FEHR PEERS

Memorandum

Date: July 25, 2022

To: Julio Perucho, Metro

From: Amanda Chapman and Chelsea Richer, Fehr & Peers

Subject: VMT Regulatory and Policy Guidance (Task 3)

LA22-3343

Introduction

The purpose of this memorandum is to summarize a literature review of regulatory and policy guidance related to Vehicle Miles Traveled (VMT) quantification and mitigation strategies, in the context of potential applications to highway improvement projects included in Los Angeles County Metropolitan Transportation Authority's (Metro's) Sales Tax Measures Expenditure Plans/Ordinances and corresponding subregional programs.

Statement of Purpose

Metro, in partnership with the California Department of Transportation (Caltrans), is developing the VMT Mitigation Program to support the region's Assembly Bill (AB) 32 and Senate Bill (SB) 375 goals by reducing the impacts of VMT and correlated greenhouse gas (GHG) emissions while affording greater mobility and access for the County's residents. Aligning Metro's highway investments with the spirit of SB 743 that emphasizes multi-modal and smart growth strategies to reduce VMT, this program will allow Metro to support the region's goal of reducing VMT impacts; provide Metro, Caltrans, and other project delivery partners within the County of Los Angeles with refined tools to determine project VMT impacts more accurately; and provide feasible and enforceable VMT mitigation strategies.

History of SB 743 Policy

Signed into law on September 27, 2013, California State SB 743 directed the Governor's Office of Planning and Research (OPR) to "prepare, develop, and transmit to the Secretary of the Natural Resources Agency for certification and adoption proposed revisions to the guidelines adopted pursuant to Section 21083 establishing criteria for determining the significance of transportation impacts of projects within transit priority areas… Upon certification of the guidelines by the

Secretary of the Natural Resources Agency pursuant to this section, automobile delay, as described solely by Level of Service (LOS) or similar measures of vehicular capacity or traffic congestion within a transit priority area, shall not support a finding of significance pursuant to this division…"

On August 11, 2015, OPR released a preliminary draft of changes to California Environmental Quality Act (CEQA), revising the Guidelines based on public comments received at that time. In October 2015, OPR and the Natural Resources Agency conducted a public workshop based on this draft.

On January 20, 2016, OPR updated the CEQA Guidelines via the *Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA*, with the evaluation of vehicle miles traveled (VMT) recognized as "generally the most appropriate measure of transportation impacts." OPR also stated that lead agencies may tailor their analysis to include other measures.

On November 2017, OPR proposed a new section, 15064.3, to help determine the significance of transportation impacts. This section was updated July 2, 2018, and finalized on December 28, 2018, with criteria for analyzing transportation impacts, and is seen below in the "Thresholds of Significance" section. Its purpose is to describe specific elements for considering the transportation impacts of a given project given the use of VMT as the primary measurement.

In December 2018, OPR shared its comprehensive update to the CEQA guidance per the proposed updates to analysis of GHG emissions, with a particular focus on the shift in how transportation impacts would be analyzed, among other items. This document codified that in the State of California, environmental analysis under CEQA of a project's transportation impacts would be done through analysis of VMT. VMT was already being used to study other impacts such as air quality, GHGs, and energy use. This major shift in approach clearly prioritized projects that reduce the number of miles that cars travel and increased use of other modes. The Guidelines allowed for two years for cities and lead agencies to update their process.

Per the guidance from OPR, "a lead agency may elect to be governed by the provisions of this section immediately. Beginning on July 1, 2020, the provisions of this section shall apply statewide." In order to comply with the guidelines understood to become the standard in our state, environmental impact reports must evaluate vehicle trips and VMT consistent with the intent of SB 743.

Vehicle Miles Traveled (VMT) and Level of Service (LOS)

The shift towards VMT reflects a major change of the State's priorities, emphasizing the reduction of GHGs by encouraging high-occupancy, multi-modal, and active transportation modes and infill land use development, discouraging urban sprawl. The metrics with which transportation impacts are measured inherently direct the future of the built environment. SB 743 initiated the change of

primary metric from LOS to VMT; this change in the way of analyzing potential impacts necessitated new ways of considering project VMT quantification and mitigation strategies.

VMT is a measure of the number of miles traveled within a defined area and are based on the number of vehicle trips (VT) multiplied by the average trip length in miles for various trip types. It measures miles traveled (e.g., private automobiles, trucks and buses[1]) generated by all land uses (e.g., residential, retail, office). It can be studied by population, employment, or service population. To obtain an average VMT per service population, the total VMT is divided by the total population and employees within the area of analysis. While the total VMT is expected to increase as growth occurs in a given area, a reduction in per-capita or total VMT over time can be used as an indicator of reduced reliance on single-occupancy automobiles. Reducing VMT can help meet the State's goals of reducing GHG emissions, as mandated by AB 32 and SB 375.

LOS was used previously as the primary method for determining CEQA transportation-related impacts. LOS is a measure used to describe the condition of traffic flow, ranging from excellent conditions at LOS A to overloaded conditions at LOS F. Congested conditions and poor LOS is generally associated with the highest pollutant emission intensity.[2] Traditional mitigation measures to address the LOS impact often involved increasing capacity (i.e., the width of a roadway or intersection), which has the potential to induce more trips/VMT and reduce some of the emissions benefits gained from congestion relief. The concept of induced travel demand will be discussed further in this memorandum.

Policy Guidance

This section of the memorandum discusses policy guidance related to VMT quantification and mitigation strategies, as well as project types currently assumed to increase or induce VMT, and project types currently assumed to not increase VMT. It also outlines potential challenges and considerations.

Caltrans' SB 743 Environmental Essentials for Project Development & Delivery

As part of a three-part series (parts two and three forthcoming), Caltrans' *SB 743 Environmental Essentials for Project Development & Delivery* acknowledges the gaps in existing state-wide experience as of yet in avoiding and mitigating induced travel and summarizes current best-practices in planning and project delivery. It exists less as a policy document and more as general guidance given the common themes and questions Caltrans has come across in projects requiring

[1] For SB743 purposes, only automobile VMT is required to be analyzed. Total VMT including heavy trucks and buses is only required for other resource sections such as energy and air quality.

[2] Zhang, Kai & Batterman, Stuart & Dion, Francois. (2011). Vehicle emissions in congestion: Comparison of work zone, rush hour and free-flow conditions.

CEQA analysis since the establishment of SB 743. The following is a brief summary of the sections of this document:

1. *Balancing Transportation and Environmental Outcomes* – Caltrans as an agency must balance the need for improving the statewide transportation system, while aiming to reduce VMT and GHG emissions. Previously the agency focused on projects that primarily advanced transportation outcomes specifically, but now Caltrans has several guiding documents that reflect the current statewide environmental goals as well. Per the "plan consistency" requirement of CEQA, these documents can help proposers of projects achieve balanced outcomes and focus on projects that "can facilitate access to desired destinations, for both travelers and freight, without inducing VMT through the construction of additional capacity."[3]
2. *Avoidance and Minimization in Project Alternatives* – All components of a project, from alternatives to design, should consider environmental effects, with an approach that minimizes these impacts from the purpose and needs statements onwards as opposed to assuming mitigation will be possible. If a project can endeavor to avoid these effects during scoping, project design, alternative development, and construction materials and process, the EIR process will be much more streamlined.
3. *Full Disclosure and Informed Decision-Making* – While CEQA requires the use of the best available information (such as the Transportation Analysis under CEQA [TAC] and Transportation Analysis Framework [TAF]), discussed later in this memorandum), it is also imperative that we disclose VMT as well as any other metrics and information critical to telling the whole story, and explain unknowns, assumptions, and technical challenges in a way that understandable to a broad audience.
4. *Good Faith Effort and Substantial Evidence* – Schedule pressure is not a good reason to reduce the analysis, as we must show that we took all reasonable and feasible approaches to balancing transportation and environmental needs in a project. Similarly, budget pressures are not a good reason to discount mitigation, as the cost of such must be incorporated into the total project cost. The conclusions of analysis are much better supported by demonstration of due diligence.
5. *An Overview of Significance Determinations* – While mitigation strategies should be considered a last resort more than an assumed part of a project, features or design elements can be incorporated into the project such as those that encourage mode shift away from single occupancy vehicles. Additionally, projects should be evaluated based on the VMT potentially induced by the project and its effects on land development.
6. *Mitigation Adequacy and Implementation Assurance* – Mitigation measures must be "reasonable, feasible, effective, and our commitment to their implementation needs to be

[3] SB 743 Environmental Essentials, Accessed on 3.30.22, https://dot.ca.gov/-/media/dot-media/programs/sustainability/documents/sb-743-environmental-essentials-for-project-development-and-delivery-a11y.pdf

assured." They do not need to be confined to one jurisdiction or agency. For mitigation measures that are considered and determined ill-suited, similar analysis should be explored and conveyed.

VMT Impact Estimation: Regional & State Documents

OPR CEQA Guidelines Update (2018)

Following the SB 743 history shared earlier in this memorandum, OPR shared its comprehensive update to the CEQA guidance in December 2018 per the proposed updates to analysis of GHG emissions, with a particular focus on the shift in how transportation impacts would be analyzed, among other items. This document codified that in the State of California, environmental analysis under CEQA of a project's transportation impacts would be done through analysis of VMT. VMT was already being used to study other impacts such as air quality, GHGs, and energy use. This major shift in approach clearly prioritized projects that reduce the number of miles that cars travel and increased use of other modes. The Guidelines allowed for two years for cities to update their process.

OPR Technical Advisory on Evaluating Transportation Impacts in CEQA (2018)

This document includes recommendations on how to assess and analyze VMT under the 2018 CEQA Guidelines update, how to approach thresholds of significance, and consideration of mitigation measures. Referencing the California Air Resources Board (CARB) *2016 Mobile Source Strategy*, this document notes that it will not be possible to meet statewide emissions goals without reducing VMT, as well as documenting the benefits of those reductions to public health. Examples of environmental, health, and fiscal benefits are documents at OPR's website.[4]

Thresholds of significance are often used to determine impact significance, and should be "quantitative, qualitative, or performance level of a particular environmental effect".[5] Section 21099 of the *California Public Resources Code* requires that these thresholds must promote reduction of GHG emissions, development of multimodal networks, and diversity of land uses. Lead agencies may define their own, and can look towards a variety of state polices to help create their thresholds (as listed in this document), but OPR itself recommends a threshold "of per capita or per employee VMT that is fifteen percent below that of existing development"[6]. The overall analysis should address:

[4] https://opr.ca.gov/ceqa/sb-743/

[5] Governor's Office of Planning and Research. 2018, April. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. Note, Note, the use of the term "performance level" is intended to provide guidance for impacts that may have a less direct quantitative connection to environmental harm.

[6] Governor's Office of Planning and Research. 2018, April. *Technical Advisory on Evaluating Transportation Impacts in CEQA*.

- Direct, indirect and cumulative effects of the transportation project (CEQA Guidelines, § 15064, subds. (d), (h))
- Near-term and long-term effects of the transportation project (CEQA Guidelines, §§ 15063, subd. (a)(1), 15126.2, subd. (a))
- The transportation project's consistency with state greenhouse gas reduction goals (Pub. Resources Code, § 21099)
- The impact of the transportation project on the development of multimodal transportation networks (Pub. Resources Code, § 21099)
- The impact of the transportation project on the development of a diversity of land uses (Pub. Resources Code, § 21099)

Screening thresholds may be used to streamline review based on a presumption of no VMT impacts. For example, projects generating less than 110 trips per day, residential and office projects in areas that already have low VMT, and projects near transit stations with certain stipulations can often be presumed to have a less-than-significant VMT impact.

Transportation projects "would need to quantify the amount of additional vehicle travel in order to assess air quality impacts, greenhouse gas emissions impacts, energy impacts, and noise impacts"[7] and analyze and report induced growth and change in VMT. Estimation of the VMT impacts and induced travel is necessary to understanding the full effects of the project. This should be done by estimating the "change in total VMT" method, described further in the *Methodological Guidance* below.

SCAG Connect SoCal 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (2020)

Per requirements from SB 375, the Southern California Association of Governments (SCAG) regularly produces an RTP/SCS to convey a vision for the six-county region across many aspects, including mobility, economy, and sustainability. This document also includes projections for future growth in households, population and jobs, an important baseline from which VMT impacts may be compared against. The latest RTP/SCS, adopted in September 2020 and titled *Connect SoCal*, estimates an increase of 1.6 million households, 3.7 million people, and 1.6 million jobs from 2020-2045. It also reported that the mode split in 2016 across the region was 36% single-occupancy vehicle (SOV) across all trip types and has a goal of increasing non-SOV work trips by 3%. Other relevant goals include reducing VMT per capita by 5%, vehicle hours traveled by 9%, reducing delay per capita, and creating new jobs. Key aspects of the plan include investment in broadband to enable people to access opportunities through virtual technology, increasing job density in sub-regional centers where housing is already located, housing supportive infrastructure, accelerated electrification, shared mobility as a service, and "Go Zones", where

[7] Governor's Office of Planning and Research. 2018, April. *Technical Advisory on Evaluating Transportation Impacts in CEQA*.

mobility options are housed together, and tolls are used to reduce reliance on SOVs. The plan laid out in *Connect SoCal* is projected to decrease daily per capita VMT from 21.8 miles to 20.7 miles.

California Air Resources Board's Mobile Source Strategy (2020)

This document demonstrates how the State can meet several goals through the advancement of cleaner technology and alternative fuels, identifying that the transportation sector is a major contributor to GHG emissions in the state. The 2020 Strategy includes goals of 100% of California registered medium and heavy-duty to be zero-emission vehicles by 2045 where feasible, 100% of light-duty vehicle sales to be zero-emission vehicles by 2035, and 100% of off-road vehicles and equipment to be zero emission by 2035. These goals would be accomplished through the detailed plan outlined in the 2020 Strategy, including manufacturing requirements, in-use requirements, incentive programs, enforcement strategies, outreach and education, and infrastructure planning.

CalSTA's Climate Action Plan for Transportation Infrastructure (CAPTI, 2021)

Acknowledging the role that transportation systems and infrastructure play in GHG emissions and building on California executive orders related to reducing emissions from transportation specifically, this document outlines the recommendation to invest the state's transportation dollars to combat climate change and support public health, safety, and equity.

The CAPTI approach to highway expansion projects addresses how these projects further dependency on SOV travel, have not reduced overall congestion, and are very costly. Accordingly, a guiding investment principle for this entity is promoting projects that do not significantly increase passenger vehicle travel, alternatively emphasizing investment in multimodal options, pricing strategies, and using technology to optimize operations.[8]

Among the strategies CAPTI plans to employ, some relevant ones include:

- Develop and Utilize Equity Index to Assist in Evaluation or Prioritization of Caltrans Projects
- Develop and Implement the Caltrans Strategic Investment Strategy (CSIS)
- Update the 2023 State Highway System Management Plan (SHSMP) to Meaningfully Advance CAPTI Investment Framework
- Develop and Implement Caltrans Climate Action Plan (CCAP)
- Explore a statewide VMT mitigation bank
- Convene a Roadway Pricing Working Group
- Explore a "Highways to Boulevards" Conversion Pilot Program

[8] CalSTA Climate Action Plan for Transportation Infrastructure (CAPTI), 2021

California Air Resources Board (CARB) Climate Change Scoping Plan (2022)

This document outlines how California can become carbon neutral by 2045. Previous plans aimed to get the state to 1990 levels of emissions or 40% below that; this plan expands on those actions to capture and store carbon and further actions to reduce emissions. To accomplish this, carbon must be edged out of use in every sector of the economy. This must be done for the benefit of everyone in the State, but particularly for the low-income communities hit hardest by environmental justice issues. Relevant to this study, a large part of the Scoping Plan includes movement towards zero-emission transportation, providing communities with enhanced options for use of active modes of travel that decrease reliance on cars, and the preservation of natural lands to help sequester carbon. Per the TAC (described below), Caltrans expects this document to be referred to when following the CEQA requirement of being consistent with other plans.

VMT Impact Estimation: Caltrans Documents

Caltrans Transportation Analysis under CEQA (TAC) (2020)

This document provides guidance on how to analyze induced travel associated with transportation projects on State Highways System (SHS) specifically, reflecting a major shift in approach. It is related to the Caltrans SB 743 Transportation Analysis Framework (TAF) in that once a project has been screened to likely induce travel using the TAC, one should refer to the TAF for the process that follows. Several project types are identified in the TAC as not being affected by this guidance, as they are assumed by Caltrans not to have an impact. See the section of this document titled *Project Types Assumed Not to Increase VMT* for the complete list.

SB 743 influenced two major areas of Caltrans' activities: proposed project or plan's potential impact on the SHS, and the CEQA analysis of capacity-increasing projects on the SHS. Caltrans states here that VMT is the most appropriate metric for analysis of SHS project impacts, and has chosen to express it in absolute terms. To accomplish this analysis, quantitative methods such as forecasting and calculator tools are preferred, which are outlined in the *Methodological Guidance* section of this document. Qualitative methods are appropriate in specific instances, such as the application of travel demand management (TDM) strategies. Capacity-increasing projects should consider including investment in multi-modal transportation infrastructure and expansion of existing/exploration of new pricing strategies. A separate project EIR may not be necessary if it is deemed appropriate to tier from the local RTP/SCS.

Generally speaking, VMT impacts should be anticipated when a project:

- Induces travel, often via:
    - Route changes (may increase or decrease overall VMT)
    - Mode shift to automobile use (increases overall VMT)
    - Longer trips (increases overall VMT)
    - More trips (increases overall VMT)

- Location and land use changes (increases or decreases overall VMT)

Caltrans SB 743 Transportation Analysis Framework (TAF) (2020)

This document provides guidance on how to determine impact significance under CEQA on the SHS. It should be consulted "when a transportation project on the SHS could lead to a measurable and substantial increase in vehicle travel."[9] As a general rule, projects that result in a reduction in the cost of travel, whether time or money, leads to an increase in VMT. This increase manifests in longer trips, changes in mode choice, route changes, newly generated trips, and location and land use changes – a wider area than the project boundary itself. There are various tools for estimating this induced travel, which are discussed in the *Methodological Guidance* below.

Caltrans Strategic Plan (2021)

This document lays out goals for management and guidance of Caltrans for 2020-2024, focusing on safety, cultivating excellence, enhancing and connecting the multimodal transportation network, strengthening stewardship and driving efficiency, leading climate action, and advancing equity and livability in all communities. Strategies relevant to this effort include:

- Using operational incentives to reduce VMT through high occupancy modes, active transportation, and TDM
- Optimize and expand equitable pricing
- Establish a VMT monitoring and reduction program

Caltrans SB 743 Review Process Summary (Internal Caltrans document, April 2022)

This document outlines when and how to submit for SB 743 Review. In addition to the VMTDD document described below, projects must submit their VMT study methodology, induced travel study, mitigation scoping plan, and induced travel risk assessment. These analyses should include details on how the NCST calculator or travel model was used, details on tolling for pricing projects, and land-use considerations for interchange projects.

Caltrans Vehicle-Miles Traveled Decision Document (VMTDD) (Internal Caltrans document, April 2022)

This three-page form is used as an element of Project Initiation Documents (PIDs) to determine CEQA requirements. It includes the following questions in order to determine whether a project is anticipated to have VMT impacts:

- Are all project alternatives screened as not likely to induce travel per Section 5.1.1 of Transportation Analysis Under CEQA?

[9] Caltrans SB 743 Transportation Analysis Framework (TAF), 2020

- Do any of the project alternatives add lane-miles (mainline or aux lanes greater than 1 mile) to the SHS?
- Do any of the proposed alternatives add other capacity to the SHS (e.g., a new or widened interchange)?
- Has induced VMT been estimated, as prescribed in TAF, TAC, or other methods, for the project alternatives?
- Have VMT-reducing project elements or mitigation measures been identified?
- What is the budget for VMT mitigation? Provide the dollar figure and rationale.
- Provide estimated completion dates and points of contacts for any applicable technical studies to be produced in Project Approval & Environmental Document (PA&ED) stage and submitted to HQ.

Caltrans' 2022 State Highway Operation and Protection Program (SHOPP, 2022)

This document outlines a four-year program of projects to improve sustainability of the SHS and related infrastructure. This includes $17.9 billion in projects over those four years, which came from the proposed list of projects from Caltrans in early 2022 and is based in asset management. Expected accomplishments from these projects include improvements to 6,347 lane miles of pavement, improvements to 9.2 million square feet of bridges, rehabilitation of 397,724 linear feet of culverts, and addressing 2,803 field elements. Several projects also promote active transportation and sustainability.

Caltrans Policy Guidance Under Development

The following guiding documents are under development. The first two have been summarized above as they are currently functioning similar to other adopted policy documents published by Caltrans; however, it is possible the guidance and policy direction contained therein may shift before formal publication. Upon formal publication, we recommend these are reviewed again to assess whether they provide further insight into the quantification of VMT:

- Caltrans SB 743 Review Process Summary
- Caltrans Vehicle-Miles Traveled Decision Document (VMTDD)
- Caltrans Mitigation Playbook (Draft July 2022)
- Caltrans When Are VMT Impacts from A Project Acceptable?
- Caltrans VMT Analysis of Auxiliary Lanes

Additional information is made available regularly on the Caltrans website (dot.ca.gov) as guidance is developed and formalized.

Project Types Assumed to and Assumed Not to Increase VMT (per Caltrans and OPR)

The following project types are assumed to increase VMT, per the TAC:

- New general purpose (GP)/mixed flow lanes
- New high occupancy vehicle (HOV) lanes
- New peak period lanes
- New express/toll lanes
- New auxiliary lanes that serve the through traffic (over a mile long)
- New lanes through grade-separated interchanges
- Other projects adding capacity to SHS

The following project types are assumed not to increase VMT, per the TAC:

- Rehabilitation, maintenance, replacement, safety, and repair projects
- Roadside safety devices or hardware installation
- Roadway shoulder enhancements for use only by transit vehicles or bicycles or to improve traffic safety
- 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
- 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
- Installation, removal, or reconfiguration of traffic control devices
- Installation of traffic metering systems, detection systems, cameras, changeable message signs and other electronics
- Timing of signals
- Installation of roundabouts or traffic circles
- Installation or reconfiguration of traffic calming devices
- Adoption of or increase in tolls
- Initiation of new transit service
- Conversion of streets from one-way to two-way operation with no net increase in number of through lanes
- Removal or relocation of off-street or on-street parking spaces
- Adoption or modification of on-street parking or loading restrictions
- Addition of traffic wayfinding signage
- 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
- HOV bypass lanes on on-ramps
- Local and collector roads in rural areas that don't include sidewalks where there would be no pedestrian traffic to use them
- Lanes through grade-separated interchanges without additional receiving lanes downstream
- Adding vehicle storage to a ramp without further reconfiguration
- Park and Ride facilities
- Truck size and weight inspection stations

VMT Mitigation Estimation: Policy Summaries by Document

OPR Technical Advisory on Evaluating Transportation Impacts in CEQA (2018)

When capacity-increasing roadway projects induce travel, mitigation measures an agency can consider include tolling or increasing tolling, converting GP lanes to HOV or high occupancy toll (HOT), TDM programs, or implementing Intelligent Transportation Systems (ITS) for better passenger throughput. When any kind of significant impact is determined, several mitigation measures are recommended by OPR:

- Improve or increase access to transit.
- Increase access to common goods and services, such as groceries, schools, and daycare.
- Incorporate affordable housing into the project.
- Incorporate neighborhood electric vehicle network.
- Orient the project toward transit, bicycle, and pedestrian facilities.
- Improve pedestrian or bicycle networks, or transit service.
- Provide traffic calming.
- Provide bicycle parking.
- Limit or eliminate parking supply.
- Unbundle parking costs.
- Provide parking or roadway pricing, or cash-out programs.
- Implement or provide access to a commute reduction program.
- Provide car-sharing, bike sharing, and ride-sharing programs.
- Provide transit passes.
- Shifting single occupancy vehicle trips to carpooling or vanpooling, for example providing ridematching services.
- Providing telework options.

- Providing incentives or subsidies that increase the use of modes other than single-occupancy vehicle.
- Providing on-site amenities at places of work, such as priority parking for carpools and vanpools, secure bike parking, and showers and locker rooms.
- Providing employee transportation coordinators at employment sites.
- Providing a guaranteed ride home service to users of non-auto modes.

Project alternatives should also be considered for reduction in VMT (several of which are only applicable to land use development projects), including:

- Locate the project in an area of the region that already exhibits low VMT.
- Locate the project near transit.
- Increase project density.
- Increase the mix of uses within the project or within the project's surroundings.
- Increase connectivity and/or intersection density on the project site.
- Deploy management strategies (e.g., pricing, vehicle occupancy requirements) on roadways or roadway lanes.

Caltrans VMT Program Bulletin 21-01: VMT Mitigation Funding Status & Additionality (2021)

This document discusses VMT mitigation funding for programmed projects, those in a fiscally constrained portion of an RTP, and those in an unconstrained portion. Generally, "Caltrans' investment strategy seeks to minimize any induced traffic that would generate VMT, which would reduce or eliminate the need for mitigation."[10] However, when SHS projects do generate VMT, mitigation strategies must be employed per CEQA.

In order to qualify as a mitigation strategy, the investment must be able to demonstrate a negative effect on VMT and be relatively likely to come to fruition. However, the mitigation does not need to be specific to the project, such as investment in a transit project that is already on a Caltrans district or partner wish list of VMT-reducing projects. Such a project being counted as a mitigation measure must pass the "additionality test", or ensure that the funding provided via the project looking for mitigation must provide additional resources by dollars or time that would not have otherwise been available. Support for a VMT-reducing project that is already on a jurisdictional or regional wish-list is a reasonable way to mitigate SHS VMT, but not projects that are already built or not in need of support. Evaluation of funding status is key to determining whether a project on an existing list may be leveraged as mitigation for another VMT inducing project.

[10] Caltrans VMT Program Bulletin 21-01: VMT Mitigation Funding Status & Additionality (2021)

Potential Challenges and Considerations

Several challenges currently exist when considering the guidance related to VMT quantification, owing to the fact that understanding of the metric of VMT and the implications of induced travel conceptually and temporally are still being studied and understood. Caltrans as an agency is still evolving in their approach to VMT impact assessment and mitigation expectations, and more recent documents are inconsistent with the more formalized TAC and TAF documents. While some of these documents still inform the process and may be treated during environmental review as formalized policy, several of the more recent publications are still in draft or have not yet gone through the same internal vetting process to create "one voice", and as such there are competing guidelines at present. With final policy guidance on induced travel still forthcoming, there are persistent challenges in anticipating whether and how projects' environmental analysis will fulfill Caltrans guidance or not.

Methodological Guidance

This section of the memorandum discusses methodological guidance on VMT quantification and related estimation tools, mitigation methods, and strategies.

General Quantification of VMT Methods Approach

OPR Technical Advisory on Evaluating Transportation Impacts in CEQA (2018)

As explained in the CEQA guidelines update and related documents, CEQA defers to the lead agency to determine the method of analyzing impacts. This document provides suggestions regarding those methodology options, including considerations of:

- *Vehicle types* – The CEQA Guidelines specifically call out "For the purposes of this section, 'vehicle miles traveled' refers to the amount and distance of automobile travel attributable to a project"[11], referring specifically to cars and light-duty trucks. Should heavy-duty trucks be included as they are combined in the input data, it is important to be consistent with their inclusion throughout the process.
- *Truncation of space and time* – analysis should not be limited to the jurisdictional area if the project may have broader reaching impacts, ensuring that the good faith effort is taken per CEQA guidelines. Projects should also look at both short and long-term effects on VMT.

When considering which VMT to count, an analysis can be trip-based (basic and traditional method of counting each leg of a journey, compiling them into home-based VMT) or tour-based (counting all legs of a journey into tours, compiling them into household VMT). It can also be

[11] Governor's Office of Planning and Research. 2018, December 28. *CEQA Guidelines*.

assessed as "change in total VMT", looking at the net difference on the project area VMT with and without a project.

Transit and active transportation projects are assumed not to increase VMT, nor are roadway capacity reduction projects. However, adding new roadway capacity where there is currently or may be congestion should be assumed to induce travel. The figure below shows a method of determining these impacts in many but not all scenarios. VMT impacts can also be analyzed at a programmatic level.

To estimate VMT impacts from roadway expansion projects:

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

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

Figure 1 – Method recommended for estimating VMT impacts on roadway expansion projects. Governor's Office of Planning and Research. 2018, April. Technical Advisory on Evaluating Transportation Impacts in CEQA.

Methodological Discussion of Transportation Projects Known to Increase VMT

When considering projects that have multiple aspects or could be analyzed in different ways, it is valuable to consider the variation in methodological approaches that are possible. In general, a project is expected to cause an increase in VMT when travel is induced or SOV travel becomes more time or cost effective, and a project would be expected to decrease VMT when travel by car is made less attractive. However, goals of a project might be met that are also important for the region when VMT goals are not, such as an increase in VMT with a decrease in congested peak hours or a decrease in average travel time. As projects are reviewed for their VMT impacts, efficiency and maximization of existing infrastructure through better timing and tolling mechanisms should not be discounted as beneficial to the region. This is particularly relevant for ITS enhancements and projects focused on increase accessibility in infill development locations.

VMT Estimation Tools

As noted in the TAF, there are three primary categories of tools for estimating induced travel:

- Elasticity-based methods, which look at the percent increase of VMT associated with a given percent increase in roadway lane miles.
- Travel demand models, which spatially locate socio-economic data into analysis zones and forecast trips to and from those zones based on the related data.
- Qualitative assessments, which are appropriate in limited circumstances, primarily when neither the NCST calculator (described below) nor a travel demand model is useful, such as when a project type is on the screened-out list from the TAC.

NCST Travel Calculator

This tool puts into practice an elasticity-based method developed at The National Center for Sustainable Transportation at UC Davis. It calculates VMT specifically in relation to addition of new GP or HOV lanes on the SHS. Originally, it was not used for high occupancy toll lanes, managed lanes, or truck lanes, but a 2021 update has clarified that those types of projects be analyzed using the calculator as well.[12] It is based on statistical studies that quantify VMT for both short and long term effects.

In general, the calculator reflects the change in total VMT attributable to the project while controlling for other factors that contribute to VMT growth based on research-derived elasticities from nation-wide studies.

Travel Demand Models

Models estimate travel by inputting socio-economic data into Transportation Analysis Zones (TAZs) and setting up networks that accurately reflect roadway conditions (number of lanes, availability of turns, etc.). When looking at different scenarios with a model, such as No Project and With Project, it is vital that comparable data and methods are used for inputs in both.

When utilizing a travel demand model (possibly with off-model post processing), the requirements for analyzing the full impacts of vehicle travel from a capacity-increasing project include changes in VMT due to changes in:

- Trip length (generally increases VMT)
- Mode shift (generally shifts from other modes toward automobile use, increasing VMT)
- Route choice (can act to increase or decrease VMT but is likely to decrease emissions because more direct or preferred facility routing occurs)
- Newly generated trips (generally increases VMT)

[12] Memo: Changes to NCST Tool for VMT Analysis (Nov 2021)

Potential Challenges, Limitations, and Considerations

NCST Travel Calculator

As described above, the NCST Calculator forecasts long-term VMT changes while controlling for variables such as population and employment growth, income changes, etc. This tool uses MSA-specific lane miles as baseline for elasticity calculations. However, the NCST calculator and elasticity models in general are not sensitive to land use context, geographic constraints, or the amount of existing congestion. Additionally, it produces an annual forecast, while project analysis typically requires a weekday forecast, and does not distinguish between GP and HOV/HOT lanes. As a result, use of the NCST Calculator and the elasticity approach in general should be viewed as a rapid-response but oversimplified analysis approach and could result in an over-estimation or under-estimation of induced VMT with a high degree of uncertainty, depending on project context.

Travel Demand Models

Travel models forecast VMT changes based on variables such as population and employment growth, and income changes, and therefore can reflect context sensitivity for land use and the network. They can be locally calibrated and validated to observed local VMT conditions. Travel models vary in their setup, whether they are activity or trip based, and whether they are able to estimate induced travel related to highway projects. This results more often in underestimation than overestimation of induced VMT and makes them more complicated and time-intensive to run than an elasticity-based calculator. They may not include a process for capturing potential changes in trip generation or land use growth allocation depending on setup. Some limitations can be addressed by incorporating the land use feedback loop and dynamic traffic assignment module. Models also often lack commercial driving sensitivity.

Relationship to Metro's SHS Project List

Metro's SHS Project List contains 55 projects at the writing of this memo and includes projects and programs from several sources such as Measure R, Measure M, and the 2020 Long Range Transportation Plan (LRTP). The projects and programs are currently in varying phases, ranging from pre-planning to in planning, environmental review, final design, and construction. Due in part to the variety in origin and status, the current level of detail also varies widely in these projects, which has an effect on how accurately presumptions can be made regarding potential impacts. Project types on this list include grade separations, soundwalls, interchange and ramp modifications, ITS and other technological upgrades, addition of HOV lanes, HOT lanes, or ExpressLanes, auxiliary lanes, collector-distributor roads, various efficiency and safety upgrades, and new highways.

The above guidance is intended to set the context for a review of Metro's SHS Project List in order to understand the analysis needs and starting assumptions for each type of project. For example, projects on the SHS Project List that also fall on the list of projects assumed to increase VMT may require a more extensive analysis approach to understanding induced VMT than a project that is comprised of elements on the list of Projects Assumed Not to Increase VMT (though these projects may also be subject to induced VMT analysis as the complexities between Caltrans guidance continue to evolve).

Next steps in the Metro VMT Mitigation Program project include reaching a decision on how to categorize, evaluate, and quantify the VMT impacts of projects on the SHS so that a mitigation program can be developed. Understanding the magnitude of mitigation needs is a crucial first step in development of a mitigation program for the agency. Through a series of meetings with the Project Development Team (PDT) comprised of representatives from Metro, Caltrans, OPR, and SCAG, the approach to evaluating projects on the SHS will be determined.