TJKM VISION THAT MOVES YOUR COMMUNITY

TECHNICAL MEMORANDUM

Date:	May 12, 2023		
To:	Adam Paszkowski, Morgan Hill	*Project No.:*	073-048 Morgan Hill VMT Thresholds
From:	Vamsee Modugula & Arthur Chen, TJKM	*Jurisdiction:*	City of Morgan Hill
Subject:	**Morgan Hill VMT Methodology Memo (FINAL)**		

CEQA Guidelines Section 15064.3(b)(4) states, "a lead agency may use models to estimate a project's vehicle miles traveled quantitatively." In Appendix 1 of the OPR Technical Advisory, it states, "travel demand models, sketch models, spreadsheet models, research, and data can all be used to calculate and estimate VMT."

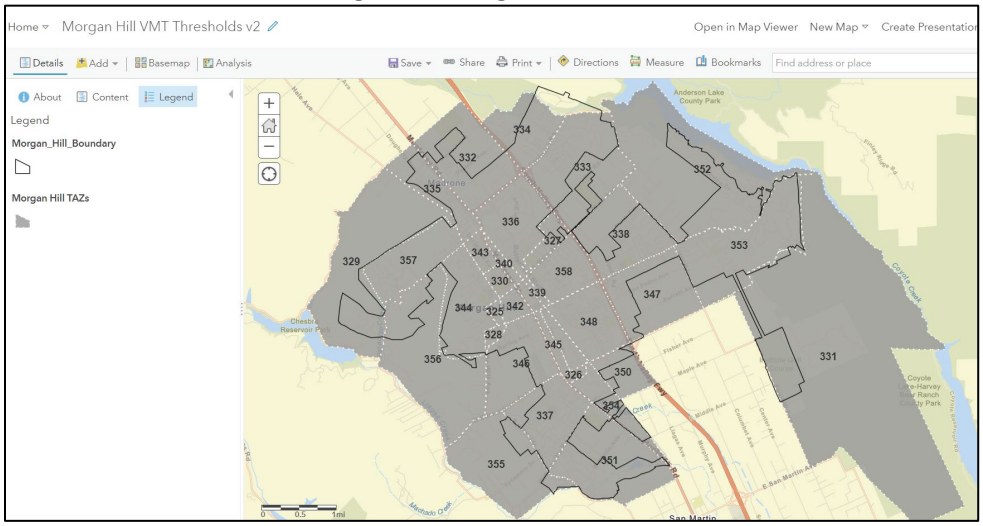
Various travel demand models and sketch planning tools are available for estimating VMT. The main travel demand model in use for the Santa Clara County region (which includes Morgan Hill) is the Valley Transportation Authority (VTA) Travel Demand Model (TDM). The VTA TDM contains local land uses and roadway networks and is the best tool for estimating VMT for the City of Morgan Hill.

The VTA TDM is a four step travel demand model which runs through the following four steps:

1. Trip generation (number of trips),
2. Trip distribution (where the trips go),
3. Mode choice (how the trips are divided among the available modes of travel),
4. Trip assignment (route the trips will take).

34 TAZs make up the City of Morgan Hill in the VTA TDM as shown in Figure 1. It should be noted that a very small portion of the city is in zones 329, 331, 346, 352, 355 and 356.

Figure 1: Morgan Hill TAZs



1. VMT METHODOLOGY AND METRICS

To calculate VMT from the VTA TDM, an origin destination (OD) methodology was used. This method uses two major outputs from the VTA model - the first is a set of vehicle trip tables (which includes all vehicle trips by vehicle mode and by time of day) that contain the number of trips between each zone in the model. The second data input is the set of highway distance skims (by vehicle mode and by time of day) that allows trip distances to be calculated for each OD pair between TAZs to be based on congested travel time, speed, and costs from the final highway network assignment. The total VMT matrices are then created by multiplying the final OD trip tables with the corresponding highway distance skims.

CEQA Guidelines Section 15064.3(b)(4) states, "[a] lead agency has discretion to choose the most appropriate methodology to evaluate a project's [VMT], including whether to express the change in absolute terms, per capita, per household or in any other measure." VMT can be expressed as an efficiency-based metric (e.g., VMT per resident, VMT per employee, or VMT per service population) or as absolute metric (e.g., total VMT). OPR recommends expressing VMT as an efficiency-based metric to allow for more direct comparisons to baseline conditions. VMT fluctuates based on changes in population, employment, economic activity, or due to expanding transportation options (e.g., Uber, Lyft, Micro-Mobility, and autonomous vehicles).

The following are different type of VMT metrics that can be used to determine significance for projects in Morgan Hill:

1. **Total VMT** – VMT generated by all land uses in a defined geographic area (Morgan Hill boundaries or TAZ equivalent). Total VMT is calculated by taking the distance traveled by all passenger vehicle trips that are assigned on the roadway network.
2. **VMT per Service Population** – VMT generated by all land uses in a defined geographic area (Morgan Hill boundaries or TAZ equivalent) divided by the total number of residents and employees. Service population includes any one that generates traffic in an area such as total population, employment, students, and hotel guests. This metric reflects all passenger vehicle trips assigned on the roadway network.
3. **Home-based VMT per Resident** – VMT generated from travel between resident's homes and other destinations, such as for work, school, household errands, in a defined geographic area divided by the total residents. This metric excludes trips between two non-residential locations, such as a trip between a retail center and a school. Home based VMT per resident reflects all passenger vehicles assigned to the roadway network and is calculated using the production side of the vehicle trip table.
4. **Home-based VMT per Employee** – VMT generated from travel between an employee's home and work in a defined geographic area divided by the number of employees in the geographic area. Home-based work VMT per employee reflects all passenger vehicles assigned to the roadway network and is calculated using the attraction side of the vehicle trip table.

2. MORGAN HILL VMT METRICS

Development projects in the City of Morgan Hill can be split into two main types; transportation projects and land use projects. Transportation projects include roadway widenings, signal installations, sidewalk improvements, bicycle lanes, etc. Land use projects include residential dwellings, commercial buildings, parks, medical facilities, or government buildings.

For transportation projects, OPR recommends the total VMT methodology for estimating the VMT impact of transportation projects. The total VMT within a defined geographic area is calculated for the before and after project conditions. The impacts of the transportation project is reflected by whether VMT generated by the project increases the total roadway VMT. For more information, the OPR Technical Advisory and California Department of Transportation (Caltrans) Draft Transportation Analysis Framework (Caltrans, 2020) provides a step by step guidance for estimating VMT for transportation projects.

For land use projects, OPR recommends one of the following metrics to calculate a project's VMT significance impact:

- Home-based VMT per Resident and Home-based VMT per Employee metrics.
- Home-based VMT per service population.

TJKM obtained the latest VTA TDM and isolated Morgan Hill TAZs and calculated the VMT metrics for the city for the base year (2015) and the forecast year (2040). Table 1 presents Morgan Hill VMT metrics from the VTA TDM.

Table 1 – VMT Metrics for City of Morgan Hill

	VMT Metrics	
	Home-Based VMT per Resident	Home-Based VMT per Employee
2015 Base Year Model	24.64	21.42
2040 Forecast Year Model	25.46	22.65

Source: VTA TDM

3. MORGAN HILL VMT SCREENING CRITERIA

The OPR Technical advisory provides "screening thresholds" that local agencies may use to determine when a land use or transportation project would typically be expected to cause a less than significant VMT impact.

Projects that meet the screening threshold/criteria for VMT would most likely reduce VMT in a specific TAZ within Morgan Hill. In addition, a project that meets at least one of the screening criteria would be exempt from further VMT analysis.

Below are various land use projects VMT screening criteria that may be applicable to projects within Morgan Hill. For single use land use projects, meeting one of the following criteria is sufficient. For multiple land use projects, such as a mixed use project, multiple screening criterion need to be met for each type of land use for it to be exempt from further VMT analysis.

1. **Project Size Screening** – OPR Technical Advisory (page 12) states that local agencies may screen out projects that generate less than 110 average daily trips. When estimating trips generated by a project, Institute of Transportation Engineers (ITE) guidelines or local surveys of trip generations need to be reviewed and approved by the City of Morgan Hill. Such analysis will need to account for trip generation of all uses on the project site when calculating the total number of daily trips.
2. **Locally Serving Retail Screening** – OPR Technical Advisory (page 16) states that local serving retail projects, defined as retail projects that are less than 50,000 square feet may be presumed to have an insignificant VMT impact. Fast food restaurants are in this category. Local serving retail generally improves proximity and convenience for residents to food and other consumer goods and reduce the vehicle distance travelled.
3. **Low VMT Area Screening** – OPR Technical Advisory (page 12) states that residential and employment projects located within a low VMT generating area may be presumed to have an insignificant VMT impact. OPR's guidance suggests using low VMT screening criteria as 15 percent below a region's home based VMT per resident or home based VMT per employee metric but allows the lead agency to set their own thresholds. Morgan Hill has elected to use the low VMT area screening as equal to the city's average Home-based VMT per resident or VMT per employee, depending on the type of project. Further discussion in the next section will support findings that show why using the existing average is better compatible with Morgan Hill's development standards.
4. **Transit Proximity Screening** – OPR Technical Advisory (page 13) states that projects located within Transit Priority Areas or High Quality Transit Corridors are presumed to have a less than significant impact and will not require further VMT analysis. Close proximity means any project located within half a mile radius of an existing or planned major transit stop. Major transit stops are defined as either rail transit with dedicated right of way, a ferry terminal served by bus or rail or the intersection of two or more bus routes with headways of 15 minutes or less during morning and afternoon peak commute periods. Morgan Hill has a Caltrain station in the downtown area that fulfills this screening criteria. In addition, VTA bus route 68 is a high capacity bus line with stations along Monterey Road in Morgan Hill that also meet this criteria.

Figure 2: Morgan Hill Transit Buffer around Caltrain Station and VTA Route 68

5. **Affordable Housing Screening** – OPR Technical Advisory (page 14) states affordable housing generates lower VMT than market housing. Adding affordable housing to infill locations generally improves jobs-housing match, in turn shortening commutes and reducing VMT. Lower income families tend to choose a residential location close to their workplace and have lower levels of auto ownership, allowing buildings to be designed with less parking which, in some cases, represents the difference between a project being economically viable or not. Therefore, a project consisting of a high percentage of affordable housing may be a basis for the lead agency to find a less-than-significant impact on VMT. Evidence supports a presumption of less than significant impact for a 100 percent affordable residential development (or the residential component of a mixed-use development) in infill locations. Lead agencies may develop their own presumption of less than significant impact for residential projects (or residential portions of mixed use projects) containing a particular amount of affordable housing, based on local circumstances and evidence. Not every city has screened out projects with affordable homes but most have included them in VMT reduction mitigation measures that calculate lower VMT for affordable homes.
6. **Active Transportation Projects** – For transportation projects, CEQA Guidelines Section 15064.3(b)(2) states, "Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact." OPR Technical Advisory (page 23) states that transportation projects that promote active transportation, such as transit, bicycle, and pedestrian facilities, are presumed to generally reduce VMT and can be screened out from further analysis.

4. MORGAN HILL VMT THRESHOLDS OF SIGNIFICANCE

Section 15064 of the CEQA Guidelines provide general criteria to local agencies in determining the significance of environmental effects of their projects (such as VMT) as required by section 21083 of the Public Resources Code. The Natural Resources Agency updated CEQA guidelines Section 15064 to expressly clarify that agencies may rely on standards adopted for environmental protection as thresholds of significance. An agency that relies on a threshold of significance should explain how the application of the threshold indicates a less than significant effect.

The VMT Thresholds of Significance for Morgan Hill are based on the type of land use development - VMT per capita for residential projects and VMT per job or employee for employment projects. While OPR suggests a threshold of 15 percent reduction in the VMT metric as compared to the existing baseline, it recognizes that not all cities in California are similar in terms of land use and transportation options.

Many of the cities and counties adopting the OPR recommended 15% threshold are jurisdictions where the majority of the city falls within transit priority areas and / or are mostly urbanized near a high employment center core. With land parcels in these cities and counties mostly screened out, few projects in the 15% threshold areas would require a full CEQA transportation analysis (including VMT).

Below are some examples of VMT thresholds that deviate from OPR's recommendation. Appendix 1 shows the full list compiled as part of a literature review.

- Baseline – City of Laguna Hills, City of Corona, City of Pasadena, City of Glendora, Canyon lake, Chino, Laguna Niguel, Walnut, Calimesa, Jurupa Valley, Lake Elsinore, Fullerton, Menifee, Moreno Valley, Murrieta, Norco, Cucamonga, San Dimas, Seal Beach, San Jacinto, Upland, Vallejo, Victorville, Yorba Linda
- 3% below baseline – City of Beaumont, Wildomar
- 4% below baseline – County of San Bernardino
- 5% below baseline – Simi Valley in Ventura County

OPR guidelines state that lead agencies have the discretion to setup their own VMT thresholds. If they are deviating from OPR's 15% reduction in VMT, they need to provide substantial evidence. Western Riverside Council of Governments, WRCOG did a detailed analysis and took a legal opinion in this regard which stated that "*Substantial evidence is critical in the threshold setting process and should explain why the OPR recommended threshold is not appropriate for the lead agency and why another threshold was selected*". This opinion considers the fact that the 15-percent reduction is not included in the statute or the proposed CEQA Guidelines; rather it is only included in OPR's *Technical Advisory*. The technical advisory relies heavily on CAPCOA's "Quantifying Greenhouse Gas Mitigation Measures" report which says that 15% is the reduction possible by combining several mitigation strategies for places classified as suburban centers. The efficacy of these mitigation measures decreases for suburban and rural areas that do not have good mixed landuse, balance of jobs and housing and transit options. Also, these reductions are not based on a before and after study of implementation of mitigation strategies. The percentages were derived comparing VMT performance for a small set of cities in California using data collected a decade ago. Further studies are needed to understand short and long term effects of TDM strategies in reducing GHG emissions.

Given all of the above and the fact that lead agencies have discretion in setting thresholds, some cities have taken the below approach.

Since an impact under CEQA is considered to have occurred when there is an increase in VMT and GHG gas emissions, a starting level for thresholds can be existing conditions or baseline VMT metrics (Total VMT, VMT per capita, VMT per employee, VMT per service population etc.). Since VMT increases with increase in population and employment, impact can be calculated by comparing build alternatives to baseline conditions. This assumes that trip patterns generated by new land use is similar to existing land uses.

5. VMT THRESHOLDS

Morgan Hill will use the city average as the VMT threshold for both residential (VMT per Capita) and employment (VMT per employee) land uses. This balances the city's development goals with environmental goals. Residential and employment projects can be added to zones where the VMT metric is below or equal to the city's average. This ensures that at a minimum, the city's VMT metrics remain the same. The table below shows the percentage of TAZs that meet the criteria when using the baseline City Average as the threshold.

Table 2: VMT Threshold Summary

Using City Average as Threshold…			VMT Metric
Metric	**Meets threshold**	**Percent**	**Value**
VMT / Capita	24 of 34 Zones meet threshold	71%	24.64
VMT / Employee	13 of 34 Zones meet threshold	38%	21.42

Following are the recommended thresholds for Morgan Hill.

BASE YEAR VMT THRESHOLDS

A project would result in a significant project-generated VMT impact if:

a. For residential projects, its net VMT per capita exceeds Morgan Hill's baseline VMT per capita.
b. For office and industrial projects, its net VMT per employee exceeds Morgan Hill's baseline VMT per employee.
c. For all other uses, including commercial / retail uses over the 50,000 square feet local threshold, a net increase in total VMT within Morgan Hill would be considered a significant impact.

CUMULATIVE VMT IMPACTS

For future year forecasts, a project would result in a significant VMT impact if:

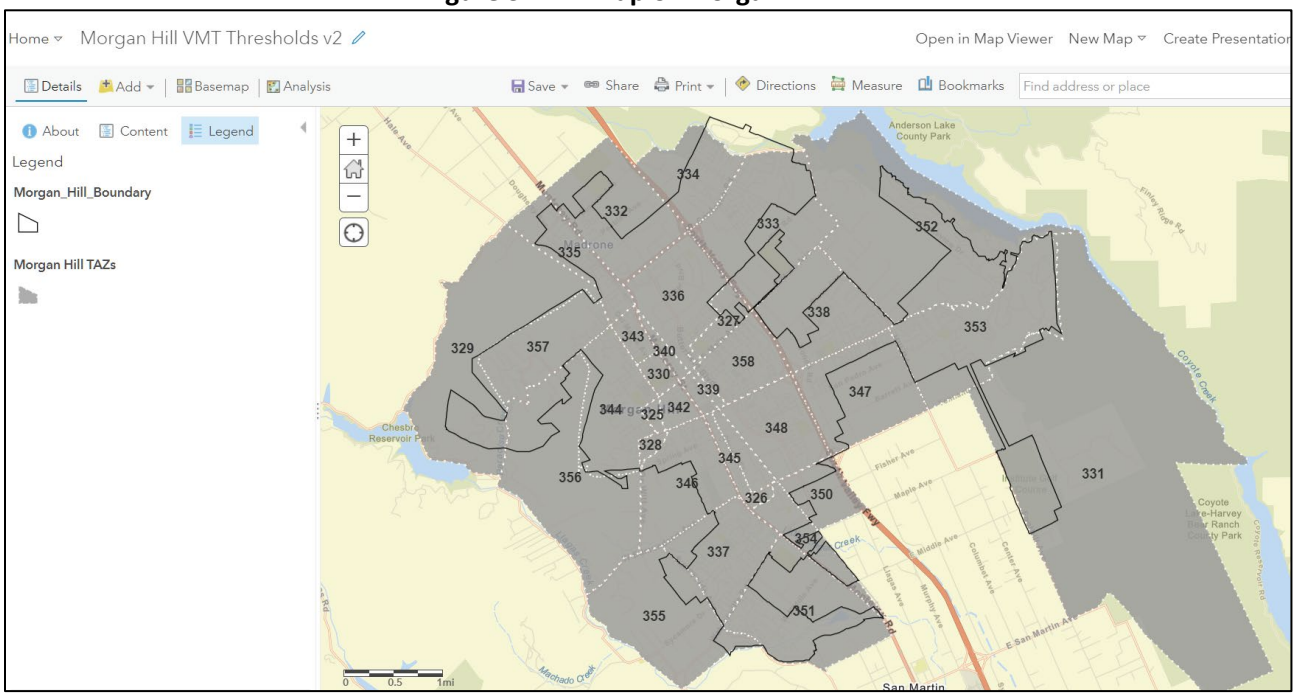
a. For residential projects, its cumulative project-generated VMT per capita exceeds the future baseline VMT per capita for Morgan Hill.
b. For office and industrial projects, its cumulative project-generated VMT per employee exceeds the future baseline VMT per employee for Morgan Hill.
c. For all other land development project types, a net increase in total VMT in the Cumulative Plus Project scenario would be considered a significant impact.

Online maps have been provided for the various TAZs that comprise Morgan Hill along with VMT per Capita and VMT per Employment data. In addition, a half mile boundary transit buffer zone has been drawn around the Morgan Hill Caltrain station and VTA Route 68 to show transit accessible areas which are exempt from VMT analysis. The online map can be accessed here: https://arcg.is/1XTCfa0

APPENDIX A – VMT METRICS BY ZONE MAPS

Figure 3 shows all the traffic analysis zones in Morgan City and their zone number. This map can be used in conjunction with Table 2's VMT metrics and how they compare to different options for thresholds.

Figure 3: TAZ Map of Morgan Hill



The following maps show TAZs in Morgan Hill which are under the threshold, are mitigatable, or unmitigitable for VMT per Capita and VMT per Employee metrics.

Figure 4: VMT per Capita Map for Morgan Hill

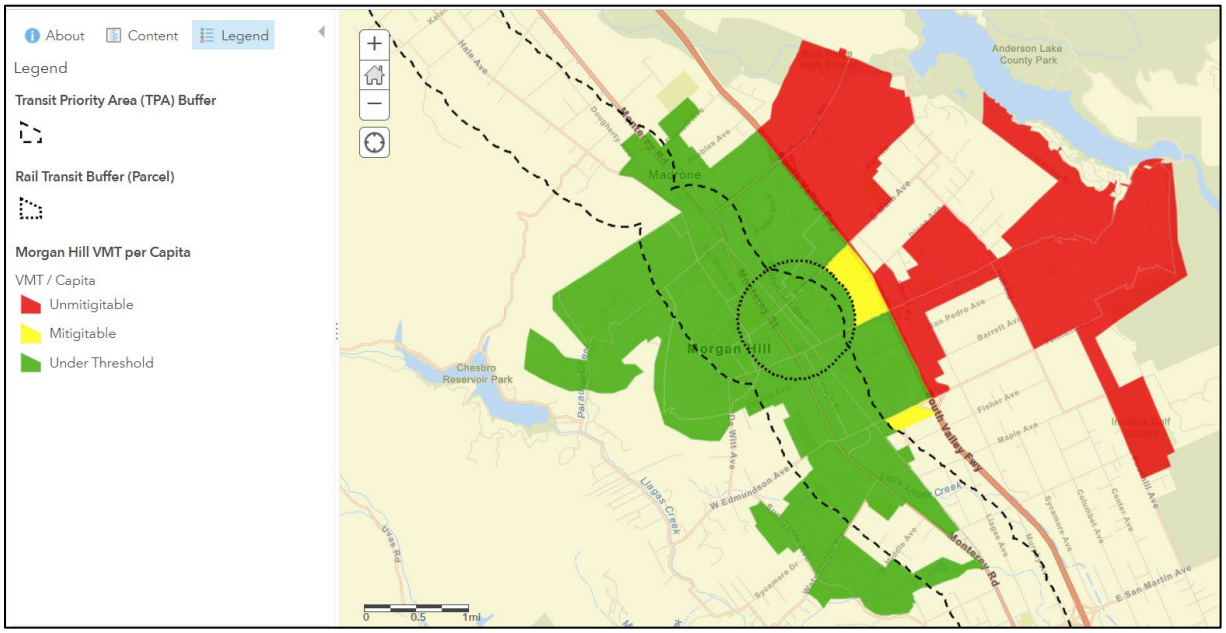
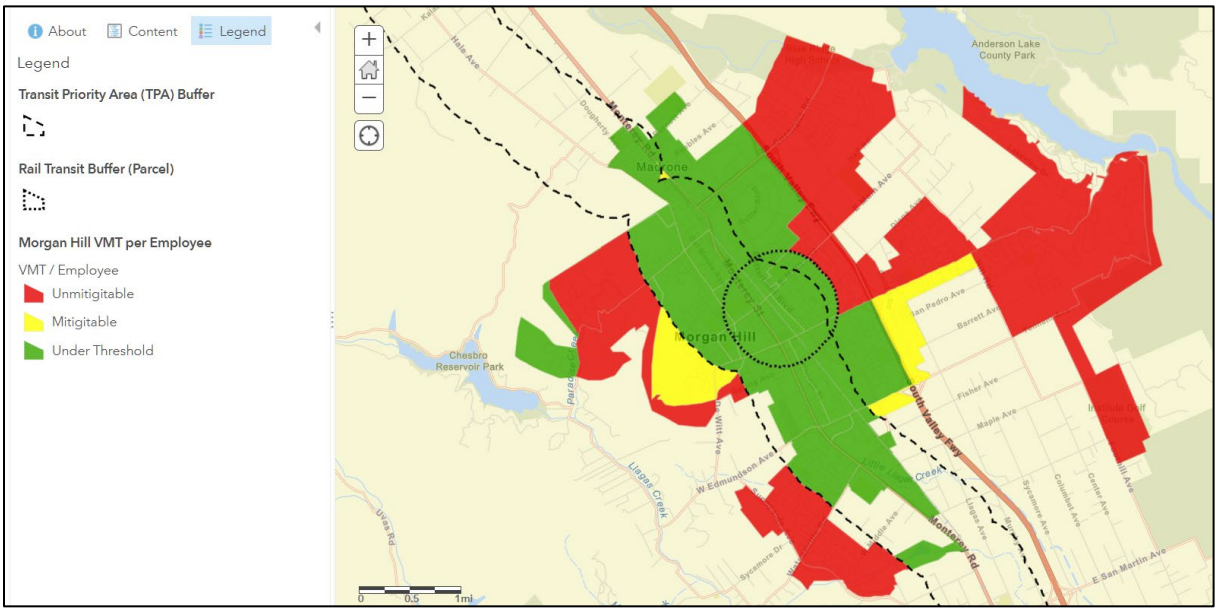


Figure 5: VMT per Employee Map for Morgan Hill



APPENDIX B – CITIES IN CALIFORNIA THAT DEVIATE FROM OPR'S RECOMMENDATION OF 15% REDUCTION IN VMT METRICS AS COMPARED TO BASELINE

Name	County	Metric - Residential	Threshold - Residential	Metric - Office	Threshold - Office
Aliso Viejo	Orange	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Buena Park	Orange	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Calimesa	Riverside	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Fountain Valley	Orange	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Fullerton	Orange	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
La Habra	Orange	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Ontario	San Bernardino	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Orange	Orange	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Palm Springs	Riverside	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
San Bernardino	San Bernardino	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Twentynine Palms	San Bernardino	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Upland	San Bernardino	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Yorba Linda	Orange	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Yucca Valley	San Bernardino	VMT/SP	< City VMT at general plan build-out	VMT/SP	< City VMT at general plan build-out
Tulare	Tulare	VMT/capita	< TAZ level VMT	VMT/employee	< TAZ level VMT

Name	County	Metric - Residential	Threshold - Residential	Metric - Office	Threshold - Office
Simi Valley	Ventura	VMT/capita	≤ 95% of city VMT	VMT/employee	≤ 95% of city VMT
San Bernardino	San Bernardino	VMT/capita	≤ 96% of unincorporated county VMT	VMT/employee	≤ 96% of unincorporated county VMT
Wildomar	Riverside	case-by-case	≤ 97% of the city VMT, or ≤ the region's VMT	case-by-case	≤ 97% of regional or city VMT
Beaumont	Riverside	VMT/SP	≤ 97% of the city VMT, or ≤ the region's VMT	VMT/SP	≤ 97% of the city VMT, or ≤ the region's VMT
Canyon Lake	Riverside	VMT/SP	≤ City baseline VMT	VMT/SP	≤ City baseline VMT
Chino	San Bernardino	VMT/SP	≤ City baseline VMT	VMT/SP	≤ City baseline VMT
Corona	Riverside	VMT/SP	≤ City baseline VMT	VMT/SP	≤ City baseline VMT
Glendora	Los Angeles	VMT/capita	≤ City baseline VMT	VMT/employee	≤ City baseline VMT
Jurupa Valley	Riverside	VMT/capita	≤ City baseline VMT	VMT/employee	≤ City baseline VMT
Laguna Hills	Orange	VMT/capita	≤ City baseline VMT	VMT/employee	≤ City baseline VMT
Laguna Niguel	Orange	VMT/capita	≤ City baseline VMT	VMT/employee	≤ City baseline VMT
Lake Elsinore	Riverside	VMT/SP	≤ City baseline VMT	VMT/SP	≤ City baseline VMT
Moreno Valley	Riverside	VMT/capita	≤ City baseline VMT	VMT/employee	≤ City baseline VMT
Murrieta	Riverside	VMT/SP	≤ City baseline VMT	VMT/SP	≤ City baseline VMT
Norco	Riverside	VMT/SP or VMT/capita	≤ City baseline VMT	VMT/SP or VMT/employee depending on context	≤ City baseline VMT
Rancho Cucamonga	San Bernardino	VMT/SP	≤ City baseline VMT	VMT/SP	≤ City baseline VMT
San Dimas	Los Angeles	VMT/SP	≤ City baseline VMT	VMT/SP	≤ City baseline VMT
Seal Beach	Orange	VMT/capita	≤ City baseline VMT	VMT/employee	≤ City baseline VMT
Vallejo	Solano	VMT/capita	≤ City baseline VMT	VMT/employee	≤ City baseline VMT

Name	County	Metric - Residential	Threshold - Residential	Metric - Office	Threshold - Office
Victorville	San Bernardino	VMT/SP	≤ City baseline VMT	VMT/SP	≤ City baseline VMT
Walnut	Los Angeles	No	≤ City baseline VMT	No	≤ City baseline VMT
Apple Valley	San Bernardino	VMT/SP	≤ City VMT at general plan build-out	VMT/SP	≤ City VMT at general plan build-out
Eastvale	Riverside	VMT/capita	≤ County general plan build-out VMT	VMT/capita	≤ County general plan build-out VMT
Menifee	Riverside	VMT/SP	≤ County general plan build-out VMT	VMT/SP	≤ County general plan build-out VMT
Barstow	San Bernardino	VMT/SP	≤ County VMT	VMT/SP	≤ County VMT
Grand Terrace	San Bernardino	VMT/SP	≤ County VMT	VMT/SP	≤ County VMT
Indio	Riverside	VMT/capita	≤ County VMT	VMT/employee	≤ County VMT
Palm Desert	Riverside	VMT/SP	≤ City baseline VMT	VMT/employee	≤ County VMT
Santa Ana	Orange	VMT/SP	≤ County VMT	VMT/SP	≤ County VMT
RIVERSIDE	RIVERSIDE	VMT/capita	≤ County VMT	VMT/employee	≤ County VMT
Alhambra	Los Angeles	VMT/capita	≤ Regional VMT	VMT/employee	≤ Regional VMT
West Covina	Los Angeles	VMT/SP	≤ Regional VMT	VMT/SP	≤ Regional VMT

Source: UC Davis Research Project Draft. To be finalized in mid-2023.