City of Montebello
Transportation Study Guidelines for Vehicle Miles Traveled and Level of Service Assessment

Revised May 2022

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Introduction

These guidelines describe the transportation analysis requirements for land development, land use plan, and transportation projects in the City of Montebello. Guidelines are provided for evaluating a project's environmental transportation impacts and effects on the local transportation system.

The purpose of these guidelines is to provide guidance on how to prepare transportation studies in the City of Montebello in conformance with all applicable City and State regulations.

Background Information

Senate Bill 743 (SB 743), signed by the Governor in 2013, has changed the way transportation impacts are identified. Specifically, the legislation directed the Office of Planning and Research (OPR) to look at different metrics for identifying transportation as a California Environmental Quality Act (CEQA) impact. The final OPR guidelines were released in December 2018 and identified vehicle miles traveled (VMT) as the preferred metric moving forward. The Natural Resources Agency completed the rulemaking process to modify the CEQA guidelines in December of 2018. The CEQA Guidelines identified that all lead agencies must use VMT as the new transportation metric for identifying significant transportation impacts beginning in July 2020.

In anticipation of the change to VMT, the San Gabriel Valley Council of Governments (SGVCOG) undertook the SGVCOG SB 743 Implementation Study to assist with answering important implementation questions about the methodology, thresholds, and mitigation approaches for VMT impact analysis in its member agencies. The study includes the following main components.

- *Analysis Methodologies Memorandum* – Identification of potential thresholds that can be considered when establishing thresholds of significance for VMT assessment and recommendations of analysis methodologies for VMT impact screening and analysis
- *Mitigation Memorandum* – Types of mitigation that can be considered for VMT mitigation
- *VMT Assessment Tool* – A web-based tool that can be used for VMT screening and mitigation recommendation

The City of Montebello utilized the information produced by SGVCOG through the Implementation Study to adopt a methodology and significance thresholds for use in CEQA compliance. As noted in CEQA Guidelines Section 15064.7(b) below, lead agencies are encouraged to formally adopt their significance thresholds and this is a key part of the SB 743 implementation process.

> *(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).*

The City has refined the SGVCOG recommendations and produced these Transportation Study (TS) Guidelines to outline the specific steps for complying with the new CEQA expectations for VMT analysis and the applicable general plan consistency requirements related to level of service (LOS).

It should be noted that CEQA requirements may change as the CEQA Guidelines are periodically updated and/or legal opinions are rendered that change how analysis is completed. As such, the City will continually review their guidelines for applicability and consultants should contact the City to ensure the most recent guidelines for project impact assessment are applied.

CEQA Changes

A key element of SB 743 is the elimination of automobile delay, LOS, and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant environmental impacts. This change is intended to assist in balancing 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.

SB 743 includes amendments to current congestion management law that allows cities and counties to opt-out of the LOS standards that would otherwise apply in areas where Congestion Management Plans (CMPs) are still used. Further, SB 743 required OPR to update the CEQA Guidelines and establish criteria for determining the significance of transportation impacts. In December 2018, OPR released their final recommended guidelines based on feedback from the public, public agencies, organizations, and individuals. OPR recommended VMT as the most appropriate measure of project transportation impacts for land use projects and land use plans. For transportation projects, lead agencies may select their own preferred metric but must support their decision with substantial evidence that complies with CEQA expectations. SB 743 does not prevent a city or county from continuing to analyze delay or LOS outside of CEQA review for other transportation planning or analysis purposes (i.e., general plans, impact fee programs, corridor studies, congestion mitigation, or ongoing network monitoring).

Level of Service Policy

While CEQA requirements have changed and LOS no longer constitutes CEQA impacts, LOS may still be used for planning and analysis purposes. The City has vehicle LOS standards for which local infrastructure will strive to maintain. The LOS standards apply to discretionary approvals of new land use and transportation projects. Therefore, these TS guidelines also include instructions for vehicle LOS analysis consistent with City requirements.

Transportation Study Guidelines

State and federal laws require the correlation of Land Use Element building intensities in a General Plan with the Circulation Element capacity. A TS is required by the City so that the impact of land use proposals on the existing and future circulation system can be adequately assessed and to ensure that the CEQA laws and guidelines are met.

The following TS Guidelines identify CEQA based requirements and non-CEQA based requirements intended for any person or entity who is proposing development in the City and should be used in coordination with the City's Local CEQA Guidelines and Municipal Code to guide the development review process.

For the past several decades, the preparation of a transportation impact analysis under the CEQA process primarily consisted of analyzing a project's impacts using intersection and/or roadway segment LOS. However, with the passage of SB 743, LOS analysis is no longer appropriate for CEQA. However, it may still be needed as a stand-alone document for project approval for planning and analysis purposes. Specifically, a transportation study may be needed as a stand-alone document which is a requirement of project approval and will include information for the decision makers that is not required as part of the CEQA process.

The purpose of these TS guidelines is to provide general instructions for analyzing the potential transportation impacts of proposed development projects. These guidelines present the recommended format and methodology that should generally be utilized in the preparation of a TS.

Application of Guidelines

An applicant seeking project approval will submit the proposed project to the City with a planning and land use approval application. After a preliminary review of the project by City Staff, the applicant will be notified by the project planner if a TS is required. The TS should summarize the evaluation of project-related changes in both LOS and VMT.

A TS which includes LOS analysis shall be required for a proposed project when either the weekday AM or PM peak hour trip generation from the proposed development is expected to exceed 100 vehicle trips and for projects that will add more than 50 trips during either the weekday AM or PM peak hours to any intersection. The trip generation methodology is detailed in this document. Analysis of roadway segments around the project site may also be required. Note that a TS may be required for smaller projects based on land use and location, and other days/peak hours of analysis may be required for unique land uses, based on City direction.

See Section "Non-CEQA Transportation Assessment" for details on when LOS analysis is required.

Furthermore, a TS which includes VMT assessment shall be required for a proposed project that does ***NOT*** satisfy the identified project screening criteria:

- Transit Priority Area Screening
- Low VMT Area Screening
- Project Type Screening

See Section "CEQA Transportation Assessment - VMT Analysis" for details on these screening criteria.

Projects may be screened from VMT analysis and require LOS analysis, or vice-versa. Where insufficient information is available to make a preliminary assessment of a project's effect on traffic, the City Traffic Engineer shall determine whether a TS will be required.

Guidelines Organization

The remainder of this document is organized to provide guidance on assessment for General Plan consistency (e.g., non-CEQA LOS analysis) and CEQA compliance (e.g. VMT analysis), as well as the format for the transportation study.

Transportation Study	
Non-CEQA Transportation Assessment • LOS Analysis	**CEQA Transportation Assessment** • VMT Analysis • Active Transportation, Public Transit, and Safety Analysis

Non-CEQA Transportation Assessment

Level of Service Analysis Procedure

Traffic analysis should be prepared by, or under the direction of, a registered traffic engineer, registered civil engineer, or qualified transportation planner. To establish a mutually agreeable scope of work for the traffic analysis, the analyst and project applicant shall meet with City staff to identify study area, assumptions, and methodologies for the traffic analysis. All assumptions and methodologies for the LOS analysis are subject to review and approval by the City Traffic Engineer.

A transportation study which includes LOS analysis shall be required for a proposed project that meets any of the following criteria:

- When either the weekday AM or PM peak hour trip generation (or other study periods, per City discretion) is expected to exceed 100 vehicle trips from the proposed development
- Projects that will add more than 50 trips during the weekday AM or PM peak hours (or other study periods, per City discretion) to any intersection
- Any project where variations from the standards and guidelines provided in this manual are being proposed
- When determined by the City Traffic Engineer that existing or proposed traffic conditions in the project vicinity warrant evaluation

Traffic Counts

The traffic analysis should not use traffic counts that are more than two years old without approval of the City Traffic Engineer. If traffic counts taken within the last two years are not available, then new traffic counts shall be collected by a qualified data collection firm. Turning movement data at the study intersections should be collected in 15-minute intervals during the hours of 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM, unless the City Traffic Engineer specifies other hours (e.g., for a signal warrant determination or weekend analysis). Unless otherwise required, all traffic counts should generally be conducted when local schools and colleges are in session, in typical weather conditions, on Tuesdays, Wednesdays or Thursdays during non-summer months, and should avoid being taken on weeks with a holiday.

Trip Generation

Trip generation rates from the latest edition of the Trip Generation Manual published by the Institute of Transportation Engineers (ITE) shall be utilized. Analysis for a proposed project with trip generation rates not provided in the ITE Trip Generation Manual may use rates from other agencies or locally approved studies for specific or unique land uses. Documentation supporting the use of these trip generation rates will be required.

The traffic analysis should include justification for trip generation credits such as existing uses, transit, and internal capture. The pass-by traffic credit should be calculated based upon ITE data or special studies approved by the City.

Trip Distribution and Assignment

Description of trip distribution and assignment for vehicle trips to and from the site along specific roadways that will be utilized by project generated traffic is required. The basic methodology and assumptions used to develop trip distribution and assignments must be clearly stated and approved by the City Traffic Engineer. The basis for trip distribution should be linked to the demographic or market data in the area and should consider the project's location relative to the regional roadway system.

The trip assignment for the project should be based on existing and projected travel patterns and the future roadway network and its travel time characteristics. The trip assignment should incorporate the trip generation of the project minus the appropriate credits.

Traffic Forecasts

The traffic analysis should include the total traffic which is expected to occur at buildout of proposed project. This means that the analyst preparing the traffic study should include all the cumulative effects of proposed developments as well. The latest version of the Southern California Association of Governments (SCAG) Travel Demand Model or appropriate sub-area travel demand model should be used to generate future year forecasts. Projects which have been approved, planned, or are under construction in the vicinity of the proposed project should be verified as included in the latest version of the SCAG model or appropriate sub-area model approved by the City Traffic Engineer.

Study Area

In consultation with City staff, intersections and roadway segments within the study area shall be analyzed for effects on intersection operations and roadway capacity. At a minimum, the transportation study should evaluate the following:

- Site access driveways
- Roadways adjacent to the project site
- Intersections in the immediate vicinity of the project site and where the proposed project will add 50 or more peak hour trips
- Roadway segments between study intersections and/or project driveways

Operations Analysis Methodologies

Intersection Analysis

The City will use the latest version of the Highway Capacity Manual (HCM) methodology to evaluate the weekday AM and PM peak hour LOS at signalized and unsignalized intersections. The peak hour will be identified as the highest one-hour period in both weekday AM and PM counted periods, as determined by four consecutive 15-minute count intervals. The following parameters should be used in determining the LOS at the intersections within the City.

- A peak hour factor (PHF) based on observed conditions shall be used for analyzing existing conditions.
- A PHF of 0.95 shall be used for future conditions (consult with City staff if the existing PHF is higher than 0.95).

Pedestrian activity should be considered on a case by case basis using reductions in saturation flow rates for affected lanes as determined by sound engineering judgement. The HCM is the best source of guidance for assessment of pedestrian influences on flow rates.

Table 1 summarizes the range of values and LOS designations.

TABLE 1: INTERSECTION LEVEL OF SERVICE CRITERIA

LOS	Intersection Delay (seconds)		Description
	Signalized Intersection	Unsignalized Intersection	
A	≤10.0	≤10.0	EXCELLENT. Operations with very low delay and most vehicles do not stop.
B	>10.0 and ≤20.0	>10.0 and ≤15.0	VERY GOOD. Operations with good progression but with some restricted movements.
C	>20.0 and ≤35.0	>15.0 and ≤25.0	GOOD. Operations where a significant number of vehicles are stopping with some backup and light congestion.
D	>35.0 and ≤55.0	>25.0 and ≤35.0	FAIR. Operations where congestion is noticeable, longer delays occur, and many vehicles stop. The proportion of vehicles not stopping declines
E	>55.0 and ≤80.0	>35.0 and ≤50.0	POOR. Operations where there is high delay, extensive queueing, and poor progression.
F	>80.0	>50.0	FAILURE. Operations that are unacceptable to most drivers, when the arrival rates exceed the capacity of the intersection.

Source: Highway Capacity Manual 6th Edition

In addition to assessing LOS at study intersections, the transportation study should also evaluate the adequacy of turn pocket storage length at off-site study intersections based on 95th percentile queues.

Roadway Segment Analysis

A roadway segment analysis compares the daily traffic volume along a study roadway segment to the roadway classification and associated design capacity. The results are reflected in a volume to capacity, or V/C, ratio. The City of Montebello has established daily vehicle capacity thresholds for each functional roadway classification. Daily capacity thresholds represent a V/C of 1.00. Table 2 summarizes the roadway segment vehicle capacity thresholds. Table 3 summarizes the range of V/C ratios and LOS values.

TABLE 2: ROADWAY SEGMENT VEHICLE CAPACITY THRESHOLDS

Roadway Classification	Roadway Capacity (Average Daily Traffic)
6 Lanes Major Arterial	60,000
4 Lane Major Arterial	40,000
4 Lane Secondary Arterial	30,000
2 Lane Collector	15,000

TABLE 3: ROADWAY SEGMENT LEVEL OF SERVICE CRITERIA

V/C Ratio	LOS
≤0.60	A
>0.60 and ≤0.70	B
>0.70 and ≤0.80	C
>0.80 and ≤0.90	D
>0.90 and ≤1.00	E
>1.00	F

Analysis Scenarios

The following identifies the analysis scenarios that should be evaluated for LOS analysis (at the discretion of the City Traffic Engineer).

- **Existing Conditions**:

  Existing traffic conditions: data must have been collected within the past two years. Otherwise, new traffic counts shall be conducted.

- **Opening Year**:

  Existing traffic conditions plus ambient growth and traffic from all the development within the study area for which an application has been submitted ("pending projects"), or that have been approved but not yet constructed. There may be multiple opening years if the project is proposed in phases.

- **<u>Opening Year plus Project</u>:**

  Traffic conditions of Opening Year (existing plus ambient growth and approved and pending developments) plus traffic generated by the proposed project.

- **<u>Horizon Year</u>:**

  Build-out of City General Plan and circulation system. SCAG build-out projections should be used for this purpose. A General Plan build-out analysis is generally required for any project that requires a General Plan Amendment or otherwise proposes development that exceeds the land use intensity assumed for the General Plan, and/or at the discretion of the City Traffic Engineer.

- **<u>Horizon Year plus Project</u>:**

  Traffic conditions of Horizon Year (General Plan build-out) plus traffic generated by the proposed project.

Projects that are to be constructed in more than one phase will require interim year future analyses to address each phase of the development and its associated traffic effects. The year(s) to be analyzed will coincide with the scheduled phasing and will be approved by the City Engineer or designee.

A table shall be included which identifies the forecast LOS for each intersection within the defined study area. This summary table shall present LOS for all scenarios evaluated, including improvements proposed by the project.

Transportation Effects

Signalized or unsignalized intersections may require improvements if one or more of the following conditions are met:

- The addition of project traffic to an intersection results in the degradation of intersection operations from LOS D or better operations to LOS E or F.
- The project-related increase in delay is equal to or greater than 2.0 seconds at an intersection that is already operating at LOS E or F.
- For unsignalized intersections, in addition to meeting one of the two conditions described above, the intersection also meets peak hour signal warrants either caused by project volumes, or project volumes are added at an intersection that meets peak hour signal warrants in the baseline scenario(s). Peak hour signal warrants should be determined based on the latest California Manual on Uniform Traffic Control Devices (CA MUTCD).

Improvements may also need to be identified to address deficiencies related to queuing at study intersections. If the project causes deficiencies or worsens deficiencies, the transportation study should identify improvements to reduce queues (such as signal timing or dedicated turning phases) or to extend queue storage space.

Thresholds for study roadway segments are based on LOS values linked to V/C ratios. Any study roadway segment that would degrade from LOS D to LOS E or F due to the addition of project-generated traffic may require improvements. In addition, any study roadway segment that already operates at LOS E or F and experiences a V/C ratio increase of greater than 0.02 due to the addition of project-generated traffic may require improvements.

While the minimum acceptable LOS for City facilities is LOS D, at its discretion the City may allow LOS E or F operations at specific locations to encourage mixed-use, infill development that is supportive of transit and active transportation.

The fair share cost for the proposed improvements in the cumulative condition should also be calculated.

On-Site Parking Analysis

The analysis should address the on-site parking supply versus parking required per City code. If the proposed development is mixed-use, a table shall be included presenting each land use, its size and the code parking requirement. This table should clearly indicate how the code parking was calculated and include the proposed on-site parking supply together with the resultant surplus or deficit from code requirements.

Should the on-site parking supply be less than required by the City code, a detailed explanation justifying a reduction to the code requirement must be included. Note that this does not eliminate the need for any zoning code variance. Shared parking evaluations will be considered when appropriate.

The proposed project’s on-site bicycle parking supply should also be compared to City code requirements (if applicable).

Access and Circulation Analysis

The project’s access points and on-site circulation shall be analyzed. As appropriate, the analysis shall include the following:

- Number of access points proposed for the project site
- Spacing between driveways and intersections
- Potential signalization of driveways
- On-site stacking distance (including uses with a drive thru) and inbound/outbound queuing at project driveways
- Shared access
- Turn conflicts/restrictions

- Adequate sight distance
- Driveway improvements
- Pedestrian connections
- Any other operational characteristics as identified by City staff

If the proposed project is a residential or commercial use with privacy gates, the applicant shall provide a stacking analysis for review and approval. The adequacy of the interface with the arterial network will need to be demonstrated and necessary improvements to adjacent intersections may be required.

The transportation study must also include any additional analysis that is deemed necessary by City staff, to be determined through a scoping meeting. This could include a passenger loading demand analysis, freight loading demand analysis, and/or truck turning templates.

CEQA Transportation Assessment – VMT Analysis

VMT Analysis Methodology

For purposes of SB 743 compliance, a VMT analysis should be conducted for land use projects as deemed necessary by the City Traffic Engineer and would apply to projects that have the potential to increase the baseline home-based VMT per capita for residential projects, home-based work VMT per employee for office projects, or total VMT for retail projects for the City. All assumptions and methodologies of the VMT analysis are subject to review and approval by the City Traffic Engineer.

A flowchart of the VMT analysis process is attached to these guidelines (see Attachment A, "VMT Analysis Flowchart"). A web-based tool has been prepared by SGVCOG to assist with VMT assessment screening and mitigation recommendations.[1] A user guide for use of the web-based tool is attached (see Attachment B, "SGVCOG VMT Assessment Tool Users Guide").

For the purposes of the VMT analysis, the baseline scenario represents the existing conditions at the time of the project's Notice of Preparation (NOP). The cumulative scenario represents the adopted SCAG RTP/SCS horizon year.

Project Screening

There are three types of screening that may be applied to effectively screen projects from a detailed, project-level VMT assessment. These screening steps are summarized below:

Step 1: Transit Priority Area (TPA) Screening

Projects located within a TPA[2] may be presumed to have a less than significant impact absent substantial evidence to the contrary. This presumption may ***NOT*** be appropriate if the project:

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[1] https://apps.fehrandpeers.com/SGVCOGVMT/

[2] A TPA is defined as a half mile area around an existing major transit stop or an existing stop along a high-quality transit corridor per the definitions below. Public Resources Code § 21099(a)(7)

Pub. Resources Code, § 21064.3 - 'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

Pub. Resources Code, § 21155 - For purposes of this section, a 'high-quality transit corridor' means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

1. Has a Floor Area Ratio (FAR) of less than 0.75;
2. Includes more parking for use by residents, customers, or employees of the project than required by the City;
3. Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the City or other lead agency, with input from SCAG); or
4. Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

A project should be considered to be within a TPA if all parcels within the project site have no more than 25 percent of their area farther than one-half mile from the stop or corridor and if not more than 10 percent of the residential units or 100 units (whichever is lower) in the project are farther than one-half mile from the stop or corridor.

To identify if the project is in a TPA, the analyst may review the TPA map included in the SGVCOG VMT assessment tool. Additionally, the analyst should confirm with all local transit providers that no recent changes in transit service have occurred in the project area (e.g., addition or removal of transit lines, addition or removal of transit stops, or changes to service frequency) since changes to transit service and/or stops may have occurred since the last time the assessment tool was updated.

At its discretion, the City can also allow a project to screen out of a detailed VMT assessment using proximity to future planned high-quality transit service.

Step 2: Low VMT Area Screening

Residential and office (and other employment-based) projects located within a low VMT-generating area may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition, other employment-related and mixed-use land use projects may qualify for the use of screening if the project can reasonably be expected to generate VMT per capita or per employee that is similar to the existing land uses in the low VMT area.

For this screening criteria, the SCAG travel forecasting model was used to measure VMT performance for individual traffic analysis zones (TAZs). TAZs are geographic polygons similar to Census block groups used to represent areas of homogenous travel behavior. Total daily home-based VMT per capita or home-based work VMT per employee was estimated for each TAZ. This presumption may not be appropriate if the project land uses would alter the existing built environment in such a way as to increase the rate or length of vehicle trips. The project applicant should document whether or not any increase to the trip generation rate or length of vehicle trips is expected.

To identify if the project is in a low VMT-generating area, the analyst should utilize the SGVCOG VMT assessment tool, which maps TAZ averages and compares them to the appropriate regional averages. Residential projects located in a TAZ that generates home-based VMT per capita that does not exceed 85% of the SGVCOG regional average VMT per capita can be screened out of a detailed VMT analysis; office and other employment-generating projects located in a TAZ that generates home-based work VMT per employee that does not exceed 85% of the SGVCOG regional average VMT per employee can be screened out of a detailed VMT analysis. The tools interpolation function should be utilized to estimate TAZ and regional averages for the existing/NOP year, as appropriate. Additionally, as noted above, the analyst must identify if the project is consistent with the existing land uses (i.e., if the project is proposing single-family housing, there should be existing single-family housing of approximately the same density) within that TAZ and use professional judgement that there is nothing unique about the project that would otherwise be misrepresented utilizing the data from the tool.

Step 3: Project Type Screening

Some project types have been identified as having the presumption of a less than significant impact. The following uses can be presumed to have a less than significant impact absent substantial evidence to the contrary, as their uses are local serving in nature:

- Local-serving K-12 schools
- Local parks
- Day care centers
- Local-serving retail uses less than 50,000 square feet, including:
    - Gas stations
    - Banks
    - Restaurants
    - Shopping Center
- Local-serving hotels (e.g., non-destination hotels)
- Local-serving assembly uses (places of worship, community organizations)
- Community institutions (public libraries, fire stations, local government)
- Affordable,[3,4] supportive, or transitional housing located within walking distance (a half-mile radius) of transit stops or non-residential uses
- Assisted living facilities
- Senior housing (as defined by HUD)
- Local serving community colleges that are consistent with the assumptions noted in the RTP/SCS
- Student housing projects on or adjacent to a college campus

[3] Defined as housing that is affordable to lower income (80% Area Median Income and less) individuals or families.

[4] If a project contains less than 100 percent affordable housing, the portion that is affordable should be screened out of needing a detailed VMT analysis.

- Other local-serving uses as approved by the City Traffic Engineer
- Projects generating less than 140 daily vehicle trips[5]
    - This generally corresponds to the following "typical" development potentials:
        - 14 single family housing units
        - 20 multi-family, condominiums, or townhouse housing units
        - 12,500 sq. ft. of office
        - 28,500 sq. ft. of light industrial[6]
        - 81,500 sq. ft. of warehousing[6]
        - 99,500 sq. ft. of high cube transload and short-term storage warehouse[6]

Local serving retail projects with a total square footage less than 50,000 square feet may be presumed to have a less than significant impact absent substantial evidence to the contrary. Local serving retail generally improves the convenience of shopping close to home and has the effect of reducing vehicle travel. At its discretion, the City could require the retail projects under 50,000 square feet to provide information in the form of a market study to support the assumption that the project would serve local market demand and its users (employees, customers, visitors) would be existing within the community. The project would not generate new "demand" for the project land uses but would meet the existing demand that would shorten the distance existing residents, employees, customers, or visitors would need to travel. In addition, the City could consider the findings of a market study to provide substantial evidence that a retail project larger than the 50,000 square foot threshold would primarily serve a local population and result in an overall reduction in citywide VMT. Based on the results of the market study and staff discretion, a higher square footage threshold may be considered.

VMT Assessment for Non-Screened Development

Projects not screened through the steps above should complete VMT analysis and forecasting through the SCAG model or appropriate sub-area model to determine if the project has a significant VMT impact. This analysis should include 'project generated VMT' for the project TAZ (or TAZs) for the baseline (existing) scenario and 'project effect on VMT' estimates under the cumulative (horizon year) scenario below. Project generated VMT shall include the VMT generated by the site compared to the CEQA threshold of significance for the baseline scenario. The project effect on VMT is the total VMT for the city, which is more appropriate to review to evaluate how developments may change travel behavior in the area in the cumulative SCAG RTP/SCS scenario.

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[5] Note that a redevelopment project replacing an existing use would estimate the net increase in trips above trips what already exists.

[6] This number was estimated using rates from ITE's Trip Generation Manual. Some industrial and warehousing tenants may generate traffic differently than what is documented in ITE. In these cases, documentation of the project generating less than 140 daily trips will be required for review and approval by the City Traffic Engineer.

- **<u>Baseline Conditions:</u>**

  This data is available from the SCAG model or appropriate sub-area model approved by the City Traffic Engineer. This data (for projects analyzed using a VMT efficiency metric) is also available in the SGVCOG VMT Assessment Tool. Baseline conditions typically represent the year of the Notice of Preparation (NOP). Interpolation between the base and future year model will be required to identify the VMT representative of the baseline year.

- **<u>Baseline plus Project:</u>**

  The project land use would be added to the project TAZ or a separate TAZ would be created to contain the project land uses. A full base year model run would be performed and VMT changes would be isolated for the project TAZ and across the full model network. The model output must include reasonableness checks of the production and attraction balancing to ensure the project effect is accurately captured. These reasonableness checks are subject to City Traffic Engineer's review. If this scenario results in a less-than-significant impact, then additional cumulative scenario analysis may not be required (more information about this outcome can be found in the Thresholds Evaluation discussion later in this chapter). The SGVCOG VMT assessment tool provides an estimate of the Baseline plus project conditions for projects analyzed using a VMT efficiency metric. This data could be presented in lieu of results from the full model run. However, it is recommended that a base year plus project run always be performed as a check for reasonableness and consistency with the cumulative year results.

- **<u>Cumulative no Project:</u>**

  This data is available from the SCAG model or appropriate sub-area model approved by the City Traffic Engineer.

- **<u>Cumulative plus project:</u>**

  The project land use would either be added to the project TAZ or a separate TAZ would be created to contain the project land uses. The addition of project land uses should be accompanied by a reallocation of a similar amount of land use from other TAZs; especially if the proposed project is significant in size such that it would change other future developments. Land use projects are often represented in the assumed growth of the cumulative year population and employment. It may be appropriate to remove land use growth that represents a project from the cumulative year model to represent the cumulative no project scenario. If project land uses are simply added to the cumulative no project scenario, then the analysis should reflect this limitation in the methodology and acknowledge that the analysis may overestimate the project's effect on VMT.

Project-generated home-based VMT per capita or home-based work VMT per employee shall be extracted from the travel demand forecasting model using the production-attraction trip matrix. The project-generated VMT metric shall be interpolated between the baseline and cumulative "plus project" models to the NOP year, while the regional average shall be interpolated to the NOP year using the "no project" models. For retail projects that require a baseline total VMT analysis, the "no project" total citywide VMT (all VMT produced by or attracted to TAZs in the city) shall be interpolated between the "no project" models, while the "plus project" total citywide VMT shall be interpolated between the "plus project models." If a cumulative total citywide VMT analysis is required, the total citywide VMT from the "no project" and "plus project" cumulative model runs shall be compared with no interpolation or extrapolation.

Other model outputs and VMT data such as total VMT by speed bin may needed as an input for CEQA air quality, greenhouse gas (GHG), and energy impact analyses.

A detailed description of this process is attached to these guidelines. See Attachment C, "Detailed VMT Forecasting Information."

The SGVCOG online VMT assessment tool would only be appropriate to use when efficiency metrics such as home-based VMT per capita for residential projects or home-based work VMT per employee for office projects are being estimated; the tool allows the user to estimate VMT for any year between 2012 and 2040. If an analysis requires estimating the change in total VMT (such as a base year analysis of a retail project or a cumulative year analysis of any land use), then use of the SCAG travel demand model is required.

In addition, there may be instances where the use of the online tool is inappropriate for residential and office projects. In particular, a project must have similar land use characteristics to other projects in the model TAZ to utilize the online VMT assessment tool; otherwise, a SCAG model run must be conducted to estimate VMT per capita or employee. For example, use of the online tool may be inappropriate if an office project is proposed in an area that consists entirely of single-family housing.

Uses Other Than Residential, Office, and Retail

While residential, office, and retail projects tend to be the most common land use projects requiring a VMT analysis, projects consisting of other uses may require a VMT analysis. When considering metrics and thresholds for other land uses, the project applicant should consult with City staff. For other uses, the City will make the final determination on the appropriate metric(s) and threshold(s).

Guidance for other land uses is listed below:

- **Industrial**: Use office project metric and threshold
- **Hotel**: Use office project metric and threshold
- **Medical Office**: Use office project metric and threshold
- **School/College**: Use retail project metric and threshold
- **Large Event Centers, Arenas, Convention Centers, and Similar Uses**: Use retail project metric and threshold
- **Recreational Facilities**: Use retail project metric and threshold

- **Churches and Other Religious Institutions**: Use retail project metric and threshold

Mixed Use Projects

For land use projects with a mixed-use component, each use in the project (e.g., residential, office, and retail) should be analyzed separately, taking internalization of trips into account. This approach ensures that the vehicle trip-reducing aspects of such projects are not omitted in the VMT analysis.

Internalization can be calculated using tools such as the ITE methodology, National Cooperative Highway Research Program (NCHRP) Report 684 "Enhancing Internal Trip Capture Estimation for Mixed-Use Developments,"[7] and the US Environmental Protection Agency (EPA) Mixed-Use Trip Generation Model (MXD).[8] Such tools can be used to calculate trip reduction rates for individual mixed-use projects in the city. Project applicants should consult with the City to determine which tool to use for estimating internalization. The percentage of internal trips needs to be confirmed with City staff.

Redevelopment Projects

Per CEQA, a redevelopment project that replaces existing uses and results in a net decrease in VMT can be presumed to have a less-than-significant transportation impact and would not require a detailed VMT analysis; a redevelopment project that replaces existing uses and results in a net increase in VMT will require a VMT analysis.

This should be calculated by estimating the total VMT for the previous and proposed land uses using ITE trip generation rates and SGVCOG-area average trip lengths from the California Household Travel Survey (CHTS)[9] provided below. If a project replaces existing uses and the project leads to a net overall increase in VMT compared to the previous uses, then the appropriate metrics and thresholds should be applied to each proposed use. If the project is a mixed-use project, then internalization should be considered when estimating its total VMT and each component's trip generation should be multiplied by its respective trip length; if the project results in a net increase in VMT, then each individual use should be analyzed under its respective threshold. In addition, the proposed land uses should be analyzed without incorporating a credit or reduction for the displacement of existing land uses at the project site.

The following trip lengths should be used to estimate total VMT:

- **Residential Projects**: 5.46 miles
- **Office/Employment Projects**: 8.31 miles
- **Retail Projects**: 4.94 miles
- **School/Educational Projects**: 3.45 miles

[7] http://www.trb.org/Publications/Blurbs/165014.aspx

[8] https://www.epa.gov/smartgrowth/mixed-use-trip-generation-model

[9] https://www.nrel.gov/transportation/secure-transportation-data/tsdc-california-travel-survey.html

- **Recreational Projects**: 5.25 miles
- **Projects w/ Employment and Customer Attributes (e.g., hospitals)**: 6.90 miles

CEQA VMT Impact Thresholds

VMT Impacts

VMT thresholds provided below are to be applied to determine potential significant VMT impacts under CEQA.

A project would result in a significant VMT impact if, in the Existing Plus Project scenario, any of the following conditions are satisfied:

- **Residential Projects**: A significant impact will occur if the project's home-based VMT per capita exceeds a level of 15% below the SGVCOG baseline home-based VMT per capita.
- **Office Projects**: A significant impact will occur if the project's home-based work VMT per employee exceeds a level of 15% below the SGVCOG baseline home-based work VMT per employee.
- **Retail Projects**: A significant impact will occur if the project would result in a net increase the baseline total citywide VMT.

The cumulative no project scenario shall reflect the adopted RTP/SCS; as such, if a project is consistent with the SCAG RTP/SCS, then the cumulative impacts shall be considered less than significant subject to consideration of other substantial evidence. In addition, a project would not require a cumulative analysis if it screens out of a detailed VMT analysis or does not result in an Existing Plus Project VMT impact.

Otherwise, a cumulative impact analysis would be required to determine if the project would result in a net increase in citywide VMT:

- **All Projects**: A significant cumulative impact will occur if the project would result in a net increase in the cumulative total citywide VMT.

VMT Mitigation Measures

To mitigate VMT impacts, the following choices are available to the applicant:

1. Modify the project's built environment characteristics to reduce VMT generated by the project.
2. Implement Transportation Demand Management (TDM) measures to reduce VMT generated by the project.
3. Participate in a VMT fee program and/or VMT mitigation exchange/banking program (if available) to reduce VMT from the project or other land uses to achieve acceptable levels.

As part of the SGVCOG Implementation Study, key TDM measures that are appropriate to the region were identified. Measures appropriate for most of the City are summarized in a table attached to these guidelines. See Attachment D, "VMT Reduction Strategies."

VMT reductions should be evaluated as part of the VMT impact analysis using state-of-the-practice methodologies recognizing that many of the TDM strategies are dependent on building tenant performance over time. As such, actual VMT reduction cannot be reliably predicted and monitoring may be necessary to gauge performance related to mitigation expectations.

When a project is found to have a significant impact under CEQA, the City requires developers and the business community to assist in reducing peak hour and total vehicular trips by implementing TDM plans. The potential of a proposed project to reduce VMT through the use of a TDM plan should be addressed in the traffic study.

If a TDM plan is proposed as a mitigation measure for a project, and the traffic study attributes a reduction in peak and total traffic to the TDM plan, the following information must be provided:

1. A detailed description of the major components of the TDM plan and how it would be implemented and maintained on a continuing basis.
2. Case studies or empirical data that supports the anticipated reduction of traffic attributed to the TDM plan.
3. Additional V/C ratio calculations of study roadway segments that illustrate the circulation benefits of the TDM plan resulting from reduced project vehicle trip generation.
4. Enforcement Measures – how it will be monitored and enforced.
5. How it complies with the South Coast Air Quality Management District Regulations.

Land Use Plans

While new development projects must undergo VMT-based transportation impact analyses under CEQA, citywide or areawide land use plans such as General Plans and Specific Plans, which can result in substantial changes to travel patterns, must also undergo VMT analyses to determine potential impacts. In general, the evaluation of a Plan will be whether it would generate less VMT than existing conditions and compared to the current (or previous) plan.

Land use plans must be analyzed using the SCAG regional travel demand model. The following model runs and scenarios must be conducted:

- Base year model to estimate existing conditions
- Cumulative year model to estimate horizon year conditions for the no project or current plan scenario
- Cumulative year model updated to reflect the proposed project to estimate horizon year conditions with the proposed plan

Home-based VMT per capita and home-based work VMT per employee are the appropriate metrics for assessing land use plans; total VMT per service population (residents and employees) should also be calculated. VMT efficiency metrics must be calculated for the entirety of the plan area. In the case of a general plan, this would consist of trips originating and/or ending in the city; in the case of a specific plan, this would consist of trips originating and/or ending in the plan area.

A significant impact would occur if any of the following conditions take place:

- If the plan generates home-based VMT per capita, home-based work VMT per employee, or total VMT per service population in the horizon year plus project scenario that exceeds the VMT metric under existing conditions.
- If the plan generates home-based VMT per capita, home-based work VMT per employee, or total VMT per service population in the horizon year plus project scenario that exceeds the VMT metric under the horizon year no project/current plan scenario.

If an area plan results in significant impacts, CEQA requires mitigation measures to be implemented to reduce or mitigate impacts. Potential mitigation measures for area plans can include:

- Increasing the density and mix of proposed land uses
- Proposing bicycle, pedestrian, and transit network improvements as opposed to automobile facilities
- Policies to reduce parking supply
- Policies to address promote worker commute reduction programs
- Policies to require on-site TDM strategies for individual projects under the plan

Transportation Projects

In addition to land use projects and plans, transportation infrastructure projects may require a VMT analysis to comply with CEQA requirements. A detailed VMT analysis is required for transportation projects if they are expected to increase VMT; these primarily consist of projects that encourage the use of single-occupant automobile use such as the addition of through travel lanes. Projects that would require a detailed VMT analysis include, but are not limited to, the addition of automobile through lanes.

Projects that are unlikely to lead to increases in vehicular travel are excluded from VMT analysis requirements. These include projects such as roadway rehabilitation, turn lanes, travel lane reductions, transit service, bikeways, and pedestrian facilities. A full list is provided in Attachment E.

A transportation project would be excluded from VMT analysis requirements if it has already undergone VMT analysis as part of a citywide or regional plan. This exemption may be granted if the necessary VMT analysis and potential mitigations have already been identified and quantified at the plan level.

For projects that require a detailed VMT analysis (e.g., increasing vehicular throughput and not analyzed as part of a citywide or regional plan), two tiers of VMT analysis must be conducted: near-term impacts and long-term impacts.

Near-Term VMT Analysis

Near-term VMT analysis must be conducting with the SCAG model in order to estimate near-term changes to citywide VMT due to rerouted trips that could result from a new or expanded facility. The model must be run for two scenarios, with and without the implementation of the transportation project. VMT should be captured using the boundary method, which would provide the total daily VMT on all roads within the City of Montebello. The metric for this analysis would be the net change in total citywide VMT with the transportation project.

Induced Demand Analysis

Long-term VMT analysis must be conducted in order to estimate potential long-term increases in citywide VMT due to induced demand. To capture the long-term effects such as increased travel demand, an induced demand assessment is required using the following formula recommended:

[% increase in lane miles] x [baseline VMT] x [elasticity] = [VMT resulting from the project]

The baseline VMT in the City should be estimated using the boundary method on a model run that does not contain the proposed transportation project. The metric for this analysis would be the net increase in total citywide VMT with the transportation project.

Research indicates an elasticity of 0.75 may be appropriate for arterial roads in the city; City staff shall be consulted before any induced demand analysis is undertaken.

Significant Impact Threshold

Total citywide VMT on roads in the City of Montebello (using the boundary method) is the appropriate VMT metric for assessing transportation projects. A significant impact will occur if a transportation project would result in a net increase in total citywide VMT for any study scenario (near-term or long-term).

Mitigation

If a transportation project would result in significant VMT impacts, CEQA requires mitigation measures to be implemented to reduce or mitigate the impact. Mitigation measures for transportation projects generally seek to reduce VMT by discouraging increased single-occupant vehicle travel or funding TDM measures. The following are potential mitigation measures for transportation projects:

- Bicycle network improvements
- Pedestrian network improvements

- Transit network improvements
- Off-site TDM strategies

In addition, intelligent transportation system (ITS) strategies should be considered in place of additional vehicular through lanes to reduce VMT.

CEQA Assessment – Active Transportation, Public Transit, and Safety Analysis

Potential impacts to public transit, pedestrian facilities and travel, and bicycle facilities and travel can be evaluated using the following criteria:

- A significant impact occurs if the project conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decreases the performance or safety of such facilities.

Therefore, the TS should evaluate whether a project is consistent with adopted policies, plans, or programs regarding active transportation or public transit facilities, or otherwise decreases the performance or safety of such facilities and make a determination as to whether it has the potential to conflict with existing or proposed facilities supporting these travel modes.

Impacts related to public transit, bicycles, and pedestrians should be assessed as follows:

- **Transit Impacts**: Examine potential operational impacts to transit routes and facilities (e.g., resulting from increased vehicular conflicts or traffic volumes). Examine potential impacts to transit user safety and accessibility for all existing and planned transit stops or stations adjacent to the project site or within a quarter mile of the project site.
- **Bicyclist Impacts**: Examine potential impacts to bicyclist safety and accessibility for all existing and planned bikeways and other bicycle facilities (including roadways) adjacent to the project site, within a quarter mile of the project site, or connecting to transit stops or stations in the quarter-mile vicinity of the project site.
- **Pedestrian Impacts**: Examine potential impacts to pedestrian safety and accessibility for all existing and planned sidewalks, crosswalks, and other pedestrian facilities adjacent to the project site, within a quarter mile of the project site, or connecting to transit stops or stations in the quarter-mile vicinity of the project site.

The following safety-related impact criteria must also be considered:

- A proposed project will result in a significant impact if it would substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- A proposed project will result in a significant impact if it would result in inadequate emergency access.

Transportation Study Format

Each transportation study submitted to the City shall contain each of the following elements unless the topic is not applicable. However, items omitted as “not applicable” shall first be approved by the City.

1. Executive Summary

This portion of the report shall present factual and concise information relative to the major issues. Pertinent information shall include a brief overview of the project, the project’s traffic generation potential, the expected VMT impacts of the project, and a summary of mitigation measures. It should also summarize any deficiencies in LOS and the corresponding proposed improvements.

2. Introduction

The introduction of the report shall include a detailed description of study procedures, a general overview of the proposed project site and study area boundaries, existing and proposed site uses, and existing and proposed roadways and intersections within the defined study area (defined study area to be determined by the City). Exhibits required for this section shall include a regional map showing the project vicinity and a site layout map.

3. Project Description and Location

This section shall expand on information presented in the introduction and shall provide a detailed development scenario and specific project location. Exhibits in this section shall include, at a minimum, a clear illustration of the project in terms of a site plan, its density, adjacent roadways, on-site parking supply, proposed traffic circulation within the project, gross square footage, number of rooms/units, and other descriptors as appropriate.

4. Methodology and Thresholds

Identify the methodology used to calculate LOS and VMT. Include the criteria used for screening projects from project-level VMT analysis, if applicable. Identify the impact threshold for VMT, and the City’s LOS standards for roadways and intersections.

5. Operations Analysis

This should include the Traffic Generation Forecast, Traffic Distribution and Assignment, Traffic Analysis, and identify required improvements as described in the Level of Service Analysis Procedure section.

6. On-Site Parking, Access, and Circulation Analysis

Refer to the On-Site Parking Analysis section and Access and Circulation Analysis section.

7. Active Transportation, Public Transit, and Safety Analysis

Refer to the Active Transportation, Public Transit, and Safety Analysis section.

8. Vehicle Miles Traveled (VMT) Analysis

Present the applicable "no project" and "plus project" VMT metrics for all study scenarios. Data should be presented in tabular format. If the project meets the City's VMT screening criteria, this should be documented. All VMT impacts should be identified in accordance with the VMT Impact Thresholds described in these guidelines. Proposed VMT mitigation measures shall be identified, if needed.

9. Findings and Recommendations

Present the CEQA impact findings and mitigation measures as well as any recommended improvements based on the non-CEQA transportation assessment.

10. Appendix

Detailed appendix material shall be supplied as part of the report. If the main report is too large to include an appendix, such material shall be provided under a separate and identifiable cover. Typical material in this regard includes VMT and TDM calculations, traffic counts, LOS calculation sheets, completed signal warrants, accident diagrams at high accident locations, sketches of proposed roadway improvements, and other information necessary for the City's review of the report.

Attachments

ATTACHMENT A: VMT ANALYSIS FLOWCHART

Montebello VMT Assessment Flowchart

Steps	Project Questions	Procedural Flowchart

Decision · Analytical process or procedural outcome

Step 1 Screening

Type A TPA Screening

1. Is the project in a Transit Priority Area?

2. Are the following requirements met?
- Must have a total FAR greater than or equal to 0.75
- Cannot provide more parking than the City Municipal Code Requirement
- Must be consistent with SCAG RTP/SCS
- Cannot replace affordable units with a smaller number of moderate- or high-income residential units

Use SGVCOG VMT Assessment Tool

YES: Process Complete

NO

Type B Low VMT Area Screening (Residential and Employment Projects)

1. Is the project located in a low VMT area?

2. Are the following requirements met?
- The project is composed of similar land use types and of a similar density to the land uses within the project TAZ
- The project is assumed to generate VMT per person similar to those existing uses

Note: Review City's thresholds of significance for definition of low VMT area.

Use SGVCOG VMT Assessment Tool

YES: Process Complete

NO

Type C Project Type Screening

Is the project a local-serving project as noted in the Project Type Screening project list in the TIA Guidelines?

These projects include but are not limited to:
- Local serving K-12 schools
- Local-serving retail uses less than 50,000 square feet
- Community and Religious Assembly Uses
- Public Services
- Affordable or supportive housing
- Projects generating less than 140 daily vehicle trips
- Other projects as approved by the City Traffic Engineer

Note: Refer to the City's guidelines for a complete list of local-serving project types.

YES: Process Complete

NO

Note: If the project fulfills Type A, B or C screening, the project is presumed to result in a less-than-significant transportation impact.

Step 2 VMT Assessment

What is the project-level VMT and its effect on VMT assessment? Does the project have a less than significant impact?

Details for VMT Assessment are provided in Transportation Study guidelines.

Use latest version of the SCAG model or local subregional model to conduct VMT Assessment consistent with Procedural Notes on VMT Assessment on next page

YES: Process Complete

NO

Note: If the project is not screened from assessment in Step 1, the project will require a full VMT assessment to disclose potential significant impacts.

Step 3 Developing Mitigation Measures

What are the options to mitigate VMT impacts?

Note: VMT reductions associated with proposed TDM mitigation measures can be estimated with:
- CAPCOA reduction equations
- Use of OCTAM and the PA Methodology to isolate commute VMT
- The SGVCOG VMT Assessment Tool TDM module can be utilized to estimate VMT reduction potential associated with TDM measures

*Please note that a Mitigation Bank or Mitigation Exchange program may not be readily available. Check with City staff.

PROJECT: Modify the project's built environment characteristics to reduce VMT generated by the project

MITIGATION: Participate in Mitigation Bank or Mitigation Exchange to offset impact*

TDM: Implement TDM measures to reduce VMT generated by the project

Abbreviations

CAPCOA = California Air Pollution Control Officers Association
FAR = Floor Area Ratio
PA = Production-Attraction
RTP = Regional Transportation Plan
SCAG = Southern California Association of Governments
SCS = Sustainable Communities Strategy
SGVCOG = San Gabriel Valley Council of Governments
TDM = Transportation Demand Management
TIA = Traffic Impact Analysis
TPA = Transit Priority Area
VMT = Vehicle Miles Traveled

ATTACHMENT B: SGVCOG VMT ASSESSMENT TOOL USER GUIDE

SGVCOG VMT Tool:
Quick Start Guide

(August 18, 2020)

Led by the San Gabriel Valley Council of Governments (SGVCOG) at the direction of 27 of the 30 member cities that constitute SGVCOG, this tool is an outcome of the VMT implementation process whereby the participating cities adopted new significance thresholds for analyzing transportation impacts pursuant to Senate Bill 743 (SB 743). The tool covers the following SGVCOG cities:

Alhambra	Industry	Rosemead
Arcadia	Irwindale	San Dimas
Azusa	La Canada Flintridge	San Gabriel
Baldwin Park	La Puente	San Marino
Claremont	Laverne	Sierra Madre
Covina	Monterey Park	South El Monte
Diamond Bar	Montebello	Temple City
Duarte	Monrovia	Walnut
El Monte	Pomona	West Covina

The tool can be accessed at https://apps.fehrandpeers.com/SGVCOGVMT/. Each of the cities has unique thresholds of significance, and the methodologies for VMT screening may vary slightly due to the different development patterns and geographic location of each community. Please coordinate with the respective city when using this tool for development purposes.

WHAT DOES THIS TOOL DO?

The SGVCOG VMT Tool is designed to assist you in screening and estimating project-generated VMT for certain types of land use projects in the San Gabriel Valley and calculating VMT reductions associated with certain VMT-reducing measures. The tool is intended for use on four primary land uses:

- Residential
- Office
- Industrial
- Commercial (e.g. retail, restaurant, and entertainment uses)

The tool evaluates projects with one or a combination of these uses.

LIMITATIONS OF THE VMT EVALUATION TOOL

The VMT Evaluation Tool only covers some of the possible screening criteria that a city or county may establish for land use project VMT analysis per California Senate Bill 743. The Tool is limited to providing estimates based on data provided in the model, whereby if a proposed project is of a land use type that is not reflected in the Traffic Analysis Zone (TAZ) either now or in the future, the Tool is not capable of estimating the VMT efficiency rate for that land use type. Other land uses types, large, complex and/or mixed-use projects, or long-range land use plans should be analyzed using the Boundary Method, which requires running the SCAG RTP Model. Before making any decisions based on the information provided by the VMT Evaluation Tool, it is recommended that you contact the city in which the proposed development is located.

RUNNING THE VMT EVALUATION TOOL – 4 BASIC STEPS

The following are the four basic steps involved in running the VMT Evaluation Tool:

Page 1: Select Project Area

Step 1: Jurisdiction

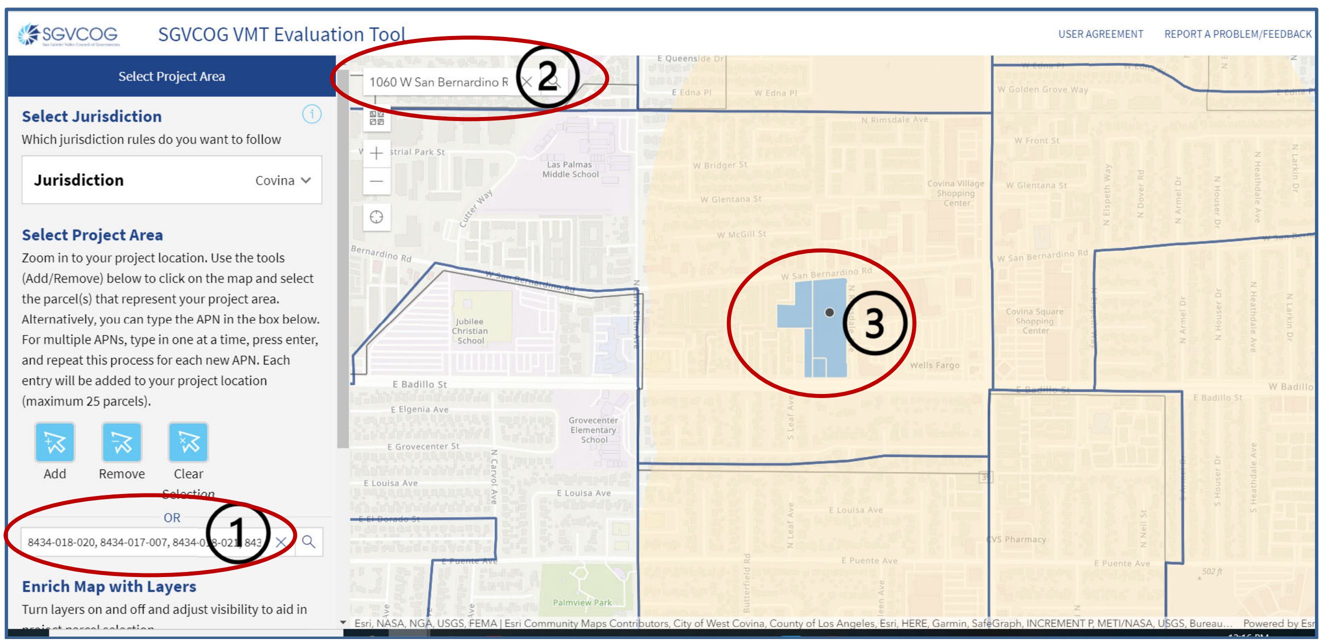
Using the drop-down box, select the city where the project is located. This is required.

Step 2: Select Parcel(s)

There are three ways to locate the parcels associated with a proposed project:

1. Type in the Assessor Parcel Number(s) (APN). The APN requires a dash between each grouping of numbers (XXXX-XXX-XXX).
2. Type in the Project Address; or,
3. Zoom into the map

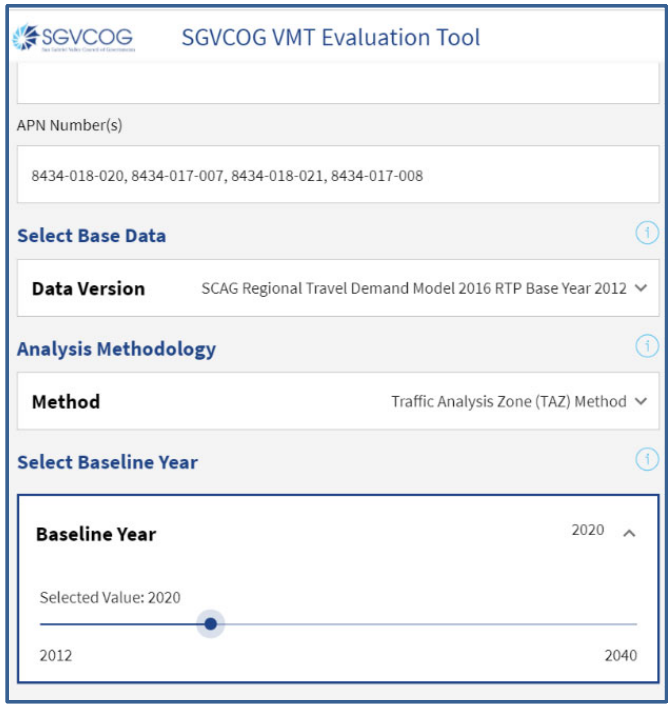
To select the parcel, click on "Add".



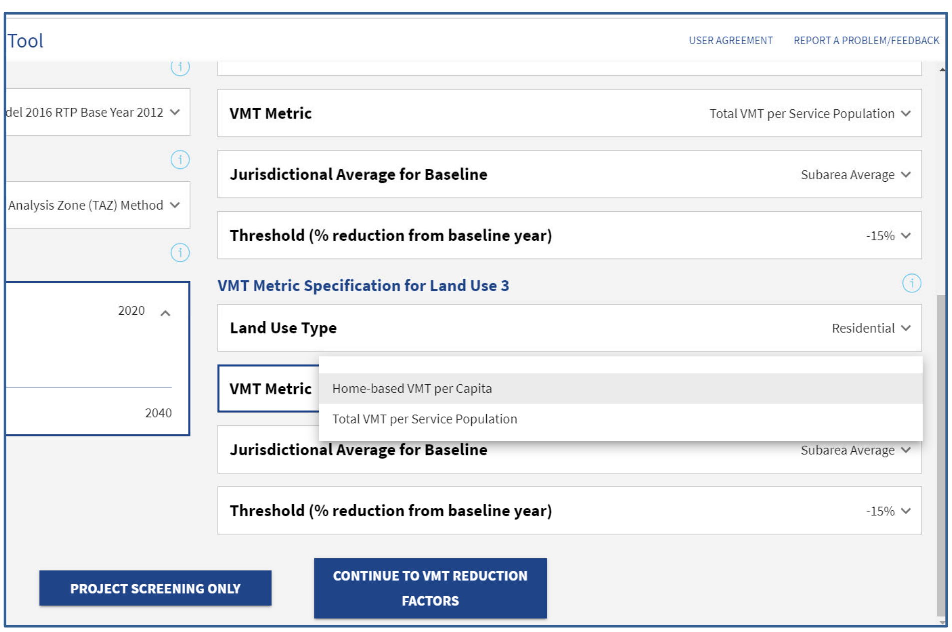
Page 2: Determine Screening Inputs

- **Project Information**
  - **Project Name:** Must type in a project name (required field) – max 250 characters
  - **Project Description:** Required field – max 250 characters
  - **APNs:** Auto-populated from Page 1

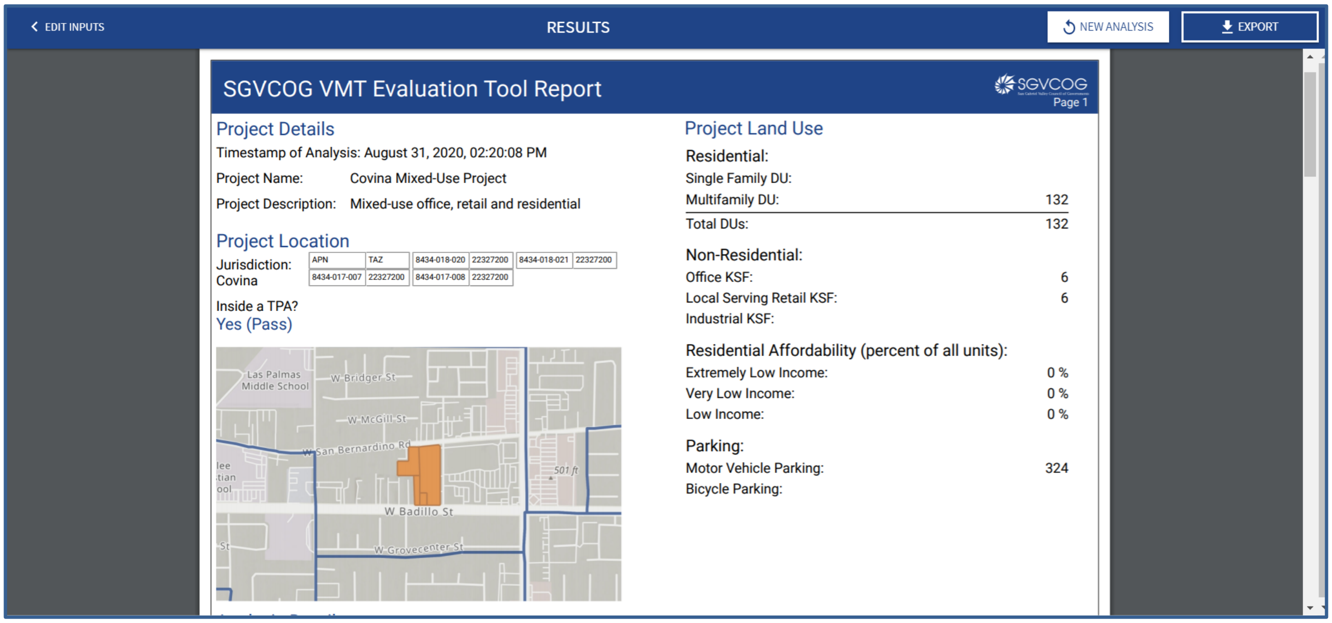
- **Select Base Data:** Auto-populated
- **Analysis Methodology:** Auto-populated
- **Select Baseline Year:** The tool has the capability of providing baseline VMT between 2012 and 2040 pursuant to the 2016 SCAG RTP Model. To select a baseline year, click on the timeline and slide the point to the preferred baseline year.
- **VMT Metric Specification for Land Use 1-3:** The tool is capable of evaluating up to three land use types per project. The tool is also capable of evaluating the difference in VMT Metrics for one land use type. For the latter, select the same land use type for Land Use 1 and Land Use 2 and select different VMT Metrics.



- **Land Use Type:** Select 1) Residential, 2) Office, 3) Industrial, or 4) Commercial.
- **VMT Metric:** Select Home-based VMT per Capita/Home-based VMT per Worker or Total VMT per Service Population
- **Jurisdictional Average for Baseline:** Pre-set (based on City preferences)
- **Threshold:** Pre-set (based on City preferences)
- **Project Screening Only** versus **Continue to VMT Reduction Factors:** Option to screen first without VMT reductions. The tool provides a mechanism to return to this page and select reductions.



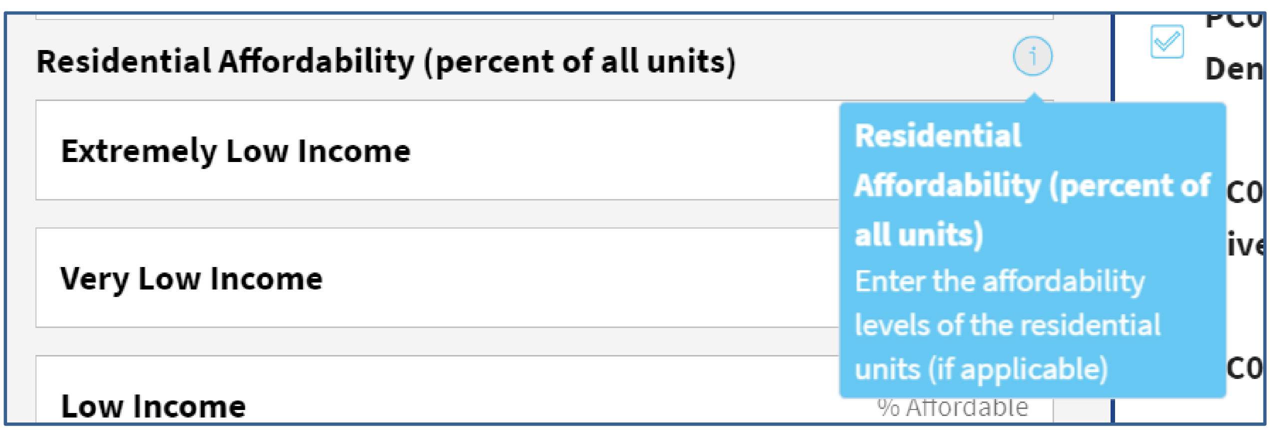
Page 4: Project Screening Results (without VMT Reduction Strategies)



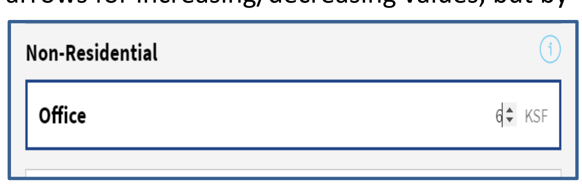
Page 4 (VMT Screening Results): From this page with Project Screening Results, there is an option at the top left of the page to "Edit Inputs". Click this to return to Page 3.

Page 3: Click on **Continue to VMT Reduction Strategies** to test VMT reduction strategies. Details about the VMT Reduction Strategies are provided in Appendix D of the Transportation Assessment Guidelines.

Page 4 (Land Use Info and VMT Reduction Strategies): On this page, populate the project details. Note that the light blue "i" in a circle can be clicked on for additional information, as demonstrated below.

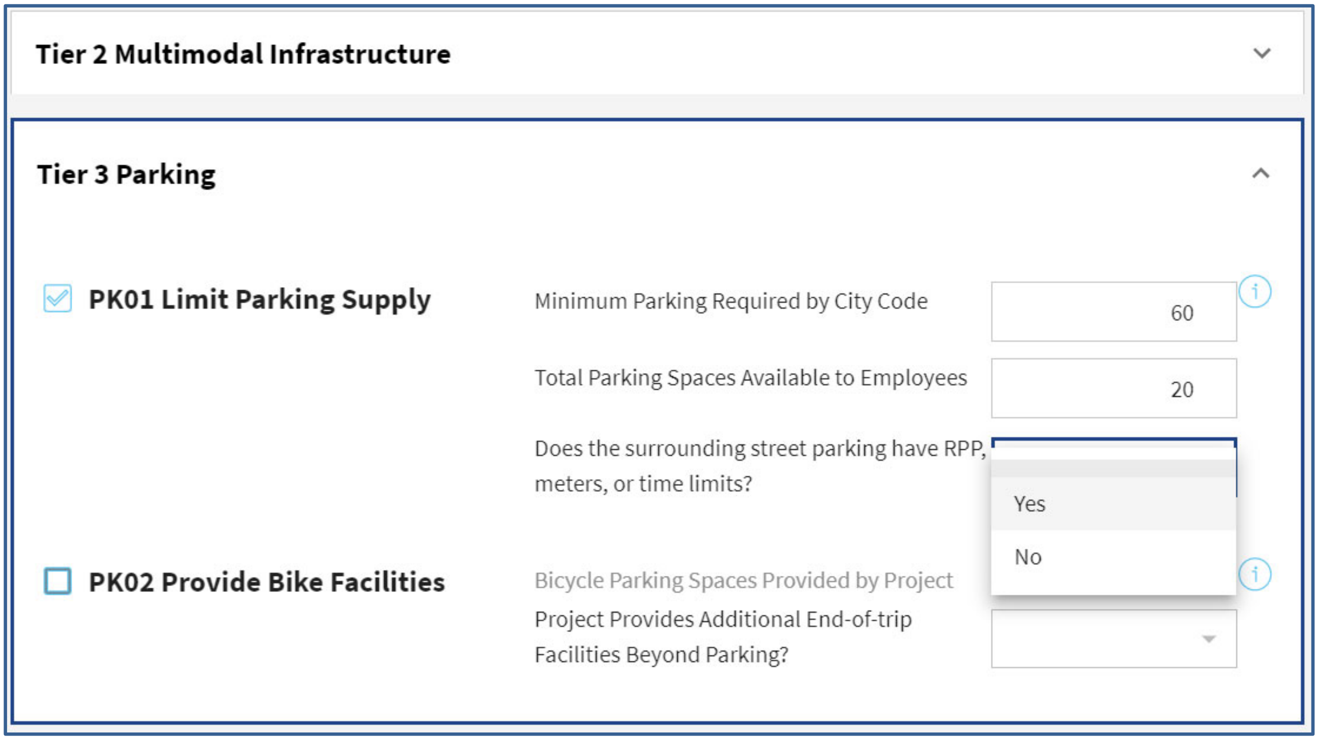


- **Project Land Use Information**
    - The left-hand entry boxes contain up/down arrows for increasing/decreasing values, but by clicking to the left of the up/down arrows, you may also type in a value, as shown below. Please note that all square-footage values are calculated in



the tool in terms of one thousand square feet (KSF) so for a 6,000 square-foot office, the field would be populated with a "6", as shown below.

- **VMT Reduction Strategies**
  - Select the desired VMT Reduction Strategies by first clicking the box next to the strategy. In some cases, additional inputs will be required, such as the example below for Tier 3 Parking (PK01 Limit Parking Supply)

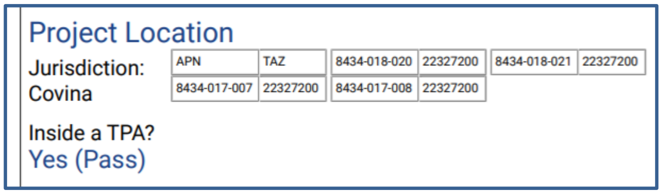


- **A number of reduction strategies overlap with each other**. For instance, a strategy may consist of a basket of measures which may overlap with some of the measures in another strategy. Therefore, the SGVCOG VMT Evaluation Tool logic has been coded to reflect these dependencies, so that if one measure is chosen, other overlapping measures are not allowed. The dependencies in the tool are summarized below and are shown in the Tool by greying out certain reductions so that they cannot be selected.

If this strategy is chosen…	This strategy is not allowed…
PK 02 Provide Bike Facilities	TP 05 Implement CTR Program
TP 04 CTR Marketing and Education	TP 05 Implement CTR Program TP 15 Travel behavior Change TP 18 Voluntary Travel Behavior Change Program
TP 05 Implement CTR Program	PK 02 Provide Bike Facilities TP 04 CTR Marketing and Education TP 08 Telecommuting and Alternative Work Schedules TP 13 Ride-Sharing Programs TP 15 Behavioral Intervention TP 17 Vanpool Incentives TP 18 Voluntary Travel Behavior Change Program
TP 06 Employee Parking Cash-Out	TP 10 Price Workplace Parking
TP 07 Subsidized Transit Program	TP 11 Alternative Transportation Benefits
TP 08 Telecommuting and Alternative Work Schedules	TP 05 Implement CTR Program
TP 09 Free Door-to-Door Transit Fleet	TP 13 Ride-Sharing Programs TP 17 Vanpool Incentives
TP 10 Price Workplace Parking	TP 06 Employee Parking Cash-Out
TP 11 Alternative Transportation Benefits	TP 07 Subsidized Transit Program
TP 13 Ride-Sharing Programs	TP 05 Implement CTR Program TP 09 Free Door-to-Door Transit Fleet TP 17 Vanpool Incentives
TP 15 Behavioral Intervention	TP 04 CTR Marketing and Education TP 05 Implement CTR Program TP 18 Voluntary Travel Behavior Change Program
TP 17 Vanpool Incentives	TP 05 Implement CTR Program TP 09 Free Door-to-Door Transit Fleet TP 13 Ride-Sharing Programs
TP 18 Voluntary Travel Behavior Change Program	TP 04 CTR Marketing and Education TP 05 Implement CTR Program TP 15 Behavioral Intervention

- **Project Screening Results (with VMT Reduction Strategies):** The results of the Project Screening are summarized in this report. The Tool does not screen based on 110-daily trips. Screening for this factor must be completed outside of the tool using the ITE Trip Generation Manual. This Tool screens projects based on their location within a TPA and/or a Low VMT Area. The Screening Results provides the following information about these two screening criteria.

1. **Transit Priority Area (TPA):** Page 1 of the SGVCOG VMT Evaluation Tool Report


Project Location

Jurisdiction: Covina

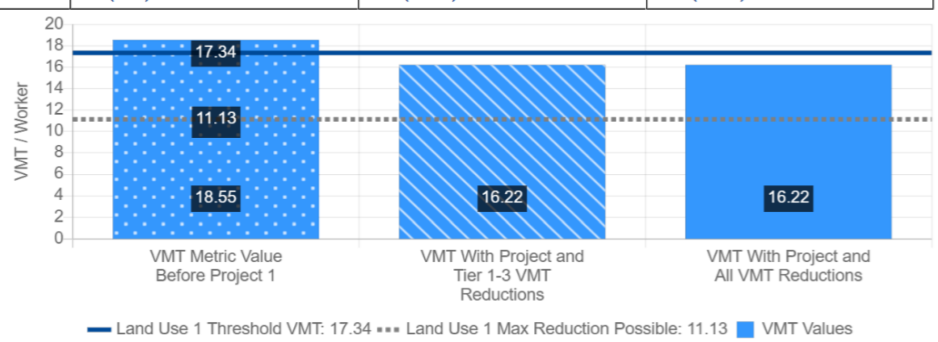
APN	TAZ				
8434-017-007	22327200	8434-018-020	22327200	8434-018-021	22327200
		8434-017-008	22327200		

Inside a TPA?
Yes (Pass)

2. **Low VMT Area:** Page 2 of the SGVCOG VMT Evaluation Tool Report provides details about the VMT generation in the area of the proposed project. The table in the figure below indicates the Home-based VMT per Employee Baseline (20.4), and the dark blue line indicated in the bar chart (17.34) indicates the threshold of 15 percent below the Baseline. The gray dotted line in the bar chart indicates the maximum potential VMT reduction (16.22) that could be available through the strategies in the tool.

Land Use Type 1:	Office
VMT Without Project 1:	Home-based Work VMT per Worker
VMT Baseline Description 1:	Subarea Average
VMT Baseline Value 1:	20.4
VMT Threshold Description 1:	-15%
Land Use 1 has been Pre-Screened by the Local Jurisdiction:	N/A

	Without Project	With Project & Tier 1-3 VMT Reductions	With Project & All VMT Reductions
Project Generated Vehicle Miles Traveled (VMT) Rate	18.55	16.22	16.22
Low VMT Screening Analysis	No (Fail)	Yes (Pass)	Yes (Pass)

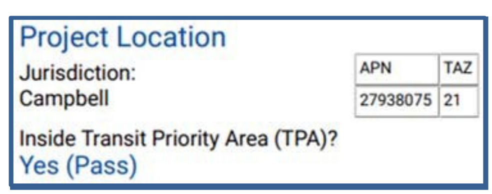


READING THE REPORT & EXPORT FILES

The VMT Evaluation Tool produces two types of outputs: a formatted report, which shows up on the Results screen and can be downloaded as a PDF file, and data tables including all the user-provided inputs and the back-end data which can be downloaded as CSV files.

Key things to look for in the report / PDF:

- **Whether the project falls in proximity to transit** (within ½ mile of a Major Transit Stop, or ½ mile of a stop along a High-Quality Transit Corridor as defined in state law):
  Look for the 'Inside TPA?' question on Page 1 of the report.


Project Location

Jurisdiction: Campbell

APN	TAZ
27938075	21

Inside Transit Priority Area (TPA)?
Yes (Pass)

- **Whether the project falls in a low-VMT area** (i.e., below the VMT threshold specified by the city/town/county): Look for the 'Low VMT Screening Analysis' row on the Screening Results page(s) of the report, starting on page 2. There will be Low-VMT Screening results for each land use you select.

	Without Project	With Project and Tier 1-3 VMT Reductions	With Project and All VMT Reductions
Project Generated Vehicle Miles Traveled (VMT) Rate	14.69	14.53	11.75
Low VMT Screening Analysis	No (Fail)	No (Fail)	Yes (Pass)

The CSV files are intended to help the user understand how the VMT reduction results were obtained; the data in the files, along with the formulas in forthcoming User Manual, should help confirm the results.

TIPS FOR SUCCESS

- Look for the "tool-tips" across the tool to help understand fields where inputs are required.
- The tool may take 1 - 2 minutes to run a report; if it takes much longer, refresh and try again.
- If you are running variations on the same site and project, use the back arrows in the upper-left of the screen (such as EDIT INPUTS) to go back, vary some inputs, and run the report again.
- To start a completely new analysis while staying in the tool, use the button in the upper-right of the Results screen. NEW ANALYSIS
- The tool is optimized for Chrome, Firefox, Edge or Safari on a Windows or Mac computer, although you may also access it from a tablet or another browser. If you encounter unexpected issues, try clearing your browser cache and cookies and running again.
- Please fill out the short feedback form by clicking on the link REPORT A PROBLEM/FEEDBACK in the upper-right of the tool. You may report errors, rate the tool, and offer suggestions for future improvements.

FOR MORE INFORMATION

SGVCOG will be providing further documentation of the VMT Evaluation Tool in Fall 2020, including a User Manual and Frequently Asked Questions (FAQ) sheet.

If you have questions about the VMT Evaluation Tool, you may email j.hayes@fehrandpeers.com.
For any inquiries about how the tool may be applied in a land use review and approval process, please contact staff at the city/town/county in which the project is located.

ATTACHMENT C: DETAILED VMT FORECASTING INFORMATION

This attachment provides detailed VMT forecasting instructions for use with the 2016 RTP/SCS version of the Southern California Association of Governments (SCAG) Travel Demand Model. Please note that SCAG periodically updates the travel demand model and while these instructions are for use of the 2016 RTP/SCS version of the model, the City should be consulted to determine the appropriate model or tool to utilize for travel demand forecasting and transportation analyses.

The SCAG travel demand model is a trip-based model that generates daily person trip-ends for each transportation analysis zone (TAZ) across various trip purposes (e.g., home-based-work, home-based-other, and non-home-based) based on population, household, and employment variables.

Production and attraction trip-ends are separately calculated for each zone, and generally production trip-ends are generated by residential land uses and attraction trip-ends are generated by non-residential land uses. Focusing on residential and employment land uses, the first step to forecasting VMT requires translating the land use into model terms, the closest approximations are:

- Residential: home-based production trips
- Employment: home-based work attraction trips

For retail uses, total VMT (accounting for all production and attraction trip types) is calculated and examined.

VMT Forecasting Instructions

The approach described below is for calculating home-based VMT and home-based work VMT using standard SCAG model output files. The major steps of this approach are listed as follows:

- Sum production-attraction (PA) matrices by time period and mode to calculate daily trips.
- Multiply distance skim matrices by PA trip matrices by purpose to estimate home-based production VMT (sum of home-based work, home-based school, and home-base non-work production VMT) and home-based work attraction VMT for individual TAZs.
- The home-based VMT per capita for a TAZ can be obtained by dividing the TAZ's home-based product VMT by the number of residents in the TAZ; home-based work VMT per employee can be obtained by dividing home-based work attraction VMT by the number of employees. VMT per capita or VMT per employee for an area (e.g., city) can be calculated by aggregating the relevant VMT for all TAZs in the area, aggregating residents or employees, and dividing VMT by residents or employees to obtain the desired metric.

The approach described below is for calculating total VMT using standard SCAG model output files. The major steps of this approach are listed as follows:

- Sum all production-attraction (PA) matrices to calculate daily trips.
- Multiply distance skim matrices by daily PA trip matrices.
- The total VMT can be calculated by aggregating the row or column totals for all TAZs that are within the desired geography (e.g., citywide or regional).

Appropriateness Checks

The estimated results should be checked against the results from an original/unmodified model run to understand the degree of accuracy. Note that these custom processes may or may not apply to special generators trips (e.g., airport or stadium) and the City should be consulted to determine if the model and these methods are appropriate.

When calculating VMT for comparison at the study area, citywide, or regional geography, the same methodologies that were used to estimate project-specific VMT at the TAZ level should be used, aggregating VMT and population/employment totals for all zones that are within the desired geography.

ATTACHMENT D: VMT REDUCTION STRATEGIES

Attachment D: VMT Mitigation Strategies

FEHR & PEERS

Comparison of CAPCOA Strategies Versus New Research Since 2010

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	Applicable to Individual Land Use Projects?	New Information Since CAPCOA Was Published in 2010		
						New information	Change in VMT reduction compared to CAPCOA	Literature or Evidence Cited
Land Use/Location	3.1.1	LUT-1 Increase Density	0.8% - 30% VMT reduction due to increase in density	Adequate	Yes - however, the project must increase residential or employment density by at least 10%.	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	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	3.1.3	LUT-3 Increase Diversity of Urban and Suburban Developments	9%-30% VMT reduction due to mixing land uses within a single development	Adequate	Yes	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,	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
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	Yes	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	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
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	Yes - the project must include the TOD design features.	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	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	Potentially yes - the use of this strategy would need to be supported by local data.	Observed trip generation indicates substantial local and regional variation in trip making behavior at affordable	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.
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	Yes	No update to CAPCOA literature; advise applying CAPCOA measure only to large developments with significant internal street	Same	N/A

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	No - this strategy would require a project to integrate into a larger overall network of pedestrian facilities that would require local and/or regional agency coordination to implement. Current research supports city and neighborhood level VMT reductions, but none of the literature	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
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	Potentially yes - The requirements for the project- level definition must be met. In general, this strategy would require a project to integrate into a larger overall network of bicycle facilities that would require local and/or regional agency coordination to implement.	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	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.	No - the evidence supporting this strategy is limited.	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
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.	Yes - evidence is only available to support taking these reduction high-transit urban areas.	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.
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.).	Yes - however, the project must be in a location that does not require parking minimums and has priced or permitting on- street parking.	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	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	Yes - however, the VMT reductions would only apply to visitor or customer trips.	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	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.
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.	Yes - however, the effectiveness of a voluntary CTR program would be building tenant specific and may require monitoring to evaluate the program's effectiveness.	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	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
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-	Yes - however, the effectiveness of a CTR program would be building tenant specific and may require monitoring to evaluate the program's effectiveness.	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	3.4.3	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."	Yes - however, the effectiveness of the ride-sharing programs is building tenant specific and may require monitoring to evaluate the program's effectiveness.	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	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	3.4.4	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."	Yes - however, the effectiveness of a transit subsidy program would be building tenant specific and may require monitoring to evaluate the program's effectiveness.	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	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	3.4.6	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	Yes - however, the effectiveness of telecommuting and alternative work schedules is building tenant specific and may require monitoring to evaluate the program's effectiveness.	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."	Yes - however, the effectiveness of CTR marketing and behavioral intervention programs is building tenant specific and may require monitoring to evaluate the program's effectiveness.	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
Commute Trip Reduction	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	No - this strategy would require local and/or regional agency coordination to implement.	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	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.
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.	Not applicable, unless if the project being evaluated is a school.	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
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.	Yes - however, the effectiveness of the employer-sponsored vanpool/shuttle programs is dependent on the building tenant specific and the quality of the vanpool/shuttle service being provided. This reduction strategy may require monitoring to evaluate the	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	3.4.13	TRT-13 Implement School Bus Program	38%-63% reduction in school VMT due to school bus service implementation	Adequate - School VMT only.	Not applicable, unless if the project being evaluated is a school.	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.
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.	Yes - however, the effectiveness of pricing workplace parking could be building tenant specific and may require monitoring to evaluate the program's effectiveness.	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	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 -
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).	Yes - however, the effectiveness of employee parking cash-out could be building tenant specific and may require monitoring to evaluate the	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.

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	No - expanding the transit network would require local and/or regional agency coordination to implement.	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	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	No - increasing the quality of transit service would require local and/or regional agency coordination to implement.	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	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 - the conversion of standard bus system to BRT would require local and/or regional agency coordination	No new information identified.	Same	N/A
Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	No -evidence currently does not show a project-specific VMT reductions, the current studies have shown city-wide VMT reductions from changes in travel modes.	Bikeshare car trip substitution rate of 7- 19% based on data from Washington DC, and Minneapolis/St. Paul. Annual VMT reduction of 151,000 and 57,000, respectively. Includes VMT for rebalancing and maintenance. VMT reduction of 0.023 miles per day per bikeshare member estimated for Bay Area bikeshare, utilizing Minneapolis/St. Paul data	57,000-151,000 annual VMT reduction, based on two large US cities. VMT reduction of 0.023 miles per day per member, based on one large US city estimate.	Fishman, E., Washington, S., & Haworth, N. (2014). Bike share's impact on car use: Evidence from the United States, Great Britain, and Australia. Transportation Research Part D: Transport and Environment, 31, 13-20. TDM Methodology: Impact of Carsharing Membership, Transit Passes, Bikesharing Membership, Unbundled Parking, and Parking Supply Reductions on Driving. Center for Neighborhood Technology, Peter Haas and Cindy Copp, with TransForm staff, May 5, 2016.

ATTACHMENT E: TRANSPORTATION PROJECT TYPES AND VMT ANALYSIS REQUIREMENTS

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.

Projects that would not likely lead to a substantial or measurable increase in vehicle travel, and therefore generally should not require an induced travel analysis, include:

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

- Initiation of new transit service
- Conversion of streets from one-way to two-way operation with no net increase in number of traffic lanes
- Removal or relocation of off-street or on-street parking spaces
- Adoption or modification of on-street parking or loading restrictions (including meters, time limits, accessible spaces, and preferential/reserved parking permit programs)
- Addition of traffic wayfinding signage
- Rehabilitation and maintenance projects that do not add motor vehicle capacity
- Addition of new or enhanced bike or pedestrian facilities on existing streets/highways or within existing public rights-of-way
- Addition of Class I bike paths, trails, multi-use paths, or other off-road facilities that serve non-motorized travel
- Installation of publicly available alternative fuel/charging infrastructure
- Addition of passing lanes, truck climbing lanes, or truck brake-check lanes in rural areas that do not increase overall vehicle capacity along the corridor