencies the discretion to select their own transportation impact metrics, although substantial evidence was required to support their decisions. For transportation impact metrics, SB 743 deleted vehicle delay as a metric, and CEQA Guidelines Section 15064.3 provided that VMT is generally the most appropriate metric for land use projects. As to thresholds, additional questions have arisen as listed below.

- Question 1: Do lead agencies have discretion to set a different VMT threshold than recommended by OPR?

- Question 2: Do lead agencies need to establish VMT thresholds for cumulative impacts?
- Question 3: Do lead agencies need to use the same VMT methodology for setting thresholds and for conducting project VMT forecasts?

The answers to the first two questions require a legal perspective, and were informed by a memorandum prepared by Remy Moose Manley (RMM) as part of the WRCOG SB 743 Implementation Pathway project, whose opinion is summarized below. The full opinion is available as part of the WRCOG documentation at http://www.fehrandpeers.com/wrcog-sb743/ and a summary of the RMM selected findings is presented below.

Question 1: Do lead agencies have discretion to set a different VMT threshold than recommended by OPR?

Setting a threshold lower than the 15% reduction recommended by OPR in their *Technical Advisory* is likely legally defensible, so long as the threshold is supported by substantial evidence. The substantial evidence is critical in the threshold setting process and should explain why the OPR-recommended threshold is not appropriate for the lead agency or project, and why another threshold was selected. This evidence will be the basis for supporting the recommended threshold, and should carefully consider the definition of substantial evidence contained Section 15384 of the CEQA Guidelines. This answer considers the fact that the 15% reduction is not included in the statute or the updated CEQA Guidelines; rather it is only included in OPR's *Technical Advisory*. However, it is unknown how much weight future courts may give OPR's *Technical Advisory,* since this is where OPR complies with Section 21099(b)(1) to develop recommendations for significance criteria.

The revisions to the CEQA Guidelines only include statements about what land use project types and locations may be presumed to have a less than significant VMT impact. Additional evidence allowing for a lower threshold (i.e., less than 15%) is also found in the discussion above about the recognition of land use context influencing VMT performance.

Question 2: Do lead agencies need to establish VMT thresholds for cumulative impacts?

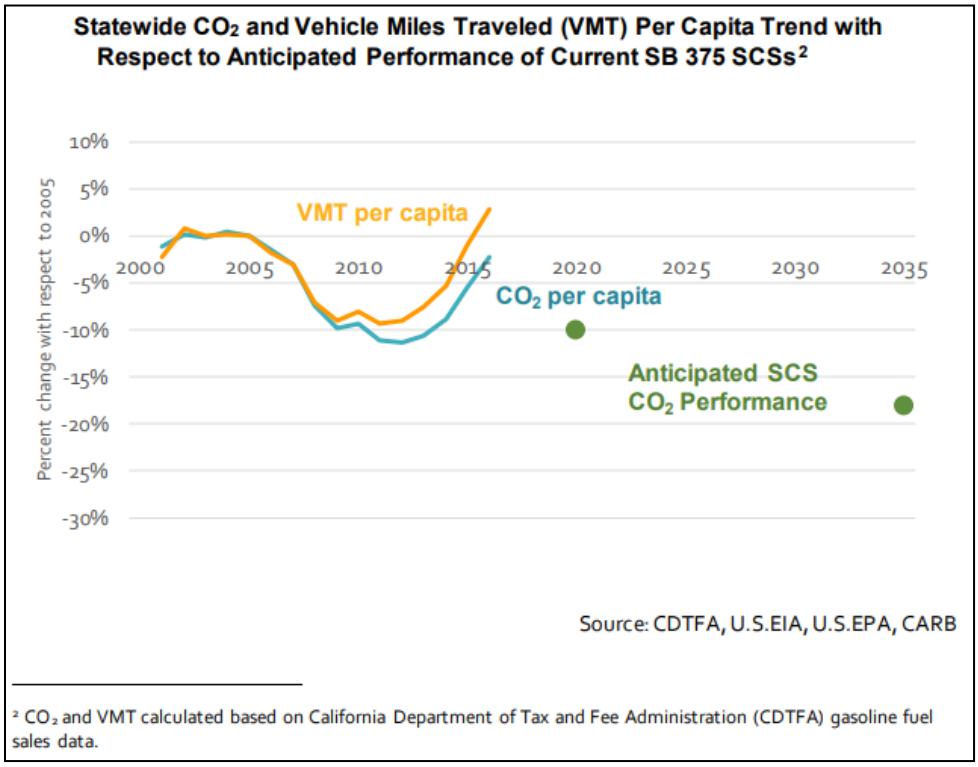
In addition to direct impact analysis, lead agencies should address VMT impacts in the cumulative context. The CEQA Guidelines (and the case law) are clear that consideration of cumulative impacts is important to CEQA compliance. That said, a separate quantitative threshold may not be required if the threshold applied for project-specific impacts is cumulative in nature. VMT thresholds based on an efficiency form of the metric, such as VMT per capita, can address both project and cumulative impacts in a similar manner that some air districts do for criteria pollutants and GHGs.

As explained in OPR's *Technical Advisory*, when using an absolute VMT metric, i.e., total VMT (as recommended below for retail and transportation projects), analyzing the combined impacts for a cumulative impacts analysis may be appropriate.

> *A project that falls below an efficiency-based threshold that is aligned with long-term environmental goals and relevant plans would have no cumulative impact distinct from the project impact. Accordingly, a finding of a less-than-significant project impact would imply a less than significant cumulative impact, and vice versa.* (OPR *Technical Advisory*, p. 6.)

A key consideration for cumulative scenarios is whether the rate of VMT generation gets better or worse in the long-term. If the rate is trending down over time, then the project level analysis may suffice. However, the trend direction must be supported with substantial evidence. This creates a potential issue for VMT because per capita VMT rates in California have been increasing, a trend inconsistent with RTP/SCS projections showing declines. The chart below from the 2018 Progress Report California's Sustainable Communities and Climate Protection Act, California Air Resources Board, November 2018 charts recent VMT per capita trends. This evidence could be used to justify the need for separate cumulative analysis to verify a project's long-term cumulative effects.

Figure 1: California VMT Trends



Source: 2018 Progress Report California's Sustainable Communities and Climate Protection Act, California Air Resources Board, 2018

For some projects, measuring project-generated VMT will only tell part of the impact story, especially if they exceed a project threshold based on VMT per capita or a similar efficiency metric. Measuring the "project's effect on VMT" may be necessary to fully explain the project's impact, especially under cumulative conditions. This occurs because of the nature of discretionary land use decisions. Cities and counties influence land supply through changes to general plan land use designations and zoning for parcels. These changes rarely, if ever, influence the long-term amounts of regional population and employment growth. Viewed through this lens, a full disclosure of VMT effects requires capturing how a project may influence the VMT generated by the project and nearby land uses. Also, some mitigation strategies that improve walking, bicycling, or transit to/from the project site can also reduce VMT from neighboring land uses (for example, installing a bike-share station on the project site would influence the riding behavior of project residents and those living and working nearby).

Question 3: Do lead agencies need to use the same VMT methodology for setting thresholds and for conducting project VMT forecasts?

Lead agencies need to use consistent methods when forecasting VMT for threshold setting and project analysis to ensure an apples-to-apples comparison for identifying potential impacts. The project team has confirmed through case study comparisons[1] that failure to comply with this approach, as recommended by the *Technical Advisory,* can lead to erroneous impact conclusions. This is an important finding, since the *Technical Advisory* also accepts that VMT analysis can be performed using sketch planning tools. Off-the-shelf sketch planning tools for VMT analysis do not contain trip generation rates or trip lengths consistent with local and regional travel forecasting models. These models are the most likely source for citywide and region-wide VMT estimates used in setting thresholds because sketch planning tools cannot produce these aggregate-level VMT metrics. The *Technical Advisory* partially recognizes this issue by recommending that sketch planning tools use consistent trip lengths as the models used to

[1] The table below shows the results of using different VMT methods. The parenthetical numbers under city and region are the threshold values (15% below the baseline values in front of the parenthetical values). If the travel demand model was used to set the italicized threshold values in the first row and the model was also used for the project analysis, then no impact would occur. If the project analysis instead used Institute of Transportation Engineers (ITE) trip generation rates and California Household Travel Survey (CHTS) trip lengths, then the project's 11.26 estimate would be higher than the model threshold values for both the city and region, resulting in a significant impact. Using thresholds derived from the ITE+CHTS data would have reversed this impact finding, demonstrating that consistent method is essential for avoiding erroneous impact conclusions.

VMT Method	Existing Home-Based VMT per Capita		
	City	Region	Project
Travel demand model	9.86 (*8.38*)	11.97 (*10.17*)	5.46
ITE + CHTS	23.90 (*20.32*)	25.67 (*21.82*)	11.26

produce thresholds, but it does not include a similar recommendation for trip generation rates. Input variables, trip lengths, and trip generation rates need to be consistent with the travel forecasting model to produce accurate project impact analysis results.

Options for Jurisdictions in San Mateo County

So how should lead agencies approach VMT threshold setting given their discretion? Since an impact under CEQA begins with a change to the existing environment, a starting level for potential thresholds would be the baseline (i.e., existing condition) VMT, VMT per capita, VMT per employee, or VMT per service population. Since VMT would normally be expected to increase or fluctuate with population and employment growth, changes in economic activity, and expansion of new vehicle travel choices (i.e., Uber, Lyft, autonomous vehicles, etc.), expressing VMT measurement in an efficiency metric form allows for more direct comparisons to baseline conditions for land use projects, land use plans, and transportation projects. Establishing a threshold such as baseline VMT per service population would be essentially setting an expectation that future land uses will perform like existing land uses.

If VMT performance expectations start with baseline conditions, lead agencies can establish reductions from baseline levels, thereby lowering future VMT generation. How much of a reduction may depend on the values placed on vehicle use and its associated effects on mobility, economic activity, and environmental consequences. Working toward higher reductions in VMT becomes possible as the land use context changes to urban areas with higher densities and high-quality transit systems.

While OPR has developed specific VMT impact threshold recommendations for project-related impacts, current practice has not sufficiently evolved where a clear line can be drawn between "acceptable" and "unacceptable" levels of VMT change for the sole purpose of determining a significant transportation impact. Until SB 743, VMT changes were viewed through an environmental lens that focused on the relationship of VMT to fuel consumption and emissions. For transportation purposes, VMT has traditionally been used to evaluate whether land use or transportation decisions resulted in greater dependency on vehicle travel. Determining whether a portion of someone's daily vehicle travel is unacceptable or would constitute a significant transportation impact is generally not clear to lead agencies.

Another consideration in threshold setting is how to address cumulative VMT impacts and whether addressing them in the General Plan EIR is advantageous for streamlining the review of subsequent land use and transportation projects, given CEQA relief available through SB 375 or CEQA Guidelines Section 15183. This section of the Guidelines relieves a project of additional environmental review if the environmental impact was adequately addressed in the General Plan EIR and the project is consistent with the General Plan (see below).

15183. PROJECTS CONSISTENT WITH A COMMUNITY PLAN OR ZONING

(a) CEQA mandates that projects which are consistent with the development density established by existing zoning, community plan, or general plan policies for which an EIR was certified shall not require additional environmental review, except as might be necessary to examine whether there are project-specific significant effects which are peculiar to the project or its site. This streamlines the review of such projects and reduces the need to prepare repetitive environmental studies.

The use of Section 15183 also addresses cumulative impacts as acknowledged in Section 15130(e).

15130. DISCUSSION OF CUMULATIVE IMPACTS

(e) If a cumulative impact was adequately addressed in a prior EIR for a community plan, zoning action, or general plan, and the project is consistent with that plan or action, then an EIR for such a project should not further analyze that cumulative impact, as provided in Section 15183(j).

For jurisdictions in San Mateo County, addressing transportation VMT impacts in the City General Plan EIR could be useful in understanding how VMT reduction should be balanced against other community values when it comes to setting new VMT impact thresholds for SB 743.

Given this information, the jurisdictions in San Mateo County have at least five options for setting VMT thresholds.

- Option 1: Rely on the OPR *Technical Advisory* suggestion to set thresholds consistent with State of California goals for air quality, greenhouse gas, and energy conservation.
- Option 2: Rely on OPR *Technical Advisory* rural thresholds guidance.
- Option 3: Use a threshold adopted or recommended by another public agency consistent with lead agency air quality, GHG reduction, and energy conservation goals
- Option 4: Set jurisdiction-specific VMT thresholds based on substantial evidence
- Option 5: Set thresholds based on baseline VMT performance

Each of these options is discussed below.

Option 1: Rely on the OPR Technical Advisory suggestion to set thresholds consistent with State of California goals for air quality, greenhouse gas, and energy conservation.

The first option is to simply rely on the threshold recommendations contained in the OPR *Technical Advisory*. As noted above, the general expectation is that land use projects should be measured against VMT per capita or VMT per worker threshold of 15% below that of baseline

conditions (i.e., existing development). Specific VMT thresholds for residential, office (work-related), and retail land uses are summarized below.

- Residential projects – A proposed project exceeding a level of 15% below existing (baseline) VMT per capita may indicate a significant transportation impact. Existing VMT per capita may be measured as regional VMT per capita, a citywide VMT per capita, or as geographic sub-area VMT per capita.
- Office projects – A proposed project exceeding a level of 15% below existing (baseline) regional VMT per employee may indicate a significant transportation impact.
- Retail projects – A net increase in total (boundary) VMT may indicate a significant transportation impact.
- Mixed-use projects – Lead agencies can evaluate each component of a mixed-use project independently and apply the significance threshold for each project type included (e.g., residential and retail). Alternatively, a lead agency may consider only the project's dominant use. In the analysis of each use, a project should take credit for internal capture.
- Other non-residential project types – OPR recommends using the quantified thresholds above, thus a proposed project exceeding a level of 15 percent below existing regional VMT per employee for the proposed non-residential project type or resulting in a net increase in total (boundary) VMT may be considered significant. Lead agencies, using more location-specific information, may develop their own more specific thresholds, which may include other land use types.
- Redevelopment projects – Where a project replaces existing VMT-generating land uses, if the replacement leads to a net overall decrease in VMT, the project would lead to a less-than-significant transportation impact. If the project leads to a net overall increase in VMT, then the thresholds described above should apply.

For land use plans (i.e., a general plan, policy area plan, or specific area plan), a significant impact would occur if the respective thresholds above were exceeded in aggregate. This means that new population and employment growth combined with the planned transportation network would need to generate future VMT per capita or VMT per worker that is less than 85% of the baseline value to be considered less than significant. Land use project and land use plans would also need to be consistent with the jurisdiction General Plan.

A potential limitation of the OPR recommendations is that the substantial evidence used to justify the thresholds is largely based on the State of California air quality and GHG goals. Three issues arise from this reliance:

1. The OPR-recommended threshold does not establish a level of VMT reduction that would result in California meeting its air quality and GHG goals according to the *California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals* (2019). This may create confusion with air quality and GHG impact analysis in environmental documents, which should already address the influence of VMT.

2. The OPR-recommended thresholds do not directly reflect expectations related to the other SB 743 objectives related to statewide goals to promote public health through active transportation, infill development, multimodal networks, and a diversity of land uses. Recommending a reduction below baseline levels is consistent with these objectives, but the numerical value has not been tied to specific statewide values for each objective or goal.

3. State of California expectations for air quality and GHG may not align with local/lead agency expectations. Using State expectations for a local lead agency threshold may create inconsistencies with local city or county general plans.

Option 2: Rely on OPR Technical Advisory discussion for rural thresholds

As discussed above, the OPR *Technical Advisory* states, "*In rural areas of non-MPO counties (i.e., areas not near established or incorporated cities or towns), fewer options may be available for reducing VMT, and significance thresholds may be best determined on a case-by-case basis. Note, however, that clustered small towns and small town main streets may have substantial VMT benefits compared to isolated rural development….*"

When determining thresholds on a case-by-case basis, the lead agency could consider the following factors when making a significance determination.

- What are the state policy considerations for VMT reduction from rural areas? Is the amount of new VMT generated small enough that it would not interfere with the state's ability to achieve desired VMT and GHG emissions reductions?
- What is the land use context and associated lead agency policy for VMT reduction? Since the CEQA Guidelines allow for thresholds to vary based on land use context, the lead agency may consider sensitivity to VMT reduction in different land use contexts (i.e., rural areas, small towns, and unincorporated community centers).
- Is the project displacing other less efficient development? For example, is the project, diverting trips from more distant stores, which result in a net (absolute) VMT reduction, e.g. constructing a grocery store in a food desert? (OPR *Technical Advisory* p. 30)

However, because the Caltrans TISG draft is supportive of the specific OPR *Technical Advisory* guidance, less restrictive thresholds are unlikely to be accepted for state highway facilities,

Option 3: Use a threshold adopted or recommended by another public agency consistent with lead agency air quality, GHG reduction, and energy conservation goals

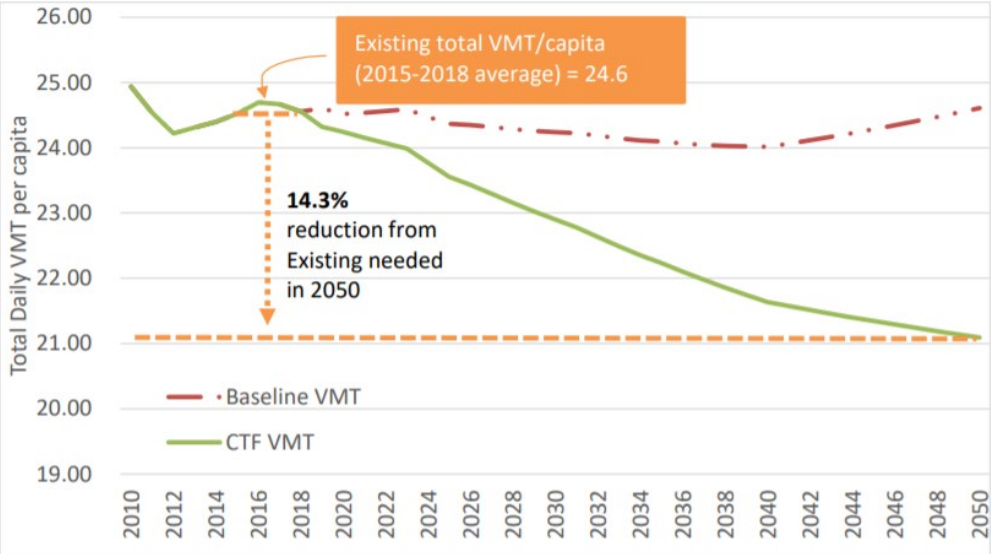
This option sets a threshold consistent with local air quality, GHG reduction, and energy conservation goals. This approach requires that local air quality and GHG reduction goals in general plans, climate action plans, or GHG reduction plans comply with the legislation and associated plans described earlier.

- 2000 levels by 2010
- 1990 levels by 2020
- 80% below 1990 levels by 2050

SB 32 expanded on these goals and added the expectation that the state should reach 40% below 1990 levels by 2030, followed by SB 391 requirements for the California Transportation Plan to support 80% reduction in GHGs below 1990 levels by 2050. With respect to the land use and transportation sectors, SB 375 tasked CARB with setting specific GHG reduction goals through the RTP/SCSs prepared by MPOs.

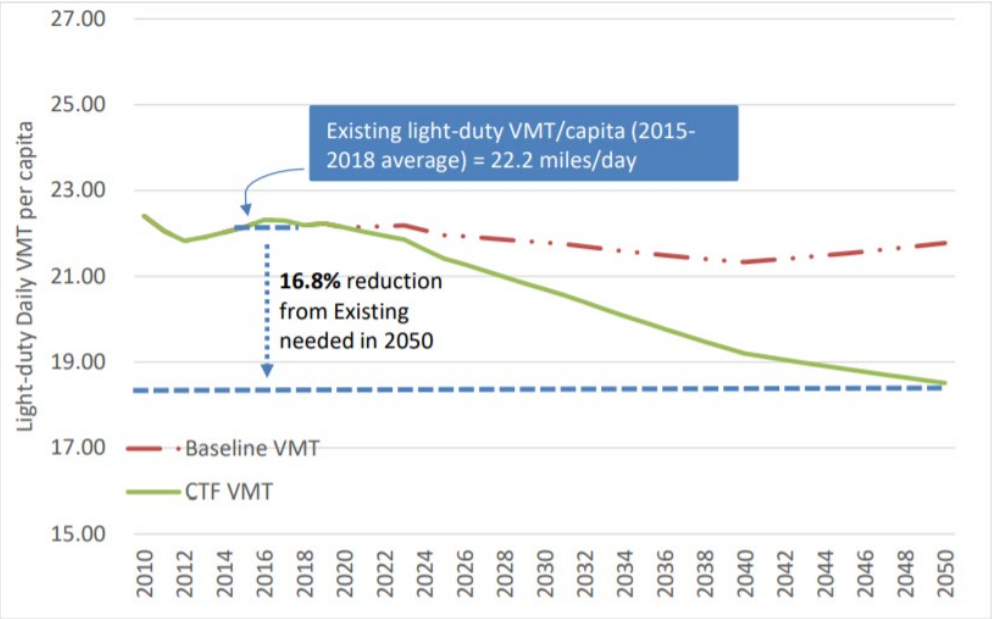
The CARB *Scoping Plan* and *Mobile Source Strategy* provide analysis related to how the state can achieve the legislative and executive goals, while the Caltrans *Strategic Management Plan* and *Smart Mobility Framework* provide supportive guidance and metrics. An important recognition of the CARB *Scoping Plan* and *Mobile Source Strategy* is that the initial SB 375 targets were not aggressive enough. The CARB *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals* document provides updated information on VMT reductions needed to meet the State's GHG emission reduction targets by 2050. This document identifies two specific thresholds to meet these targets, a 14.3% reduction in total project generated VMT per capita, and a 16.8% reduction in light-duty vehicle project generated VMT per capita. While this evidence is tied largely to the State of California's emission reduction goals, the proposed project generated VMT reductions associated with this approach to thresholds would be supportive of multimodal networks, infill development, and greater land use diversity.

Figure 2: Statewide Total VMT/Capita



Source: *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*, CARB (p. 10)
https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf

Figure 3: Statewide Light-Duty VMT/Capita



Source: *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*, CARB (p. 11)
https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf

One benefit of relying on CARB or other state agencies for a threshold recommendation is the CEQA Guidelines provision in Section 15064.7(c) highlighted below.

§ 15064.7. Thresholds of Significance.

(a) ~~**Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects.**~~ A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.

(b) **Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects.** Thresholds of significance to be adopted for general use as part of the lead agency's environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence. **Lead agencies may also use thresholds on a case-by-case basis as provided in Section 15064(b)(2).**

(c) When adopting **or using** thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.

Source: Final Adopted Text for the 2018 Amendments and Additions to the State CEQA Guidelines. California Natural Resources Agency (p. 14) http://resources.ca.gov/ceqa/

CARB meets the criteria of being a public agency and having noted expertise in the areas of VMT and emissions analysis. Further, the recommended threshold values above were developed in specific consideration of SB 743 requirements.

One other agency threshold to consider is Caltrans. The Local Development-Intergovernmental Review (LD-IGR) Branch at Caltrans (https://dot.ca.gov/programs/transportation-planning/office-of-smart-mobility-climate-change/local-development-intergovernmental-review) has a responsibility to reduce potential adverse impacts of local development on the state transportation system. As part of its responsibilities, each district branch performs reviews of CEQA environmental documents for local land use projects. These reviews include providing expectations for transportation impact analysis, such as metrics and thresholds.

When Caltrans reviews CEQA documents, they may function as a reviewing agency or a responsible agency. In a responsible agency role, Caltrans has approval authority over some component of the project, such as an encroachment permit for access to the state highway system. Comments from Caltrans should be adequately addressed, and special attention should be paid to those comments when Caltrans serves as a responsible agency because an adequate response may be required to obtain its required approval.

Caltrans recently released a draft update to its Transportation Impact Study Guide (https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/sb-743/2020-02-26-transmittal-and-draft-vmt-focused-tisg.pdf). Key points from this draft include the following:

- Caltrans recommends use of OPR's recommended thresholds for land use projects.
- Caltrans supports CEQA streamlining for land use projects in transit priority areas and areas with existing low VMT, as described in OPR's *Technical Advisory*.
- Caltrans recommends following the guidance on methods of VMT assessment found in OPR's *Technical Advisory*.
- Caltrans comments on a CEQA document may note methodological deviations from those methods and may recommend that significance determinations and mitigation be aligned with State of California GHG reduction goals as articulated in that guidance, ARB's *Scoping Plan*, and related documentation.
- In rural areas, Caltrans may comment requesting VMT-reducing strategies for the rural area be included programmatically, including at the General Plan level, for example. Caltrans will also recommend establishment of programs or methods to reduce VMT and support appropriate bicycle, pedestrian, and transit infrastructure, services, or incentives.

With Caltrans endorsement of the recommended OPR thresholds, a state VMT threshold has been established for impacts to the state highway system. If a lead agency chooses a different threshold, they may have to complete more than one impact analysis.

Option 4: Set jurisdiction-specific VMT threshold based on substantial evidence

VMT is a composite metric that is created as an output of combining a community's long-term population and growth projections with its long-term transportation network (i.e., the General Plan). Other variables are also in play related to travel behavior, but land use changes and transportation network modifications are the items largely influenced or controlled by cities and counties. As such, each jurisdiction already has a VMT growth budget. This is the amount of VMT that is forecast to be generated from the jurisdiction's General Plan and the jurisdiction's buildout scenario assumptions combined with other travel behavior inputs for the region as captured in the travel forecasting model. This VMT growth has already been planned for and determined to be "acceptable" by the jurisdiction. Regional and state agencies also use the General Plan growth as part of their plans and environmental impact analysis. This level of VMT could serve as the basis of a VMT threshold expressed as a VMT growth budget or as a VMT efficiency metric based on the future year VMT per capita, VMT per employee, or VMT per service population. The measurement of VMT could occur at the geographic subarea level.

Potential limitations of this approach relate to the lack of a "baseline plus project" analysis and travel forecasting model sensitivity. If a General Plan includes policies or implementation programs designed to reduce VMT through transportation demand management (TDM) strategies, the current local and regional models did not include these effects. Further, current local and regional models do not capture major disruptive trend effects such as TNCs, AVs, and internet shopping. Including baseline and baseline plus project analysis could help capture some of these effects to the extent they are already influencing travel behavior.

Option 5: Set thresholds based on baseline VMT performance

As noted above, an impact under CEQA begins with a change to the existing or baseline environment. There are a range of approaches to using this starting point for VMT impact analysis. At one end of the spectrum is "total daily VMT" generated under baseline conditions. Setting this value as the threshold for a jurisdiction basically creates a budget where any increase would be a significant impact. Alternatively, the baseline VMT per capita, VMT per employee, or VMT per service population could be used to establish an efficiency metric basis for impact evaluation. Using this form of VMT would mean that future land use projects would be expected to perform no worse than existing land use projects, and only projects that cause an increase in the rate of VMT generation would cause significant impacts. Since VMT will increase or fluctuate with population and employment growth, changes in economic activity, and expansion of new vehicle travel choices (i.e., Uber, Lyft, autonomous vehicles, etc.), expressing VMT measurement in an efficiency metric form allows for more direct comparisons to baseline conditions for land use projects, land use plans, and transportation projects.

Under this option, a separate quantitative VMT threshold may not be set for cumulative conditions unless VMT trends are increasing over time. At a minimum, a qualitative assessment of RTP and General Plan consistency may still be included, depending on whether that analysis is already being conducted for the purposes of GHG impact analysis. In general, projects should avoid jeopardizing the air quality conformity and GHG reduction performance of other relevant plans.

Appendix E: Small Project Guidance

Small Project Screening for SB 743

The following document provides substantial evidence to support the screening on 'small' projects for SB 743 purposes. The California Office of Planning and Research *Technical Advisory on Evaluating Transportation Impacts in CEQA* (December 2018) relies on a trip trigger based on *CEQA Statute & Guidelines* exemptions for the screening threshold for small projects as cited below.

> *Screening Threshold for Small Projects*
>
> *Many local agencies have developed screening thresholds to indicate when detailed analysis is needed. Absent substantial evidence indicating that a project would generate a potentially significant level of VMT, or inconsistency with a Sustainable Communities Strategy (SCS) or general plan, projects that generate or attract fewer than 110 trips per day[19] generally may be assumed to cause a less-than-significant transportation impact.*
>
> *[19] CEQA provides a categorical exemption for existing facilities, including additions to existing structures of up to 10,000 square feet, so long as the project is in an area where public infrastructure is available to allow for maximum planned development and the project is not in an environmentally sensitive area. (CEQA Guidelines, § 15301, subd. (e)(2).) Typical project types for which trip generation increases relatively linearly with building footprint (i.e., general office building, single tenant office building, office park, and business park) generate or attract an additional 110-124 trips per 10,000 square feet. Therefore, absent substantial evidence otherwise, it is reasonable to conclude that the addition of 110 or fewer trips could be considered not to lead to a significant impact.* (Quote from page 12 of the *Technical Advisory: On Evaluating Transportation Impacts* in CEQA, December 2018).

Two potential limitations of this trigger have been identified. First, the trigger is not tied to a VMT estimate. Second, the trigger does not consider residential land uses. To strengthen the evidence, we used specific California Environmental Quality Act (CEQA) exemptions related to residential projects and 2012 California Household Travel Survey (CHTS) household VMT estimates to develop the following modification to the OPR approach. The CEQA exemption sections are provided below (see the listed items a to c below and yellow highlighted text for minor land use divisions.

> ***15303. NEW CONSTRUCTION OR CONVERSION OF SMALL STRUCTURES***
>
> *Class 3 consists of construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure. The numbers of structures described in this section are the maximum allowable on any legal parcel. Examples of this exemption include, but are not limited to:*

(a) One single-family residence, or a second dwelling unit in a residential zone. In urbanized areas, up to three single-family residences may be constructed or converted under this exemption.

(b) A duplex or similar multi-family residential structure, totaling no more than four dwelling units. In urbanized areas, this exemption applies to apartments, duplexes and similar structures designed for not more than six dwelling units.

(c) A store, motel, office, restaurant or similar structure not involving the use of significant amounts of hazardous substances, and not exceeding 2500 square feet in floor area. In urbanized areas, the exemption also applies to up to four such commercial buildings not exceeding 10,000 square feet in floor area on sites zoned for such use if not involving the use of significant amounts of hazardous substances where all necessary public services and facilities are available and the surrounding area is not environmentally sensitive.

***Note**: Authority cited: Section 21083, Public Resources Code; Reference: Sections 21084, Public Resources Code.*

15315. MINOR LAND DIVISIONS

Class 15 consists of the division of property in urbanized areas zoned for residential, commercial, or industrial use into four or fewer parcels when the division is in conformance with the General Plan and zoning, no variances or exceptions are required, all services and access to the proposed parcels to local standards are available, the parcel was not involved in a division of a larger parcel within the previous 2 years, and the parcel does not have an average slope greater than 20 percent.

Note: Authority cited: Sections Section 21083, Public Resources Code; Reference: Section 21084, Public Resources Code.

Based on the 2012 CHTS, here are a range of VMT estimates for 2, 4, and 6 units based on the CA average VMT generation per household.

- CA Average – 41.6 VMT per household
  - 2 units = 83.2 VMT per day
  - 4 units = 166.4 VMT per day
  - 6 units = 249.6 VMT per day (urban areas only)

Another option is to rely on the maximum level of development allowed by CEQA exemptions and convert that value to a 'dwelling unit equivalent' measure similar to impact fee programs. OPR estimated that non-residential uses could generate 110-124 daily trips based on a maximum project exemption size of 10,000 square feet (KSF). Using the lower end of the range and CHTS trip lengths produces a VMT equivalent for 10 KSF for CA of 836. This equates to about 20 residential households.

Appendix F: Additional VMT Data in San Mateo County

External Station Adjustments

Table F-1: External Station Adjustments at Bay Area Regional Boundary

External Station (Connecting County)	Distance (Miles)
SR 1 – Mendocino County	9.4
US 101 – Mendocino County	48.4
SR 29 – Lake County	21.4
I-505 – Yolo County	101.2
SR 113 – Yolo County	12.9
I-80 – Yolo County	39.2
SR 12 – San Joaquin County	No adjustment made to these external station distances because the VTA travel model area incudes San Joaquin County.
SR 4 – San Joaquin County	
I-205 – San Joaquin County	
SR 152 – Merced County	162.9
SR 25 – San Benito County	No adjustment made to these external station distances because the VTA travel model area incudes San Benito County.
US 101 – San Benito County	
SR 152 – Santa Cruz County	No adjustment made to these external station distances because the VTA travel model area incudes Santa Cruz County.
SR 17 – Santa Cruz County	
SR 9 – Santa Cruz County	
SR 1 – Santa Cruz County	

Notes: External station adjustments rounded to nearest tenth of a mile.
Source: California statewide travel demand mode (CSTDM) was used to develop the external station adjustments. Fehr & Peers, 2021.

Transportation Analysis Zone Correspondence for each Jurisdiction

Table F-2: Transportation Analysis Zones Correspondence for each Jurisdiction

Jurisdiction	TAZ Groups
Coastside and Unincorporated County	
Half Moon Bay	1556, 1557, 1558
Pacifica	1513, 1514, 1515, 1516, 1517, 1518, 1597, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927
Unincorporated San Mateo County	1492, 1526, 1555, 1559, 1560, 1590, 1593, 1601, 1602, 1604, 1615, 1616, 1617, 1618, 1619, 1648, 1649, 1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665, 1666, 1906, 1908, 1928, 1939, 1992, 1993, 1994, 1995, 1996, 1997, 2002, 2027, 2028, 2029, 2037, 2045, 2046
I-280/Hillside Corridor	
Colma	1900
Hillsborough	1534, 1535, 1608, 1609, 1952, 1954
Portola Valley	1620, 1998
Woodside	1561, 1621, 1667, 1668, 1999, 2000, 2022
101/Caltrain Corridor	
Atherton	1584, 1587, 1633, 1634, 1684, 1685, 1686, 2039, 2042
Belmont	1543, 1551, 1552, 1553, 1614, 1657, 1975, 1986, 1987, 1988, 1989
Brisbane	1592, 1636, 1637, 1638, 1639,
Burlingame	1529, 1530, 1531, 1532, 1533, 1605, 1606, 1607, 1652, 1653, 1946, 1947, 1948, 1949, 1950, 1951
Daly City	1491, 1493, 1494, 1495, 1496, 1497, 1498, 1499, 1500, 1501, 1502, 1503, 1512, 1589, 1591, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1901, 1902, 1903, 1904, 1905, 1907, 1918, 1919
East Palo Alto	1579, 1580, 1632, 1682, 2032, 2033, 2034, 2035
Foster City	1541, 1612, 1654, 1655, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973
Menlo Park	1577, 1578, 1581, 1582, 1583, 1585, 1586, 1588, 1630, 1631, 1635, 1681, 1683, 2031, 2036, 2038, 2040, 2041, 2043, 2044
Millbrae	1527, 1528, 1603, 1650, 1651, 1940, 1941, 1942, 1943, 1944, 1945
Redwood City	1562, 1563, 1568, 1569, 1570, 1571, 1572, 1573, 1574, 1575, 1576, 1622, 1625, 1626, 1627, 1628, 1629, 1671, 1672, 1673, 1674, 1675, 1676, 1677, 1678, 1679, 1680, 2001, 2003, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2019, 2020, 2021, 2023, 2024, 2025, 2026, 2030

Table F-2: Transportation Analysis Zones Correspondence for each Jurisdiction

Jurisdiction	TAZ Groups
San Bruno	1519, 1520, 1521, 1522, 1523, 1524, 1525, 1598, 1599, 1600, 1645, 1646, 1647, 1929, 1932, 1933, 1934, 1935, 1936, 1937, 1938
San Carlos	1564, 1565, 1566, 1567, 1623, 1624, 1669, 1670, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2018
San Mateo	1536, 1537, 1538, 1539, 1540, 1542, 1544, 1545, 1546, 1547, 1548, 1549, 1550, 1554, 1610, 1611, 1613, 1953, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1974, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1990, 1991
South San Francisco	1504, 1505, 1506, 1507, 1508, 1509, 1510, 1511, 1594, 1595, 1596, 1640, 1641, 1642, 1643, 1644, 1656, 1687, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1930, 1931

Source: Fehr & Peers, 2021.

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Service Population for each Jurisdiction

Table F-3: Service Population for each Jurisdiction

Jurisdiction	Existing (Baseline) Conditions (2015)			Cumulative Conditions (2040)		
	Residents	Employees	Service Population	Residents	Employees	Service Population
Coastside and Unincorporated County						
Half Moon Bay	11,890	5,380	17,270	15,560	6,050	21,610
Pacifica	38,930	5,740	44,670	39,670	6,860	46,530
Unincorporated San Mateo County	55,330	17,300	72,630	59,180	19,660	78,840
I-280/Hillside Corridor						
Colma	1,540	4,520	6,060	2,740	4,140	6,880
Hillsborough	11,370	1,590	12,960	11,650	2,190	13,840
Portola Valley	4,730	1,240	5,970	4,930	1,630	6,560
Woodside	16,690	2,010	18,700	16,420	3,740	20,160
101/Caltrain Corridor						
Atherton	7,070	940	8,010	7,540	1,140	8,680
Belmont	26,970	7,950	34,920	34,040	9,660	43,700
Brisbane	4,690	10,730	15,420	9,880	31,860	41,740
Burlingame	29,560	30,940	60,500	32,240	41,230	73,470
Daly City	107,150	22,540	129,690	124,670	24,280	148,950
East Palo Alto	28,980	4,430	33,410	37,410	5,490	42,900
Foster City	32,690	24,350	57,040	36,360	26,620	62,980
Menlo Park	32,440	35,820	68,260	52,030	42,790	94,820
Millbrae	22,520	6,080	28,600	26,840	11,040	37,880
Redwood City	82,540	57,980	140,520	100,850	82,490	183,340
San Bruno	42,760	12,550	55,310	51,450	14,390	65,840
San Carlos	32,220	21,760	53,980	32,530	18,970	51,500
San Mateo	103,860	54,670	158,530	147,010	66,990	214,000
South San Francisco	68,930	42,650	111,580	85,940	57,160	143,100
San Mateo County and Bay Area Region						
San Mateo County	762,860	371,170	1,134,030	928,940	478,380	1,407,320
Bay Area Region	7,509,900	3,762,580	11,272,480	9,662,100	4,717,530	14,379,630

Source: Fehr & Peers, 2021.

Figures Showing Jurisdiction Boundary Used to Calculate each Boundary VMT Estimate

Appendix G: Comparison of CAPCOA Strategies Versus Research Since 2010

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Comparison of CAPCOA Strategies Versus New Research Since 2010

					New Information Since CAPCOA Was Published in 2010		
CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New information	Change in VMT reduction compared to CAPCOA	Literature or Evidence Cited
Land Use/Location	3.1.1	LUT-1 Increase Density	0.8% - 30% VMT reduction due to increase in density	Adequate	Increasing residential density is associated with lower VMT per capita. Increased residential density in areas with high jobs access may have a greater VMT change than increases in regions with lower jobs access. The range of reductions is based on a range of elasticities from -0.04 to -0.22. The low end of the reductions represents a -0.04 elasticity of demand in response to a 10% increase in residential units or employment density and a -0.22 elasticity in response to 50% increase to residential/employment density.	0.4% -10.75%	Primary sources: Boarnet, M. and Handy, S. (2014). Impacts of Residential Density on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Secondary source: Stevens, M. (2017). Does Compact Development Make People Drive Less? Journal of the American Planning Association, 83(1), 7-18.
Land Use/Location	3.1.9	LUT-9 Improve Design of Development	3.0% - 21.3% reduction in VMT due to increasing intersection density vs. typical ITE suburban development	Adequate	No update to CAPCOA literature; advise applying CAPCOA measure only to large developments with significant internal street structure.	Same	N/A
Land Use/Location	3.1.4	LUT-4 Increase Destination Accessibility	6.7%-20% VMT reduction due to decrease in distance to major job center or downtown	Adequate	Reduction in VMT due to increased regional accessibility (jobs gravity). Locating new development in areas with good access to destinations reduces VMT by reducing trip lengths and making walking, biking, and transit trips more feasible. Destination accessibility is measured in terms of the number of jobs (or other attractions) reachable within a given travel time, which tends to be highest at central locations and lowest at peripheral ones.	0.5%-12%	Primary sources: Handy, S. et al. (2014). Impacts of Network Connectivity on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Handy, S. et al. (2013). Impacts of Regional Accessibility on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Secondary source: Holtzclaw, et al. (2002.) Location Efficiency: Neighborhood and Socioeconomic Characteristics Determine Auto Ownership and Use – Studies in Chicago, Los Angeles, and Chicago. Transportation Planning and Technology, Vol. 25, pp. 1–27.
Land Use/ Location	3.1.3	LUT-3 Increase Diversity of Urban and Suburban Developments	9%-30% VMT reduction due to mixing land uses within a single development	Adequate	1] VMT reduction due to mix of land uses within a single development. Mixing land uses within a single development can decrease VMT (and resulting GHG emissions), since building users do not need to drive to meet all of their needs. 2] Reduction in VMT due to regional change in entropy index of diversity. Providing a mix of land uses within a single neighborhood can decrease VMT (and resulting GHG emissions), since trips between land use types are shorter and may be accommodated by non-auto modes of transport. For example when residential areas are in the same neighborhood as retail and office buildings, a resident does not need to travel outside of the neighborhood to meet his/her trip needs. At the regional level, reductions in VMT are measured in response to changes in the entropy index of land use diversity.	1] 0%-12% 2] 0.3%-4%	1] Ewing, R. and Cervero, R. (2010). Travel and the Built Environment - A Meta-Analysis. Journal of the American Planning Association,76(3),265-294. Cited in California Air Pollution Control Officers Association. (2010).Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf Frank, L., Greenwald, M., Kavage, S. and Devlin, A. (2011). An Assessment of Urban Form and Pedestrian and Transit Improvements as an Integrated GHG Reduction Strategy. WSDOT Research Report WA-RD 765.1. Washington State Department of Transportation. Retrieved from: http://www.wsdot.wa.gov/research/reports/fullreports/765.1.pdf Nasri, A. and Zhang, L. (2012). Impact of Metropolitan-Level Built Environment on Travel Behavior. Transportation Research Record: Journal of the Transportation Research Board, 2323(1), 75-79. Sadek, A. et al. (2011). Reducing VMT through Smart Land-Use Design. New York State Energy Research and Development Authority. Retrieved from: https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/C-08-29%20Final%20Report_December%202011%20%282%29.pdf Spears, S.et al. (2014). Impacts of Land-Use Mix on Passenger Vehicle Use and Greenhouse Gas Emissions- Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm 2] Zhang, Wengia et al. "Short- and Long-Term Effects of Land Use on Reducing Personal Vehicle Miles of Travel."

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Comparison of CAPCOA Strategies Versus New Research Since 2010

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New Information Since CAPCOA Was Published in 2010		
					New information	Change in VMT reduction compared to CAPCOA	Literature or Evidence Cited
Land Use/ Location	3.1.5	LUT-5 Increase Transit Accessibility	0.5%-24.6% reduce in VMT due to locating a project near high-quality transit	Adequate	1] VMT reduction when transit station is provided within 1/2 mile of development (compared to VMT for sites located outside 1/2 mile radius of transit). Locating high density development within 1/2 mile of transit will facilitate the use of transit by people traveling to or from the Project site. The use of transit results in a mode shift and therefore reduced VMT. 2] Reduction in vehicle trips due to implementing TOD. A project with a residential/commercial center designed around a rail or bus station, is called a transit-oriented development (TOD). The project description should include, at a minimum, the following design features: • A transit station/stop with high-quality, high-frequency bus service located within a 5-10 minute walk (or roughly ¼ mile from stop to edge of development), and/or • A rail station located within a 20 minute walk (or roughly ½ mile from station to edge of development) • Fast, frequent, and reliable transit service connecting to a high percentage of regional destinations • Neighborhood designed for walking and cycling	1] 0%-5.8% 2] 0%-7.3%	1] Lund, H. et al. (2004). Travel Characteristics of Transit-Oriented Development in California. Oakland, CA: Bay Area Rapid Transit District, Metropolitan Transportation Commission, and Caltrans. Tal, G. et al. (2013). Policy Brief on the Impacts of Transit Access (Distance to Transit) Based on a Review of the Empirical Literature. California Air Resources Board. Retrieved from: https://www.arb.ca.gov/cc/sb375/policies/transitaccess/transit_access_brief120313.pdf 2] Zamir, K. R. et al. (2014). Effects of Transit-Oriented Development on Trip Generation, Distribution, and Mode Share in Washington, D.C., and Baltimore, Maryland. Transportation Research Record: Journal of the Transportation Research Board. 2413, 45–53. DOI: 10.3141/2413-05
Land Use/ Location	3.1.6	LUT-6 Integrate Affordable and Below Market Rate Housing	0.04%-1.20% reduction in VMT for making up to 30% of housing units BMR	Weak - Should only be used where supported by local data on affordable housing trip generation.	Observed trip generation indicates substantial local and regional variation in trip making behavior at affordable housing sites. Recommend use of ITE rates or local data for senior housing.	N/A	"Draft Memorandum: Infill and Complete Streets Study, Task 2.1: Local Trip Generation Study." Measuring the Miles: Developing new metrics for vehicle travel in LA. City of Los Angeles, April 19, 2017.
Neighborhood Site Enhancements	3.2.1	SDT-1 Provide Pedestrian Network Improvements	0%-2% reduction in VMT for creating a connected pedestrian network within the development and connecting to nearby destinations	Adequate	VMT reduction due to provision of complete pedestrian networks. Only applies if located in an area that may be prone to having a less robust sidewalk network.	0.5%-5.7%	Handy, S. et al. (2014). Impacts of Pedestrian Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm

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Neighborhood Site Enhancements	3.2.2	SDT-2 Provide Traffic Calming Measures	0.25%-1% VMT reduction due to traffic calming on streets within and around the development	Adequate	Reduction in VMT due to expansion of bike networks in urban areas. Strategy only applies to bicycle facilities that provide a dedicated lane for bicyclists or a completely separated right-of-way for bicycles and pedestrians. Project-level definition: Enhance bicycle network citywide (or at similar scale), such that a building entrance or bicycle parking is within 200 yards walking or bicycling distance from a bicycle network that connects to at least one of the following: at least 10 diverse uses; a school or employment center, if the project total floor area is 50% or more residential; or a bus rapid transit stop, light or heavy rail station, commuter rail station, or ferry terminal. All destinations must be 3-mile bicycling distance from project site. Include educational campaigns to encourage bicycling.	0%-1.7%	Zahabi, S. et al. (2016). Exploring the link between the neighborhood typologies, bicycle infrastructure and commuting cycling over time and the potential impact on commuter GHG emissions. Transportation Research Part D: Transport and Environment. 47, 89-103.
Neighborhood Site Enhancements	3.2.3	SDT-3 Implement an NEV Network	0.5%-12.7% VMT reduction for GHG-emitting vehicles, depending on level of local NEV penetration	Weak - not recommended without supplemental data.	Limited evidence and highly limited applicability. Use with supplemental data only.	N/A	City of Lincoln, MHM Engineers & Surveyors, Neighborhood Electric Vehicle Transportation Program Final Report, Issued 04/05/05, and City of Lincoln, A Report to the California Legislature as required by Assembly Bill 2353, Neighborhood Electric Vehicle Transportation Plan Evaluation, January 1, 2008. Cited in: California Air Pollution Control Officers Association. (2010). Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
Neighborhood Site Enhancements	3.4.9	TRT-9 Implement Car-Sharing Program	0.4% - 0.7% VMT reduction due to lower vehicle ownership rates and general shift to non-driving modes	Adequate	Vehicle trip reduction due to car-sharing programs; reduction assumes 1%-5% penetration rate. Implementing car-sharing programs allows people to have on-demand access to a shared fleet of vehicles on an as-needed basis, as a supplement to trips made by non-SOV modes. Transit station-based programs focus on providing the "last-mile" solution and link transit with commuters' final destinations. Residential-based programs work to substitute entire household based trips. Employer-based programs provide a means for business/day trips for alternative mode commuters and provide a guaranteed ride home option. The reduction shown here assumes a 1%-5% penetration rate.	0.3%-1.6%	Lovejoy, K. et al. (2013). Impacts of Carsharing on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Need to verify with more recent UCD research.
Parking Pricing	3.3.1	PDT-1 Limit Parking Supply	5%-12.5% VMT reduction in response to reduced parking supply vs. ITE parking generation rate	Weak - not recommended. Fehr & Peers has developed new estimates for residential land use only that may be used.	CAPCOA reduction range derived from estimate of reduced vehicle ownership, not supported by observed trip or VMT reductions. Evidence is available for mode shift due to presence/absence of parking in high-transit urban areas; additional investigation ongoing	Higher	Fehr & Peers estimated a linear regression formula based on observed data from multiple locations. Resulting equation produces maximum VMT reductions for residential land use only of 30% in suburban locations and 50% in urban locations based on parking supply percentage reductions.

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Parking Pricing	3.3.2	PDT-2 Unbundle Parking Costs from Property Cost	2.6% -13% VMT reduction due to decreased vehicle ownership rates	Adequate - conditional on the agency not requiring parking minimums and pricing/managing on-street parking (i.e., residential parking permit districts, etc.).	Reduction in VMT, primarily for residential uses, based on range of elasticities for vehicle ownership in response to increased residential parking fees. Does not account for self-selection. Only applies if the city does not require parking minimums and if on-street parking is priced and managed (i.e., residential parking permit districts).	2%-12%	Victoria Transport Policy Institute (2009). Parking Requirement Impacts on Housing Affordability. Retrieved March 2010 from: http://www.vtpi.org/park-hou.pdf.
Parking Pricing	3.3.3	PDT-3 Implement Market Price Public Parking	2.8%-5.5% VMT reduction due to "park once" behavior and disincentive to driving	Adequate	Implement a pricing strategy for parking by pricing all central business district/employment center/retail center on-street parking. It will be priced to encourage park once" behavior. The benefit of this measure above that of paid parking at the project only is that it deters parking spillover from project supplied parking to other public parking nearby, which undermine the vehicle miles traveled (VMT) benefits of project pricing. It may also generate sufficient area-wide mode shifts to justify increased transit service to the area. VMT reduction applies to VMT from visitor/customer trips only. Reductions higher than top end of range from CAPCOA report apply only in conditions with highly constrained on-street parking supply and lack of comparably-priced off-street parking.	2.8%-14.5%	Clinch, J.P. and Kelly, J.A. (2003). Temporal Variance Of Revealed Preference On-Street Parking Price Elasticity. Dublin: Department of Environmental Studies, University College Dublin. Retrieved from: http://www.ucd.ie/gpep/research/workingpapers/2004/04-02.pdf. Cited in Victoria Transport Policy Institute (2017). Transportation Elasticities: How Prices and Other Factors Affect Travel Behavior. Retrieved from: http://www.vtpi.org/tdm/tdm11.htm Hensher, D. and King, J. (2001). Parking Demand and Responsiveness to Supply, Price and Location in Sydney Central Business District. Transportation Research A. 35(3), 177-196. Millard-Ball, A. et al. (2013). Is the curb 80% full or 20% empty? Assessing the impacts of San Francisco's parking pricing experiment. Transportation Research Part A. 63(2014), 76-92. Shoup, D. (2011). The High Cost of Free Parking. APA Planners Press. p. 290. Cited in Pierce, G. and Shoup, D. (2013). Getting the Prices Right. Journal of the American Planning Association. 79(1), 67-81.
Transit System	3.5.3	TST-3 Expand Transit Network	0.1-8.2% VMT reduction in response to increase in transit network coverage	Adequate	Reduction in vehicle trips due to increased transit service hours or coverage. Low end of reduction is typical of project-level implementation (payment of impact fees and/or localized improvements).	0.1%-10.5%	Handy, S. et al. (2013). Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Transit System	3.5.4	TST-4 Increase Transit Service Frequency/Speed	0.02%-2.5% VMT reduction due to reduced headways and increased speed and reliability	Adequate	Reduction in vehicle trips due to increased transit frequency/decreased headway. Low end of reduction is typical of project-level implementation (payment of impact fees and/or localized improvements).	0.3%-6.3%	Handy, S. et al. (2013). Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Transit System	3.5.1	TST-1 Provide a Bus Rapid Transit System	0.02%-3.2% VMT reduction by converting standard bus system to BRT system	Adequate	No new information identified.	Same	N/A
Commute Trip Reduction	3.4.1	TRT-1 Implement CTR Program - Voluntary	1.0%-6.2% commute VMT reduction due to employer-based mode shift program	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-2 Implement CTR Program - Required Implementation/Monitoring" or with CAPCOA strategies TRT-3.4.3 through TRT-3.4.9.	Reduction in vehicle trips in response to employer-led TDM programs. The CTR program should include all of the following to apply the effectiveness reported by the literature: • Carpooling encouragement • Ride-matching assistance • Preferential carpool parking • Flexible work schedules for carpools • Half time transportation coordinator • Vanpool assistance • Bicycle end-trip facilities (parking, showers and lockers)	1.0%-6.0%	Boarnet, M. et al. (2014). Impacts of Employer-Based Trip Reduction Programs and Vanpools on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm

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Commute Trip Reduction	3.4.2	TRT-2 Implement CTR Program - Required Implementation/Monitoring	4.2%-21.0% commute VMT reduction due to employer-based mode shift program with required monitoring and reporting	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or with CAPCOA strategies TRT-3.4.3 through TRT-3.4.9.	Limited evidence available. Anecdotal evidence shows high investment produces high VMT/vehicle trip reductions at employment sites with monitoring requirements and specific targets.	Same	Nelson/Nygaard (2008). South San Francisco Mode Share and Parking Report for Genentech, Inc.(p. 8) Cited in: California Air Pollution Control Officers Association. (2010). Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
Commute Trip Reduction	3.4.4	TRT-4 Implement Subsidized or Discounted Transit Program	0.3%-20% commute VMT reduction due to transit subsidy of up to $6/day	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	1] Reduction in vehicle trips in response to reduced cost of transit use, assuming that 10-50% of new bus trips replace vehicle trips; 2] Reduction in commute trip VMT due to employee benefits that include transit 3] Reduction in all vehicle trips due to reduced transit fares system-wide, assuming 25% of new transit trips would have been vehicle trips.	1] 0.3%-14% 2] 0-16% 3] 0.1% to 6.9%	1] Victoria Transport Policy Institute. (2017). Understanding Transport Demands and Elasticities. Online TDM Encyclopedia. Retrieved from: http://www.vtpi.org/tdm/tdm11.htm 2] Carolina, P. et al. (2016). Do Employee Commuter Benefits Increase Transit Ridership? Evidence rom the NY-NJ Region. Washington, DC: Transportation Research Board, 96th Annual Meeting. 3] Handy, S. et al. (2013). Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Commute Trip Reduction	3.4.15	TRT-15 Employee Parking Cash-Out	0.6%-7.7% commute VMT reduction due to implementing employee parking cash-out	Weak - Effectiveness is building/tenant specific. Research data is over 10 years old (1997).	Shoup case studies indicate a reduction in commute vehicle trips due to implementing cash-out without implementing other trip-reduction strategies.	3%-7.7%	Shoup, D. (1997). Evaluating the Effects of Cashing Out Employer-Paid Parking: Eight Case Studies. Transport Policy. California Air Resources Board. Retrieved from: https://www.arb.ca.gov/research/apr/past/93-308a.pdf. This citation was listed as an alternative literature in CAPCOA.
Commute Trip Reduction	3.4.14	TRT-14 Price Workplace Parking	0.1%-19.7% commute VMT reduction due to mode shift	Adequate - Effectiveness is building/tenant specific.	Reduction in commute vehicle trips due to priced workplace parking; effectiveness depends on availability of alternative modes. Workplace parking pricing may include: explicitly charging for parking, implementing above market rate pricing, validating parking only for invited guests, not providing employee parking and transportation allowances, and educating employees about available alternatives.	0.5%-14%	Primary sources: Concas, S. and Nayak, N. (2012), A Meta-Analysis of Parking Price Elasticity. Washington, DC: Transportation Research Board, 2012 Annual Meeting. Dale, S. et al. (2016). Evaluating the Impact of a Workplace Parking Levy on Local Traffic Congestion: The Case of Nottingham UK. Washington, DC: Transportation Research Board, 96th Annual Meeting. Secondary sources: Victoria Transport Policy Institute. (2017). Understanding Transport Demands and Elasticities. Online TDM Encyclopedia. Retrieved from: http://www.vtpi.org/tdm/tdm11.htm Spears, S. et al. (2014). Impacts of Parking Pricing on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Commute Trip Reduction	3.4.6	TRT-6 Encourage Telecommuting and Alternative Work Schedules	0.07%-5.5% commute VMT reduction due to reduced commute trips	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	VMT reduction due to adoption of telecommuting. Alternative work schedules could take the form of staggered starting times, flexible schedules, or compressed work weeks.	0.2%-4.5%	Handy, S. et al. (2013). Policy Brief on the Impacts of Telecommuting Based on a Review of the Empirical Literature. California Air Resources Board. Retrieved from: https://www.arb.ca.gov/cc/sb375/policies/telecommuting/telecommuting_brief120313.pdf
Commute Trip Reduction	3.4.7	1] TRT-7 Implement CTR Marketing 2] Launch Targeted Behavioral Interventions	0.8%-4.0% commute VMT reduction due to employer marketing of alternatives	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	1] Vehicle trips reduction due to CTR marketing; 2] Reduction in VMT from institutional trips due to targeted behavioral intervention programs	1] 0.9% to 26% 2] 1%-6%	1] Pratt, Dick. Personal communication regarding the Draft of TCRP 95 Traveler Response to Transportation System Changes – Chapter 19 Employer and Institutional TDM Strategies. Transit Cooperative Research Program. Cited in California Air Pollution Control Officers Association. (2010).Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf Dill, J. and Mohr, C. (2010). Long-Term Evaluation of Individualized Marketing Programs for Travel Demand Management. Portland, OR: Transportation Research and Education Center (TREC). Retrieved from: http://pdxscholar.library.pdx.edu/usp_fac 2] Brown, A. and Ralph, K. (2017.) "The Right Time and Place to Change Travel Behavior: An Experimental Study." Washington, DC: Transportation Research Board, 2017 Annual Meeting. Retrieved from: https://trid.trb.org/view.aspx?id=1437253

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Commute Trip Reduction	3.4.11	TRT-11 Provide Employer-Sponsored Vanpool/Shuttle	0.3%-13.4% commute VMT reduction due to employer-sponsored vanpool and/or shuttle service	Adequate - Effectiveness is building/tenant specific.	1] Reduction in commute vehicle trips due to implementing employer-sponsored vanpool and shuttle programs; 2] Reduction in commute vehicle trips due to vanpool incentive programs; 3] Reduction in commute vehicle trips due to employer shuttle programs	1] 0.5%-5.0% 2] 0.3%-7.4% 3] 1.4%-6.8%	1] Concas, Sisinnio, Winters, Philip, Wambalaba, Francis, (2005). Fare Pricing Elasticity, Subsidies, and Demand for Vanpool Services. Transportation Research Record: Journal of the Transportation Research Board, 1924, pp 215-223. 2] Victoria Transport Policy Institute. (2015). Ridesharing: Carpooling and Vanpooling. Online TDM Encyclopedia. Retrieved from: http://vtpi.org/tdm/tdm34.htm 3] ICF. (2014). GHG Impacts for Commuter Shuttles Pilot Program.
Commute Trip Reduction	3.4.3	TRT-3 Provide Ride-Sharing Programs	1%-15% commute VMT reduction due to employer ride share coordination and facilities	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	Commute vehicle trips reduction due to employer ride-sharing programs. Promote ride-sharing programs through a multi-faceted approach such as: • Designating a certain percentage of parking spaces for ride sharing vehicles • Designating adequate passenger loading and unloading and waiting areas for ride-sharing vehicles • Providing an app or website for coordinating rides	2.5%-8.3%	Victoria Transport Policy Institute. (2015). Ridesharing: Carpooling and Vanpooling. Online TDM Encyclopedia. Retrieved from: http://vtpi.org/tdm/tdm34.htm
Commute Trip Reduction	3.4.10	TRT-10 Implement a School Pool Program	7.2%-15.8% reduction in school VMT due to school pool implementation	Adequate - School VMT only.	Limited new evidence available, not conclusive	Same	Transportation Demand Management Institute of the Association for Commuter Transportation. TDM Case Studies and Commuter Testimonials. Prepared for the US EPA. 1997. (p. 10, 36-38) WayToGo 2015 Annual Report. Accessed on March 12, 2017 from http://www.waytogo.org/sites/default/files/attachments/waytogo-annual-report-2015.pdf
Commute Trip Reduction	3.4.13	TRT-13 Implement School Bus Program	38%-63% reduction in school VMT due to school bus service implementation	Adequate - School VMT only.	VMT reduction for school trips based on data beyond a single school district. School district boundaries are also a factor to consider. VMT reduction does not appear to be a factor that was considered in a select review of CA boundaries. VMT reductions apply to school trip VMT only.	5%-30%	Wilson, E., et al. (2007). The implications of school choice on travel behavior and environmental emissions. Transportation Research Part D: Transport and Environment 12(2007), 506-518.

Appendix H: VMT Mitigation Through Banks and Exchanges: Understanding New Mitigation Approaches

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APPENDIX H

APRIL 2020 | FINAL

VMT Mitigation Through Fees, Banks, & Exchanges

UNDERSTANDING NEW MITIGATION APPROACHES

A WHITE PAPER PREPARED BY

FEHR & PEERS

WRCOG
Western Riverside Council of Governments

VMT MITIGATION THROUGH FEES, BANKS, AND EXCHANGES

Understanding New Mitigation Approaches

BACKGROUND

On September 27, 2013, Governor Jerry Brown signed SB 743 into law and started a process intended to fundamentally change transportation impact analysis as part of CEQA compliance. These changes include elimination of *auto delay, level of service (LOS), and other similar measures of vehicular capacity or traffic congestion* as a basis for determining significant impacts. Instead, transportation impacts will be determined based on changes to vehicle miles of travel (VMT). ***This change essentially shifts the focus of analysis from impacts to drivers through higher delays to the impact of driving itself***.

Lead agencies making the transition to VMT are realizing the challenges of using the new metric especially when it comes to mitigating significant VMT impacts. Reducing VMT from land use projects and land use plans has traditionally been accomplished through transportation demand management (TDM) strategies. These strategies include modifying a project's land use characteristics (i.e., density) and incorporating vehicle trip reduction programs at the site to change travel behavior of tenants and visitors. TDM is most effective in urban areas where the site is accessible by multiple travel modes (i.e., walking, bicycling, transit, and vehicle) offering similar travel times and convenience. Conversely, TDM strategies are less effective in lower density suburban and rural areas where modes are limited to personal vehicles. In both areas though, a program-based approach to mitigation can be more effective than project-site strategies. Programs can pool development mitigation contributions to pay for larger and more effective VMT reduction strategies that are not be feasible for individual projects. This paper outlines and compares multiple program types and then explains the implementation steps and key governance issues.

PROGRAM CONCEPTS

The concept of a 'program' approach to impact mitigation is not new and has been used for a variety of technical subjects including transportation, air quality, greenhouse gases, and habitat. Transportation impact fee programs have been used to help mitigate cumulative level of service (LOS) impacts. What is new are how to use impact fee programs for VMT impacts and alternative programs called mitigation exchanges and banks. Absent new program-level mitigation options, suburban and rural lead agencies will have limited feasible mitigation options for project sites.

For CEQA purposes, feasible means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."

- CEQA Guidelines Section 15364

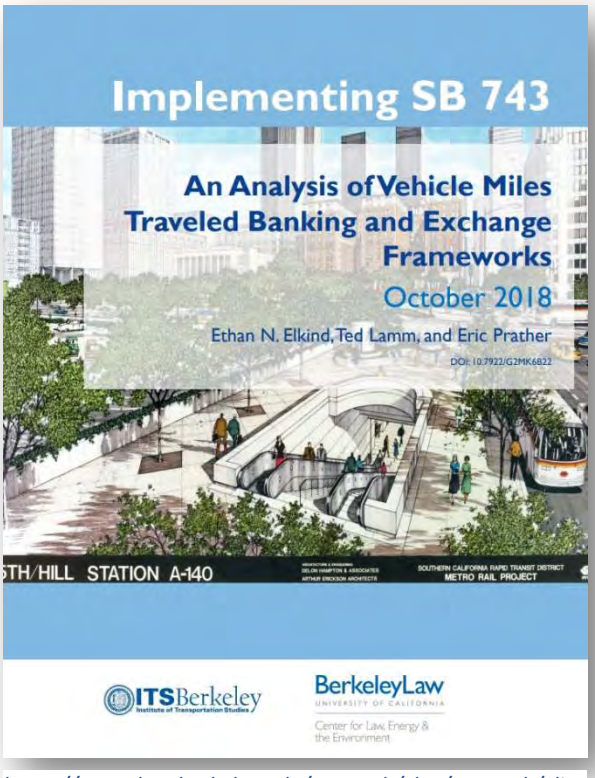
Without feasible mitigation, significant VMT impacts would be significant and unavoidable (SAU). Under these circumstances a project must prepare an environmental impact report (EIR) adding extra time and cost to environmental review compared to a negative declaration (ND). Program-based approaches may be able to overcome the limitation of project-site only mitigation. Three specific concepts as described below have been identified for the purposes of this white paper.

- **VMT-based Transportation Impact Fee program (VMT-TIF)** – The first program concept is a traditional impact fee program in compliance with the mitigation fee act. The nexus for the fee program would be a VMT reduction goal consistent with the CEQA threshold established by a lead agency for SB 743 purposes. The City of LA is the first in California to complete a nexus study for this type of program. The main difference from a fee program based on a metric such as vehicle level of service (LOS) is that the VMT reduction nexus results in a capital improvement program (CIP) consisting largely of transit, bicycle, and pedestrian projects. These types of fee programs are time consuming to develop, monitor, and maintain but are recognized as an acceptable form of CEQA mitigation if they can demonstrate that the CIP projects will be fully funded and implemented.

- **VMT Mitigation Exchange** – In simple terms, the exchange concept relies on a developer agreeing to implement a predetermined VMT reducing project or proposing a new one. The project may be located in the vicinity of the project or elsewhere in the community, and possibly outside the community. The exchange needs to have a facilitating entity that can match the VMT generator (the development project) with a VMT reducing project or action. The facilitating entity could be the lead agency or another entity that has the ability to provide the match and to ensure through substantial evidence that the VMT reduction is valid. A key unknown with this approach is the time period for VMT reduction. For example, how many years of VMT reduction are required to declare a VMT impact less than significant?

- **VMT Mitigation Bank** – A mitigation bank attempts to create a monetary value for VMT reduction such that a developer could purchase VMT reduction credits. The money exchanged for credits could be applied to local, regional, or state level VMT reduction projects or actions. Like all VMT mitigation, substantial evidence would be necessary that the projects covered by the bank would achieve expected VMT reductions and some form of monitoring may be required. This is more complicated than a simple exchange and would require more time and effort to set up and implement. The verification of how much VMT reduction is associated with each dollar or credit would be one of the more difficult parts of the program.

With both exchanges and banks, another important test is that the VMT reduction would not have occurred otherwise such that mitigation program creates 'additionality'. This means that additional VMT reduction will occur above and beyond what would have occurred without the program. A commonly accepted definition of 'additionality' has not yet been developed. One possible test of additionality is that the mitigation project is not included in the regional transportation plan (RTP). The RTP is a financially constrained plan so projects not included in the plan would not likely have been implemented within the typical cumulative timeframe.



https://www.law.berkeley.edu/research/clee/research/climate/transportation/vehicle-miles-traveled/

For any program to qualify as a CEQA mitigation program, the discretionary action to adopt the program may require CEQA review. This conclusion is based on the *California Native Plant Society v. County of El Dorado* where the court found that payment of fee does not presumptively establish full mitigation of a discretionary project. A separate CEQA review of the program is necessary to satisfy the 'duty to mitigate' imposed by CEQA. Decision makers should also realize that absent a VMT reduction program, developers would likely be limited to only project site mitigation. While this may be less effective, it also lowers their mitigation costs because the available and feasible mitigation would be more limited.

More details about exchanges and banks are explained in the framework document shown above and available at the cited web link. This white paper expands on the framework to accomplish two objectives. The first objective is to compare the pros and cons of exchanges and banks to a traditional impact fee program. Since impact fee programs have already been established as feasible CEQA mitigation, they serve as a benchmark against which to compare other program concepts. The second objective is to outline the implementation steps associated with creating an exchange or bank to help identify key implementation questions or issues that could affect their feasibility.

PROGRAM ASSESSMENT (Pros/Cons)

Table 1 below outlines the pros and cons of approach VMT mitigation through an impact fee program, exchange, or bank. This assessment is intended to highlight some of the key differences between each program concept.

Table 1 – VMT Mitigation Program Type Comparison

Program Type	Pros	Cons
Impact Fee Program	• Common and accepted practice • Accepted for CEQA mitigation • Adds certainty to development costs • Allows for regional scale mitigation projects • Increases potential VMT reduction compared to project site mitigation only	• Time consuming and expensive to develop and maintain • Requires strong nexus • Increases mitigation costs for developers because it increases feasible mitigation options • Limited to jurisdictional boundary unless a regional authority is created • Uncertainty about feasibility and strength of nexus relationship between VMT and pedestrian, bicycle, and transit projects (especially in suburban/rural jurisdictions)
Mitigation Exchange	• Limited complexity • Reduced nexus obligation • Expands mitigation to include costs for programs, operations, and maintenance • Allows for regional scale mitigation projects • Allows for mitigation projects to be in other jurisdictions • Increases potential VMT reduction compared to project site mitigation only	• Requires 'additionality' • Potential for mismatch between mitigation need and mitigation projects • Increases mitigation costs for developers because it increases feasible mitigation options • Unknown timeframe for mitigation life • Effectiveness depends on scale of the program
Mitigation Bank	• Adds certainty to development costs • Allows for regional scale projects • Allows for mitigation projects to be in other jurisdictions • Allows regional or state transfers	• Requires 'additionality' • Time consuming and expensive to develop and maintain • Requires strong nexus • Political difficulty distributing mitigation dollars/projects

Table 1 – VMT Mitigation Program Type Comparison		
Program Type	**Pros**	**Cons**
	• Expands mitigation options to include costs for programs, operations, and maintenance • Increases potential VMT reduction compared to project site mitigation only	• Increases mitigation costs for developers because it increases feasible mitigation options • Unknown timeframe for mitigation life • Effectiveness depends on scale of the program

To better understand potential program differences, Table 2 contains a comparison of the VMT mitigation projects or actions that each program type could fund or implement. The information for an impact fee program is more certain than for exchanges or banks. Fee programs have been used in practice for decades and have been vetted through court decisions. While banks and exchanges do exist for other environmental mitigation purposes such as wetlands preservation and habitat conservation, these applications have largely focused on protecting fixed land amounts versus reducing a metric that fluctuates over time and may vary in value depending on economic conditions.

Table 2 –VMT Mitigation Projects and Actions Comparison	
Program Structure	**Project Types that Reduce VMT**
Impact Fee Program	• Pedestrian network expansion • Bicycle/Scooter network expansion (includes bike/scooter share stations) • Transit vehicles or facilities associated with service expansion • Roadway gap closures that reduce trip lengths (bridges)
Mitigation Exchange	• All impact fee program project types • Private or institutional projects that reduce VMT • Transit service improvements and transit pass subsidies
Mitigation Bank	• All impact fee program project types • All mitigation exchange project types • VMT reduction strategies associated with travel behavior changes

IMPLEMENTATION STEPS

This section addresses the second objective noted above to outline the implementation steps associated with creating an exchange or bank to help identify key implementation questions or issues that could affect their feasibility. The starting point for these steps begins with identifying the potential statutory or legal requirements that could govern or influence program creation. These are highlighted in Table 3 and build on the research previously done by U.C. Berkeley in the document referenced above. Since specific statutes do not exist specific to VMT exchanges and banks, U.C. Berkeley used a proxy based on conservation programs established under the California Fish & Game code. This is a reasonable proxy given that the intent behind VMT exchanges and banks is a form of conservation. Instead of habitat, VMT exchanges and banks are trying to conserve vehicle trip making and the VMT generated through this activity. VMT mitigation banks or exchanges do not appear to require new legislative authority but as noted in the U.C. Berkeley document, having state-wide templates for their development could help establish clear standards and expectations for program designs.

Table 3 – Potential VMT Mitigation Exchange/Bank Legal Requirements

Program Type/Legal Requirements	Statutory Reference
Transportation Impact Fee Program	
1. Mitigation Fee Act – Intended to create a program that allows individual development projects to pay for all or portion of the cost to implement public facilities necessary to support the project. Public facilities are generally limited to capital projects. The nexus study for the program must demonstrate how there is a reasonable relationship between the following. • How there is a reasonable relationship between the fee's use and the type of development project on which the fee is imposed. • How there is a reasonable relationship between the need for the public facility and the type of development project on which the fee is imposed. • How there is a reasonable relationship between the amount of the fee and the cost of the public facility or portion of the public facility attributable to the development on which the fee is imposed. The fees may not be applied to existing deficiencies or the maintenance and operation of an improvement. As such, clear standards should exist about the physical and operational performance expectations for each model of travel included in the program.	• California Government Code §66000-66001

Table 3 – Potential VMT Mitigation Exchange/Bank Legal Requirements	
Program Type/Legal Requirements	**Statutory Reference**
2. Constitutional – Court decisions have placed limits on what level of mitigation can be expected of land use development projects. The limits largely require a nexus between the mitigation and a legitimate government interest plus a rough proportionality between the mitigation and the adverse impact caused by the project.	• Nollan v. California Coastal Commission, 483 U.S. 825 (1987) • Dolan v. City of Tigard, 512 U.S. 374 (1994)
3. CEQA – For mitigation to be imposed, a significant impact must occur. Impacts stem from changes to the baseline environment caused by the project. The significance of those impacts is determined by the lead agencies choice of thresholds. This limits mitigation to increment of VMT change that occurs above the threshold.	• CEQA Statute (CA Public Resources Code 21000-21189) • CEQA Guidelines (CA Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387)
VMT Mitigation Exchange or Bank	
1. An explanation of the VMT mitigation purpose of and need for the bank or exchange.	• Fish & Game Code §1852(c)(1)
2. The geographic area covered by the bank or exchange and rationale for the selection of the area, together with a description of the existing transportation and development dynamics that provide relevant context for the development of the bank or exchange.	• §1852(c)(2)
3. The public transit and VMT reduction opportunities currently located within the bank or exchange area.	• §1852(c)(3)
4. Important residential and commercial communities and transportation resources within the bank or exchange area, and an explanation of the criteria, data, and methods used to identify those important communities and resources.	• §1852(c)(4)
5. A summary of historic, current, and projected future transportation stressors and pressures in the bank or exchange area, including economic, population growth and development trends.	• §1852(c)(5-6)
6. Provisions ensuring that the bank or exchange will comply with all applicable state and local legal and other requirements and does not preempt the authority of local agencies to implement infrastructure and urban development in local general plans.	• §1852(c)(7)
7. VMT mitigation goals and measurable objectives for regional transportation resources and important mitigation elements identified in the plan that address or respond to the identified stressors and pressures on transportation within the bank or exchange area.	• §1852(c)(8)

Table 3 – Potential VMT Mitigation Exchange/Bank Legal Requirements	
Program Type/Legal Requirements	**Statutory Reference**
8. VMT mitigation projects, including a description of specific projects that, if implemented, could achieve the mitigation goals and objectives, and a description of how the mitigation projects were prioritized and selected in relation to the mitigation goals and objectives.	• §1852(c)(9)
9. Provisions ensuring that the bank or exchange plan is consistent with and complements any local, regional or federal transportation or congestion management plan that overlaps with the bank or exchange area, a summary of any such plans, and an explanation of such consistency.	• §1852(c)(10-11)
Sources: Implementing SB 743 An Analysis of Vehicles Miles Traveled Banking and Exchange Frameworks, October 2018, Institute of Transportation Studies, U.C. Berkeley. 2019 California Environmental Quality Act (CEQA) Statute & Guidelines, Association of Environmental Professionals, 2019. http://leginfo.ca.gov/ http://ccr.oal.ca.gov/	

A review of these potential legal requirements suggests that the creation of an exchange or a bank may not be less rigorous than that of a conventional transportation impact fee program. These legal requirements combined with the need to demonstrate additionality and provide verification could create implementation costs beyond those of a conventional transportation impact fee program. To explore this issue further, annotated flow charts were developed for each program concept. These flow charts are presented on the following pages and allow a reviewer to quickly surmise the differences and similarities associated with creating, operating, and maintaining these programs.

Mitigating VMT Impacts Under SB 743

FEHR & PEERS

VMT Bank

Implementation

Considerations

Procedural Flowchart

Decision Analytical process or procedural outcome

Step 1
Determine Scale/Scope

There are advantages and disadvantages to creating a Bank with a larger scale/scope. However, multiple agencies must be willing to accept the Bank's mitigation options for a state or regional Bank to be feasible. Larger regions can:

*Decrease costs associated with running the Bank
*Decrease local authority over mitigation options
*Increase efficiency and effectiveness of the program

Step 2
Determine Sponsor

There are a few organizational components to consider when creating a mitigation Bank. These elements include:

*Administrative - The Bank must perform several administrative functions such as collecting fees, managing information, answering questions, and other business operations.

*Technical - There is a significant amount of technical work needed to initially and continually prove the mitigation options reduce VMT and that the reductions would not have occurred without the programs. The Bank also needs to show the fees it receives are related and proportional to new development.

*Accounting - The Bank requires a thorough accounting system to track collected fees and to ensure fees are being handled according to CEQA and other legal guidelines. This includes payments for implementing VMT reduction projects.

Agencies should consider their ability to perform these roles when deciding whether the Bank should be run internally or by a third party.

Step 3
Formally Establish Bank & Review Team

The entity creating the Bank must legally formalize its creation. If the intent is for the Bank to be used by multiple agencies, this may require a joint powers authority or equivalent.

A review team should be used to verify the effectiveness of mitigation options based on substantial evidence. This team could be internal to the entity creating the bank or an independent third party.

Potential third party entities that could function as a review team include public agencies such as those listed below.

*Caltrans - local office
*ARB
*CalEPA

Step 4
Determine & Prioritize Mitigation Options

The Bank Sponsor creates a list of mitigation options. The Review Team evaluates the list to ensure it complies with relevant requirements. The Sponsor should consider the following elements when prioritizing options:
*Equity
*Timeliness of Implementation
*Cost

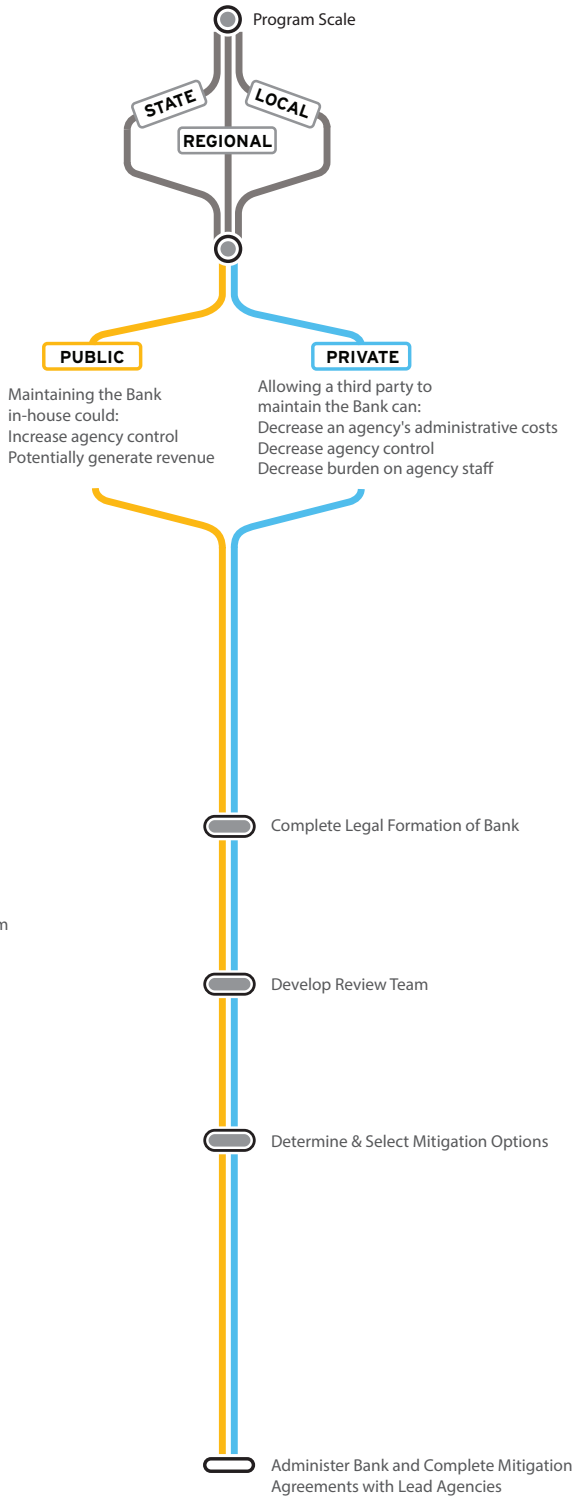
Mitigation options can include:
*Infrastructure projects
*Programs/incentives (Unlike infrastructure projects, programs/incentives are ongoing activities. Because programs/incentives must be continually maintained to be effective, agencies should consider if developers must pay for them indefinitely.

Step 5
Administer Bank

The public agency or entity sponsoring a Bank may not always be the lead agency on a project. In this situation the Sponsor should develop an agreement with the lead agency that allows the Bank's mitigation options to be considered an acceptable mitigation measure for the EIR.

Banks must continue to prove that their mitigation options reduce VMT and that the reduction would not have occurred without the projects/programs.

CEQA review of the Exchange creation may be required to be considered as a formal mitigation program.



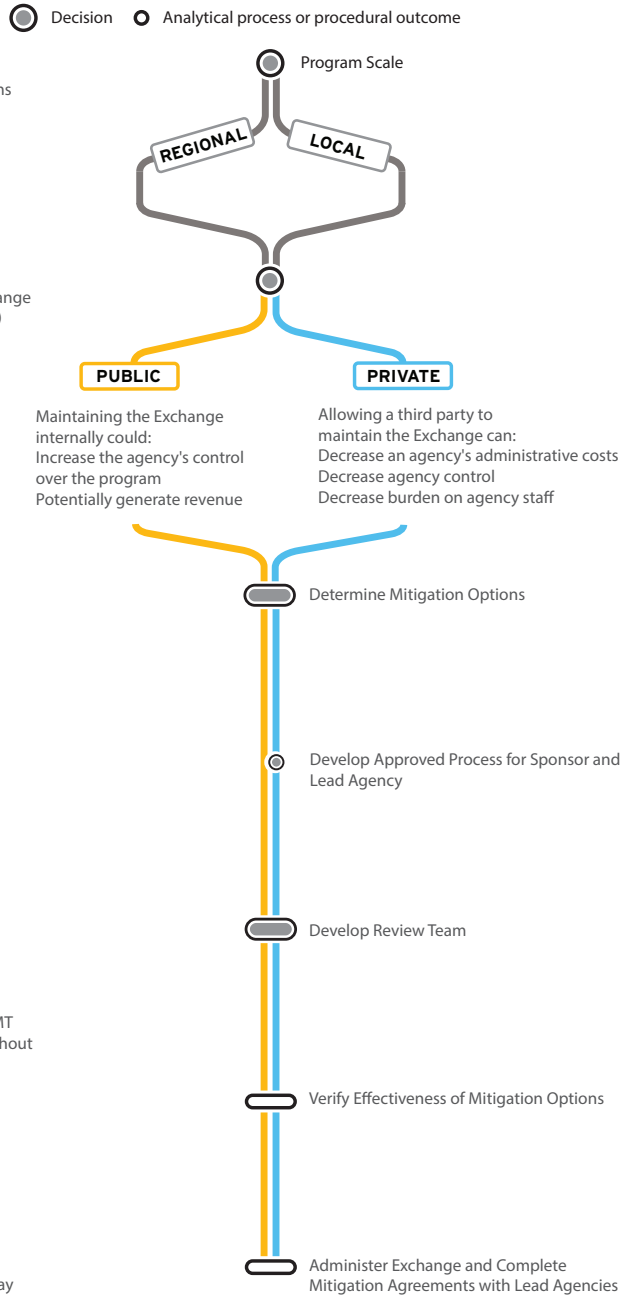
Mitigating VMT Impacts Under SB 743

FEHR & PEERS

VMT Exchange

Implementation	Considerations
Step 1 Determine Scale/Scope	To create a regional program requires all participating agencies to adopt the program. Programs with larger scopes can: *Decrease administrative costs *Decrease local authority *Increase efficiency and effectiveness of the program
Step 2 Determine Sponsor	The organizational components of a mitigation Exchange will depend on the type of sponsor (public or private) mitigation options, and matching process between mitigation options and projects.
Step 3 Determine & Propose Mitigation Options	If the sponsor is a public agency, they will develop a list of options developers can choose from to mitigate the VMT generated by their development. If the developer wants to propose their own mitigation Exchange, they must get it approved by the sponsor and lead agency.
Step 4 Develop Review Team	The Exchange should have a Review Team to verify mitigation effectiveness and additionality based on substantial evidence. The team could consist of third-party representatives. The team reviews the mitigation list and verifies that the options reduce VMT and that the reductions would not have occurred without the project, program, or incentive. Because Exchanges can include programs/incentives as mitigation options, the Review Team must continually evaluate them to ensure the options are still effective and determine to what degree they reduce VMT.
Step 5 Administer Exchange	The public agency/entity sponsoring an Exchange may not always be the lead agency on a project. In this situation the Sponsor should develop an agreement with the lead agency that allows the Exchange's mitigation options to be considered an acceptable mitigation measure for the EIR. Exchanges must continue to prove that their mitigation options reduce VMT and that the reduction would not have occurred without the projects/programs. CEQA review of the Exchange creation may be required to be considered as a formal mitigation program.

Procedural Flowchart



Mitigating VMT Impacts Under SB 743

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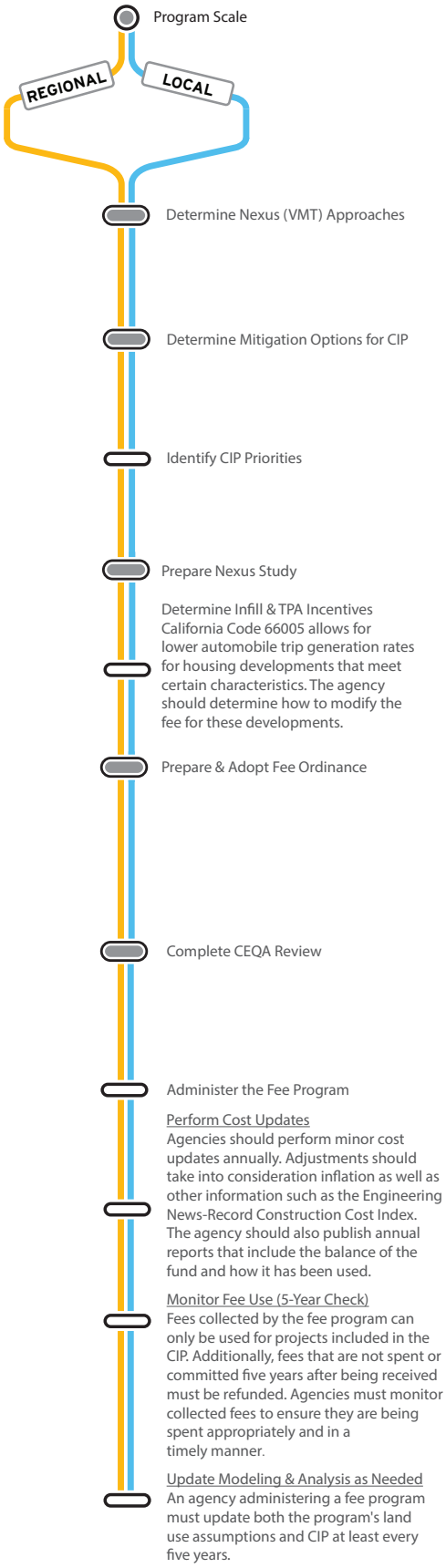
VMT Impact Fee

Implementation	Considerations
Step 1 Determine Scale/Scope	To create a regional program requires all participating agencies to adopt the program. Programs with larger scopes: *Decrease administrative costs *Decrease local authority *Increase efficiency and effectiveness of the program
Step 2 Determine Nexus (VMT)	An agency must determine its VMT reduction goal before it can show the relationship between new development and that goal.
Step 3 Determine & Propose Mitigation Options	The CIP develops a list of capital improvement projects necessary to reduce VMT consistent with its desired goal. The agency should prioritize the projects so they are constructed in a logical order. The prioritization process should consider: *Equity *Timeliness *Cost *Modal Preference (Walking/Biking/Transit) *Stakeholder/Community Input
Step 4 Prepare & Approve Nexus Study	Agencies must demonstrate that the projects in the fee program contribute to VMT reduction. The agency must also show that the fees are related and proportional to new development. Fees should take into account the delay in the time when fees are collected and when they are used.
Step 5 Prepare & Adopt Fee Ordinance	For a fee to be regularly imposed, it must be adopted as an ordinance. The ordinance must include: *Reason for the fee *The relationship between the fee and new development *Methodology used in developing the fee *Projects to be included in the CIP
Step 6 Complete CEQA Review for the Program	California courts have ruled that in order for a fee program to serve as acceptable CEQA mitigation, the program itself must first be reviewed in an EIR.
Step 7 Administer the Program	For Regional Impact Fee Programs ensure that participating agencies have adopted the program such that payment of fees is considered a feasible mitigation measure.

Procedural Flowchart

Decision Analytical process or procedural outcome



PROGRAM EXAMPLES

To help explain the different program types, it may be useful to consider some examples. The existing programs below range from an existing VMT-based impact fee program to programs that could be evolved into VMT mitigation banks or exchanges.

City of Los Angeles Westside Mobility Plan Transportation Impact Fee Program

(https://planning.lacity.org/eir/CoastalTrans/deir/pdfs/tiafeestudy.pdf)

The City of Los Angeles developed the first impact fee program that relies on a VMT reduction nexus. The westside previously relied on LOS-based impact fee programs but as the area matured and new laws like SB 743 emerged, the City chose to shift their nexus. This shift changed the nature of the CIP from largely roadway capacity expansion projects to more transit, bicycle, and pedestrian infrastructure projects. A key benefit of this approach as noted above is that once the fee program is in place, administration of the program is limited to construction cost updates and complying with state reviews to ensure that funding is being appropriately used to construct and implement the CIP projects. No further verification of CIP effectiveness is required.

WRCOG Transportation Uniform Mitigation Fee (TUMF) Program

(http://www.wrcog.cog.ca.us/174/TUMF)

Western Riverside County has the Transportation Uniform Mitigation Fee (TUMF) Program, implemented in 2003. While this program is tied to a vehicle LOS nexus, the foundation and structure of the program could be used to create a new VMT impact fee program similar to the Los Angeles example. The following summary describes the foundational elements of the TUMF and provides information about how to evolve the program for VMT impact mitigation purposes.

The TUMF funds critical county-wide transportation infrastructure to accommodate the traffic created by new population growth and commercial development throughout western Riverside County. It is a vital funding source that complements Federal, State, and local funding funds for improvements to roadways, interchanges, and transit facilities. The fee is uniformly assessed on new residential and non-residential development throughout the WRCOG region. Each of WRCOG's member jurisdictions and the March Joint Powers Authority (JPA) participate in the program.

WRCOG serves as the Program Administrator and has three main responsibilities. First, WRCOG leads the development of regular AB 1600 compliant Nexus Studies. These Studies identify needed the transportation facilities to be funded by the fee, identify future growth projections, and set the resulting

fee, which is then adopted by WRCOG's Executive Committee. The transportation projects included in the Nexus Study are identified through a collaborative process in which jurisdictions submit projects for consideration, which are then subject to an analysis process to verify that they meet applicable criteria. These two-step process ensures that the projects included in the Nexus Study reflect both local input and regional need. A similar process could be used to create a VMT reduction nexus and to select VMT reducing projects for either a separate VMT impact fee program or a modified TUMF that includes projects to achieve LOS and VMT reduction goals.

WRCOG's second responsibility is the collection and calculation of fees. WRCOG has developed a set of consistent fee calculation tools, which ensure that TUMF is calculated on a consistent basis for all projects, regardless of their location. Because there is a regional Nexus Study and a consistent fee calculation approach, WRCOG ensures that all projects of the same type pay the same fee, regardless of their location. In 2019, WRCOG completed work on an online fee payment system which expedites fee payments from project applicants.

The final responsibility of WRCOG is distributing funds collected from each agency and using those monies to fund transportation projects. Project identification and prioritization is led by the local agencies who meet to decide how much funding to provide to each project. Local agencies are grouped into geographic sub areas known as TUMF Zones. Each TUMF Zone is allocated a budget of anticipated revenues, which are then distributed through a consensus-based approach. WRCOG then provides reimbursements to each agency as work occurs. WRCOG's facilitates this process and also reviews invoices to ensure that funds in a manner which is consistent with program requirements.

Miles

(https://www.sacrt.com/apps/miles-get-rewarded-for-your-commute-travel/)

The City of Sacramento, Sacramento Regional Transit, and Sacramento State partnered with Miles, a new app that will rewards users with redeemable miles for their commute and travel. The redeemable miles can be exchanged for exclusive experiences, products and services with vendors including Ray-Ban, Illy, Audible, and Rockport. Miles app users automatically earn miles for daily travel and receive bonus miles for green trips (walk, bike, carpool or transit). Sacramento residents are also eligible to complete special challenges to earn additional rewards. While this program was not set up as an VMT mitigation exchange or bank, it could evolve into one.

The purpose of rewarding green trips and the special challenges is to influence user behavior to reduce vehicle trips and VMT. With some additional accounting of user travel behavior before and after using the app, enough substantial evidence could be created to provide the VMT reduction verification described above and noted in the flow charts. The program already has administrative functions developed and

established relationships between the partner agencies. Some of the unknowns at this time are listed below.

- cost of the program on a per user basis
- amount of VMT reduction that is achieved for a typical user
- how a developer could contribute to the program to sponsor additional users
- stability or permanency of VMT reductions dependent on 'challenges'

In addition to the Miles program, other similar vendors exist such as Luum (https://luumbenefits.com/) and Metropia (https://www.metropia.com/). These types of app-based vendors could evolve to offer exchange or bank type mitigation options if they can comply with the various requirements outlined in the implementation steps and identified in the U.C. Berkeley white paper cited above.

Metro Transit Pass Subsidy

Metro is the Los Angeles County mobility provider. One of the programs they currently offer is a transit pass subsidy with a couple of unique elements that may qualify it as a VMT mitigation exchange. Metro offers student and employee transit passes under their U-pass and E-pass programs. These are transit passes for students and employees in LA County that are unique because instead of a physical transit pass card, the pass comes in the form of an RFID chip with an antenna that sticks to an existing student or employee identification badge. This type of chip allows the transit agency to charge for trips when they are made, which is more cost-effective for schools and employers. The registration form for obtaining the pass includes a survey about current travel behavior and data such as the distance between home and school or work for the applicant. By tracking how individual travel behavior changes from this baseline condition over time, LA Metro can produce aggregate statistics about the effect on transit ridership and VMT.

The second unique component of the program is that Metro allows anyone to 'sponsor' these passes for a particular school or employer. As such, they are entertaining the concept of using the program as an SB 743 VMT mitigation exchange. Developers could purchase U- or E-passes and could use the Metro performance data to estimate the VMT reduction per pass. LA Metro is working with LA DOT and SCAG on a pilot concept this year to formalize the program. As part of this white paper development, we asked Metro if developers/agencies outside Los Angeles County could participate. The reason for this request is that VMT mitigation dollars spent on Metro transit passes may be more effective than the same dollars spent in other communities. Whether local communities would be willing to allow mitigation dollars across borders will likely depend on a variety of factors but knowing that it is feasible on the Metro end is an important first feasibility question. Metro replied that their work has not progressed sufficiently to answer this question yet.

Expanded Public Agency Telecommute Bank

With increased telecommuting during the COVID-19 shelter-in-place order, public agencies may decide to permanently expand their telecommuting offerings to employees. When making that decision, these agencies could 'bank' the commute VMT savings from each employee into a mitigation program. The agency would then have the option to allocate the VMT savings to individual development or transportation projects. The allocation process could be gifted, auctioned, or offered at a fixed price. WRCOG could function as an umbrella facilitator for this type of program with responsibility for collecting and organizing the VMT savings into a single 'bank' and then disposing of the savings to individual projects as mitigation subject to all the program expectations outlined above.

IMPLEMENTATION RISKS

As explained above, VMT exchanges or banks come with unique requirements such as the 'additionality' test and ongoing verification that make them more challenging to implement than a conventional transportation impact fee program. However, exchanges and banks offer the ability to include program-type strategies directed at changing travel behavior that are not available in a conventional impact fee program. Given these tradeoffs, we assessed whether other risks could influence the choice of program.

One risk that stood out was related to current legal challenges to the use of carbon offsets that are based on similar concepts. In a recent legal case, the Sierra Club, Center for Biological Diversity, and Cleveland National Forest Foundation, Climate Action Campaign, Endangered Habitats League, Environmental Center of San Diego, and Preserve Wild Santee challenged the County of San Diego over the use of carbon offsets to achieve GHG reduction goals in the County's climate action plan. The court petition is available at the link below.

- https://www.biologicaldiversity.org/programs/urban/pdfs/San-Diego-CAP-Petition-for-Writ-of-Mandate.pdf

The California Attorney General's (AG's) office has also weighed in on this court case. According to a November 11, 2019 Los Angeles Times article, "California says San Diego County could undermine state's greenhouse gas plan", the AG's office filed an amicus brief. The article reported the following about the AG's brief.

> *In a strongly worded amicus brief recently submitted to the 4th District Court of Appeal in San Diego, Becerra argued that the county's offset strategy would "perpetuate current sprawling development patterns, which will impede the ability of the region and state to reach their long-term climate objectives."*
>
> *"Without significant [vehicle miles traveled] reductions across the state, California simply will not be able to achieve its [greenhouse gas] reduction targets," the 33-page document said.*

The state does not appear to support reducing GHG emissions from land use development without those reductions coming from fundamental local land use and transportation network changes. The risk is that lower density suburban and rural parts of the state would continue their sprawling patterns leading to more VMT and emissions. If the state maintains this position, it could also be used to argue against the creation of VMT mitigation exchanges and banks that attempt to offset VMT increases. To minimize this risk, the mitigation options offered by exchanges and banks could be applied only after project site mitigation has been exhausted and should attempt to offer additional mitigation within the same area or community.

GOVERNANCE

Governance for a VMT mitigation program is another important part of assessing program feasibility for a particular agency. The definition of governance for the purposes of this assessment includes the following three components.

1. Who makes program decisions?
2. How are decisions made?
3. Who is accountable for decisions?

These questions are answered below based on WRCOG serving as the specific agency that would implement and operate the VMT mitigation program. Since the answers will vary depending on the exact type of mitigation program, WRCOG was asked about specific program types of most interest. In response, three program options were identified.

- Modified TUMF – This option involves a modification to the existing TUMF where a new VMT reduction nexus is added. This change would allow the creation of two separate capital improvement programs (CIP) with their own separate fee schedules. A roadway capacity CIP would be retained for the LOS nexus component of the program and a new VMT mitigation CIP would be created. Some of the existing projects in the TUMF CIP are VMT reducing such as transit, bicycle, and pedestrian projects. These would be moved to the new VMT mitigation CIP presuming they are consistent with the new VMT reduction nexus requirement. If changes are limited to this new accounting and nexus approach, impact fees would remain relatively stable.

  This option also allows for new VMT reducing projects to be added to the VMT mitigation CIP. The more projects that are added, the greater the potential VMT reduction, but also the greater the impact fees. Under this option, the TUMF would continue to serve a mitigation program for land use development projects. No mitigation would be available through the program for transportation infrastructure projects that generate new VMT.

- New VMT Impact Fee Program – This option involves creating a new VMT impact fee program focused solely on achieving VMT reduction through the CIP projects. The CIP would largely consist of active transportation and transit projects where sufficient evidence exists to demonstrate a VMT reduction nexus. The program would also be targeted exclusively for land use development project mitigation.

- New VMT Mitigation Exchange – This option is the most flexible in terms of offering VMT mitigation for both land use and transportation infrastructure projects. The program would identify VMT reduction projects that could be either fully funded or directly implemented by land use project applicants or transportation project sponsors. The type of project could include capital projects similar to those mentioned above for the impact fee programs plus TDM strategies or activities that reduce VMT. TDM often involves information development and dissemination and actions that change travel behavior. Since these do not qualify as capital projects, they are typically excluded from impact fee programs. As long as these strategies or activities have a clear nexus to VMT reduction, they would qualify for the VMT mitigation exchange project list. By covering VMT mitigation for transportation projects (i.e. roadway capacity projects causing induced vehicle travel impacts), more agencies could participate in the program and more VMT reduction could be delivered.

These options do not include a mitigation bank. As explained above, banks are more complex and require more effort to create, operate, and maintain without current evidence showing that the higher investment would necessarily produce greater VMT reduction than an impact fee program or exchange.

Who makes program decisions?

The simple answer to this question is that WRCOG makes the decisions, but that is not precise enough to fully understand what individuals or groups of individuals are authorized to make different types of decisions. WRCOG was formed through a joint powers agreement (JPA) is composed of all 18 incorporated Cities, Riverside County, Eastern and Western Municipal Water Districts, the Morongo Band of Mission Indians, and the Riverside County Superintendent of Education. The main decision-making body of WRCOG is the Executive Committee which is comprised of elected officials from each of WRCOG's member agencies and meets monthly to discuss policy issues and consider recommendations from WRCOG's Technical Advisory Committee (TAC), primarily comprised of the region's City Managers.

How are decisions made?

Any decision related to the implementation of any option identified above would ultimately be made by the Executive Committee after discussions, input, and voting has occurred at the various policy committees. On-going operation of the program would occur at the Executive Director, Transportation & Planning Director, and Public Works Committee (PWC) levels. Decisions and informational items are first brought to the Public Works and or Planning Directors Committee (PDC). Recommendations are then brought forth to the TAC. Following this would be the Administration & Finance Committee (AFC) who

provide budget and finance overview, which is comprised of a smaller group of elected officials who are also members of the Executive Committee. The final decision recommendations are lastly brought to the Executive Committee who make the final determination.

Once a program is established, WRCOG staff would oversee the program with input from WRCOG's member agencies, primarily through WRCOG's existing committee structure.

Who is accountable for decisions?
The WRCOG organization described above is transparent with an emphasis on a streamlined approach to decision-making. For day-to-day decision making, responsibility and accountability lies with the Executive Director and the Transportation & Planning Director. Major decisions are reserved for the Executive Committee since it has sole authority to adopt and amend by-laws for the administration and management of the JPA.

The table below summarizes the governance expectations above.

Type of Program	Who Makes Program Decisions?	How Are Decisions Made?	Who is Accountable?
Modified TUMF Program	Creation of the program - WRCOG Executive Committee Operation of the program - WRCOG Executive Committee, Executive Director, Transportation & Planning Director, AFC, TAC, and PWC	Decisions can originate from questions at any level of the agency, member agency, or the public. These are then resolved at the PWC, PDC, TAC, AFC or Transportation & Planning Director level for day-to-day operations and the Executive Committee for more significant decisions.	Executive Director and Transportation & Planning Director for day-to-day operations and the Executive Committee for more significant decisions.
New VMT Impact Fee Program			
New VMT Mitigation Exchange			

Advancing Implementation

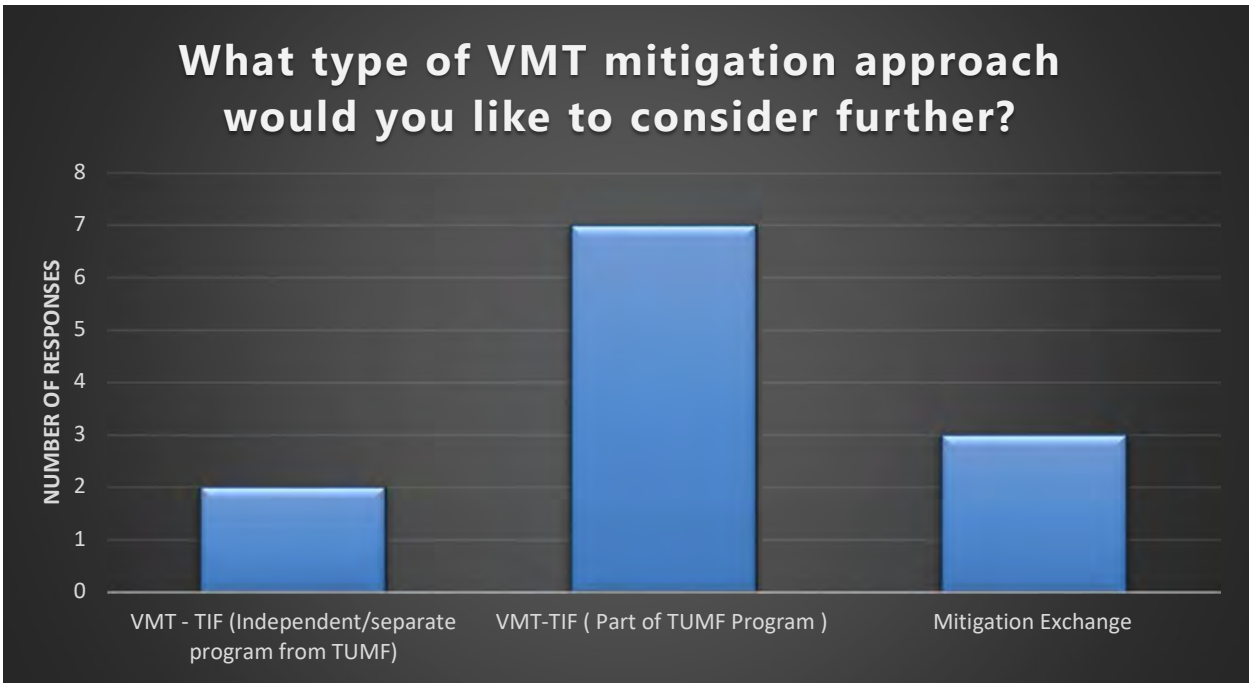
Advancing one of the three options above would begin with a formal proposal by WRCOG staff at the PWC where informative discussions, presentations, and options would be explored. With the recommendation of the PWC it would then advance to the other policy committees in the following order.

- TAC
- AFC
- Executive Committee

Prior to implementing any new Program, WRCOG would need to develop a concrete proposal for recommendation. Given WRCOG's experience, this proposal should address each item below.

- The exact structure to be implemented (bank, exchange, or fee).
- The relationship between this program and other WRCOG programs.
- Program governance, which would likely be modeled after existing WRCOG programs like TUMF.
- Supporting documentation related to this proposal such as any quantification methods related to VMT reductions and other applicable items.

WRCOG Staff conducted a survey of its member agencies late in 2019 and early in 2020 to gauge their interest in either a VMT mitigation fee or exchange. The survey results are provided below. Based on the survey responses, it appears that a majority of our local agencies prefer a fee-based approach, though there is support for an exchange as well.



Based on that positive feedback, there appears to be merit in advancing a mitigation program. The next steps would generally focus on increased socialization of this concept and conceptual program development. Specific tasks WRCOG should undertake would include but not be limited to the following items.

- Convening a meeting with the Riverside County Transportation Commission (RCTC) and Riverside Transit Agency (RTA) to discuss this concept in greater detail.
- Identify at least two options for either a fee-based approach and an exchange, which would include an evaluation of their use for mitigating development and infrastructure projects.
- A review of the latest guidance from OPR and Caltrans regarding VMT impacts and the applicability of this type of program or programs to address any issues they have raised as SB 743 is implemented.
- Coordination with the upcoming TUMF Nexus Study update to ensure that the Nexus Study scope of work provides the necessary information for this type of program.

A WHITE PAPER PREPARED BY

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