VMT/GHG Model Mitigation Program Report

PREPARED FOR
CITY/COUNTY ASSOCIATION
OF GOVERNMENTS
OF SAN MATEO COUNTY (C/CAG)
555 COUNTY CENTER, 5TH FLOOR
REDWOOD CITY, CA 94063

PREPARED BY
FEHR & PEERS
345 CALIFORNIA STREET
SUITE 450
SAN FRANCISCO, CA 94104

DATE
OCTOBER 2024

This page intentionally left blank.

VMT/GHG Model Mitigation Program Report Final Draft

Prepared for:
City/County Association of Governments
of San Mateo County (C/CAG)

December 2024

SF23-1321

FEHR PEERS

Table of Contents

Appendices

List of Figures

List of Tables

Key Definitions

Additionality: The VMT mitigation program should achieve additional VMT reduction above and beyond what would have occurred in the absence of such a program.

Administering Agency: The agency responsible for managing the VMT mitigation program, which may be the lead agency or an outside agency. The administering agency of a VMT exchange can be referred to as the VMT exchange agent, and the administering agency of a VMT bank can be referred to as a bank administrator.

California Environmental Quality Act (CEQA): CEQA was enacted in 1970 with the goal of providing public disclosure of the environmental impacts of a proposed action. Under CEQA, lead agencies must determine whether a proposed project has the potential to cause significant environmental impacts. This determination must be based, to the extent possible, on factual data and scientific methods of analysis. A project's effect on transportation is one of the 13 areas that must be analyzed.

California Air Resources Board (CARB): One of CARB's responsibilities is to prepare a Climate Change Scoping Plan every four to five years that assesses progress towards the state's legislative GHG reduction goals, most recently completed in 2022. The GHG reduction goals presented in the Scoping Plan have been used to inform VMT reduction targets for the state.

Equity Framework: C/CAG's adopted policy that commits the agency to addressing historic harms and existing inequities by taking concrete steps through its planning efforts, projects, programming, and role as a countywide funding agency.

Equitable Engagement Process: Engagement that includes listening to the community, understanding its needs, and striving toward co-creation and shared ownership of a planning process with the community, particularly with historically underrepresented people. (Refer to **Appendix B**, Equity and Environmental Justice Recommendations Memorandum, for specific details.)

Equity Focus Areas (EFA): Geographies of priority, from an equity perspective and based on high concentrations of community and demographic indicators of interest, as defined through C/CAG's San Mateo County Countywide Bicycle and Pedestrian Plan (CBPP) EFA map.[1] EFAs or "EFA geographies and demographics" in this report broadly refers to communities and populations with less historic and existing representation; fewer resources; unequal social, economic, environmental, and health impacts and outcomes; and generally greater needs and barriers. Various federal, state, regional, and countywide agencies have their own unique geographic area mapping approaches, indicators, and nomenclature, including California's Office of Environmental Health Hazard Assessments (OEHHAs) CalEnviroScreen, and the Metropolitan Transportation Commission's (MTCs) Equity Priority Communities (EPCs).

Greenhouse Gas (GHG): GHGs are gases that, when emitted into Earth's atmosphere, absorb heat and contribute to global warming.

---

[1] C/CAG's Countywide Bicycle and Pedestrian Plan map is accessible here: https://tooledesign.github.io/F0066-San-Mateo-CCAG/

Implementing Agency: The entity responsible for implementing a mitigation action, delivering infrastructure, services, or subsidies to reduce VMT or GHG to the end user or beneficiary.

Lead Agency: The local jurisdiction that has primary responsibility for a CEQA evaluation and reporting.

Local Agency: Local government agencies, such as cities and the County of San Mateo, that lead the review process for land use projects in San Mateo County. This does not include regional or statewide agencies that serve multiple jurisdictions, such as SMCTA, C/CAG, MTC, or Caltrans.

San Francisco Bay Area Metropolitan Transportation Commission (MTC): MTC is responsible for, among other programs, implementation of the 9-county Bay Area region's Sustainable Communities Strategy, which is a long-range plan that aligns transportation, housing, and land use decisions toward achieving GHG emissions reduction targets set by CARB.

VMT Mitigation Action: A project or program, such as a transit service expansion or a bike lane installation, that reduces VMT and that can be used for mitigation purposes.

Mitigation Program: A collection of mitigation actions managed in a coordinated fashion.

Project: Projects are defined in California Pub. Res. Code § 21065 and include transportation projects, such as a highway expansion, and land use projects or new building development projects (e.g., housing, offices, industrial, sports stadium, etc.), either of which generates VMT and that might require mitigation of its VMT or GHG impacts.

Project Applicant: An entity sponsoring a project that requires VMT mitigation and contributes funds toward a mitigation program or mitigation action.

Program Sponsor: Agency overseeing administration of the VMT/GHG model mitigation program with a range of responsibilities, including administrative, technical, and accounting elements. The program sponsor may also provide housing for the VMT reduction project team and may serve as the VMT administering agency and implementing agency.

State Bill 32 (SB 32): California law that amended the California Global Warming Solutions Act of 2006 and Section 38566 of the California Health and Safety Code. The bill requires the CARB to ensure that statewide greenhouse gas emissions are reduced to 40% below the 1990 level by 2030.

State Bill 375 (SB 375): The Sustainable Communities and Climate Protection Act of 2008 targets greenhouse gas emissions from passenger vehicles to meet the environmental standards set out by the Global Warming Solutions Act of 2006.

State Bill 743 (SB 743): California law that changed how local jurisdictions analyze transportation impacts under CEQA from level of service (LOS), a measure of intersection and roadway delay experienced by automobile drivers, to VMT, which measures the amount of driving in an area.

VMT Bank: Similar to a VMT Exchange, with the administering agency (bank administrator) setting a monetary value for VMT reduction such that a project applicant can purchase exactly the number of VMT reduction credits needed to mitigate their project's impact.

VMT Exchange: A structure that requires a project applicant to fund one or more mitigation actions selected from a pre-qualified list, or to propose and fund a new action that meets the exchange's

eligibility criteria, in order to meet a level of mitigation not practical on the site of the project. Because each mitigation action must be implemented in its entirety, an applicant may end up funding an amount of VMT reduction that exceeds their project's impact.

VMT Impact Fee: Allows a project applicant to pay a pre-determined fee toward the cost of a set of mitigation actions. The fee program's nexus study determines how much VMT reduction the VMT/GHG mitigation program will achieve, and each applicant pays their fair share of that reduction.

Vehicle Miles Traveled (VMT): A metric that accounts for the number of vehicle trips generated multiplied by the length or distance of those trips. VMT is generally measured in two forms: total VMT, which is the total amount of driving occurring in a community, and per capita VMT, which is a measure of the amount of VMT generated per person.

Acknowledgements

The VMT/GHG model mitigation program is funded by Caltrans' Sustainable Communities grant program, contract number 74A1344. Gratitude and appreciation are given to Caltrans and the many people who provided guidance, insight, and technical expertise to make this work possible.

City/County Association of Governments of San Mateo County (C/CAG)

- Kim Springer
- Jeff Lacap
- Sean Charpentier

Technical Advisory Task Force Members

- City of Burlingame
- City of Daly City
- City of San Mateo
- City of South San Francisco
- County of San Mateo
- SamTrans
- Commute.org
- San Mateo Transportation Authority
- 21 Elements
- Peninsula Clean Energy
- Caltrain
- Bay Area Rapid Transit (BART)
- Metropolitan Transportation Commission (MTC)
- California Air Resources Board (CARB)
- Caltrans

Community Based Organizations

- Ayudando Latinos a Soñar (ALAS)
- Boys and Girls Club of the Coastside
- Senior Coastsiders
- Pacifica Resource Center
- Farmworker Advisory Commission
- Viviendas Justas
- Rise South City
- Peninsula Family Service
- Pilipino Bayanihan Resource Center (PBRC)
- Casa Circulo Cultural
- Community Overcoming Relationship Abuse (CORA)
- Saint James AME Zion church
- Samaritan House
- Renaissance Entrepreneurship Center
- Youth United for Community Action (YUCA)
- The Primary School
- El Concilio of San Mateo County
- EPA CanDo
- Center for Independence of Individuals with Disabilities (CID)
- Silicon Valley Bicycle Coalition

Project Team

Fehr & Peers
- Matt Goyne
- Alex Murray
- Taylor McAdam
- Sam Ellman
- Julie Morgan
- Rogelio Foronda
- Melanie Gill
- Bruce Griesenbeck

InterEthnica
- Deborah Oh
- Lisa Abboud

Ann Cheng Consulting
- Ann Cheng

Mariposa Planning Solutions
- Chris Lepe

Strategic Economics
- Dena Belzer
- Madeleine Galvin

ICF
- Rich Walter

This page intentionally left blank.

Executive Summary

Introduction

With the passage of SB 743 and adoption of vehicle miles traveled (VMT) as the required transportation impact metric under the California Environmental Quality Act (CEQA), projects that trigger significant VMT impacts are required to mitigate those impacts to the fullest extent feasible. Mitigation options for land use projects have historically focused on on-site actions, such as transportation demand management (TDM) strategies, applied at an individual building or group of buildings. However, there are limitations in how much VMT reduction can realistically be generated by these relatively small-scale strategies. Further, because the California Department of Transportation (Caltrans) has set a CEQA threshold of zero VMT increases on the state highway system, adding any general purpose or managed lane-miles to San Mateo County highways could result in a significant VMT impact that requires mitigation. As a result, there is now growing interest in exploring options for larger-scale VMT mitigation programs that could fund a broader set of off-site actions and potentially result in more substantial VMT reductions over time.

The City/County Association of Governments of San Mateo County (C/CAG) has taken the lead to develop a VMT/Greenhouse Gas (GHG) Model Mitigation Program for project sponsors and developers to identify feasible options for mitigating the VMT and GHG emission impacts of land use and VMT-inducing transportation projects in San Mateo County. The goal of the VMT/GHG Model Mitigation Program is to allow project sponsors to fund off-site VMT/GHG-reducing transportation improvements and programs that could mitigate VMT/GHG impacts identified through CEQA studies. This program continues the work by C/CAG to provide technical resources that member agencies can use to reduce VMT and GHG emissions, such as C/CAG's TDM Program,[2] VMT Estimation Tool,[3] SB 743 Implementation Decisions whitepaper,[4] and the partnerships with other countywide organizations such as 21 Elements and the Regionally Integrated Climate Action Planning Suite (RICAPS) working group.[5]

This study has been led by C/CAG, in partnership with Caltrans, as recipient of a Caltrans 2023 Sustainable Communities Planning Grant, authorized by the C/CAG Board Resolution 22-29 in May 2022. Fehr & Peers served as the lead consultant for the study team, which includes subconsultants Ann Cheng Consulting, ICF, InterEthnica, Mariposa Planning Solutions, and Strategic Economics, as approved by the C/CAG Board Resolution 23-27 in April 2023. This study has been informed by feedback from a technical advisory task force (TATF) made up of representatives from local jurisdictions, local and regional transit operators, and state and regional transportation agencies. The study was also informed by interviews with community representatives who live and work within San Mateo County's diverse populations. Based on discussions

[2] https://ccagtdm.org/
[3] https://gis.smcgov.org/apps/CCAG_VMT_EstimationTool/#
[4] https://ccag.ca.gov/sb-743-los-to-vmt/
[5] https://performance.smcgov.org/stories/s/RICAPS/xzkp-fn3v/

between the TATF, community-based organizations, and project team, this program has the following goals:

- Provide substantial evidence in support of the most defensible approach for mitigating VMT and GHG emissions in a locally appropriate and equitable manner for San Mateo County.
- Develop a flexible VMT mitigation model program framework that allows lead agencies to mitigate land use and transportation projects while directing funding to both countywide and local improvements that can address regional congestion, equity, and housing needs.
- Help all lead agencies in San Mateo County, particularly in suburban and rural communities, maintain compliance with CEQA and SB 743 by providing guidance on how to feasibly mitigate VMT impacts.
- Engage agency and community-based organization (CBO) stakeholders to understand local priorities for VMT mitigation.
- Balance the need for VMT and GHG reductions with C/CAG's vision for equity in agency decisions.

Program Structure

The study team evaluated several ways that a mitigation program could be structured.

- **VMT Impact Fee:** Project applicants would pay a fee to an administering agency, and the fee revenue would be used to construct capital improvements that have a demonstrated effect of reducing VMT in the community.
- **VMT Exchange:** Project applicants would directly fund a specific VMT reduction strategy selected from a pre-qualified list or could propose and fund a new strategy that can be demonstrated to achieve VMT reductions.
- **VMT Bank:** The administering agency would identify VMT reduction strategies and calculate the monetary value of achieving a unit of VMT reduction "credit" using those strategies, and project applicants would purchase the number of credits necessary to offset the project's VMT impact.

This study recommends a VMT Exchange program structure for the countywide and local model programs because such a program requires less administrative responsibilities and allows more flexibility for lead agency use (see **Chapter 4**). Additional guidance is provided on how a VMT/GHG Mitigation Impact Fee could be developed by interested lead agencies.

Equity and Environmental Justice

In its agencywide Equity Framework, C/CAG commits to addressing historic harms and existing inequities by taking concrete steps through its planning efforts, projects, programming, and role as a countywide funder. C/CAG sees equity as a central objective in the mitigation of VMT and the VMT/GHG Model Mitigation Program will serve as a learning opportunity on how to operationalize the Equity Framework at a project/program level. This study included engaging with representatives of equity focused communities in San Mateo County in the process of prioritizing future mitigation actions (see **Chapter 2**) and provides recommendations for lead agencies to consider when implementing the VMT/GHG Model Mitigation Program (see **Chapter 3**).

Equity and environmental justice recommendations are applied through the selection of mitigation actions and implementation considerations. This includes prioritizing investments in affordable housing where feasible (one of the most popular measures among CBOs and with the highest long-term, on-going VMT and equity value), along with complementary investments in transit pass incentives, e-bike rebates, community-based travel planning, last-mile mobility services, or the construction of bicycle or pedestrian infrastructure, connecting new affordable housing projects to nearby transit services or other resources. All mitigation actions in this study can be implemented in a way to benefit equity communities, such as by funding actions identified in community-based transportation plans.

VMT/GHG Mitigation Actions

The study team conducted an initial assessment of the amount of VMT reduced by a range of example mitigation actions and brought forward 13 mitigation actions that provided VMT reduction benefit and for which there are existing structures in place to implement these mitigation actions (see **Chapter 5**). The example mitigation actions include those with one-time costs and others that require ongoing funding commitments. These VMT reduction strategies also reduce GHG emissions by reducing driving, and these measures can be used to fill GHG mitigation needs. In addition to these VMT focused actions, this study also analyzed one mitigation action—installing electric vehicle chargers—that reduces GHG but not VMT and thus could not be used as VMT mitigation. **Table ES-1** presents the list of these mitigation actions and provides a recommendation for the agencies that are most appropriate to implement them.

Table ES-1: VMT Mitigation Action Project List and Implementing Agencies

Mitigation Action	Mitigation Type	Recommended Program Scale (Local or Countywide)[1]	Likely Implementing Agency/Organization
Rail Service Frequency Expansion	Operational	Countywide	Caltrain (evaluated in this report) or BART
Local Transit Frequency, Capacity, and Reliability Enhancements	Operational	Countywide	SamTrans
Transit Priority Projects on Major Corridors	Capital	Countywide	SamTrans, SMCTA, and Caltrans
Affordable Housing	Capital/Land Use	Both	San Mateo County Department of Housing or participating Local Jurisdictions
Transit Pass Incentives	Programmatic	Both	MTC (Evaluated in this report), C/CAG, SamTrans, Caltrain, or Commute.org
Countywide E-Bike Rebate Program	Programmatic	Both	Peninsula Clean Energy
Community Based Travel Education	Programmatic	Both	Commute.org, TMAs, CBOs
Mobility Hubs	Operational	Both	Micromobility and vehicle sharing operators
Micromobility Systems	Operational	Both	Micromobility operators
Shuttle / Microtransit Services	Operational	Both	SamTrans or Commute.org
EV Charging Facilities	Capital	Both	Peninsula Clean Energy
Bicycle Infrastructure	Capital	Local	Participating Local Jurisdictions
Pedestrian Infrastructure	Capital	Local	Participating Local Jurisdictions
Parking Management and Benefit Districts	Capital	Local	Participating Local Jurisdictions

Notes:

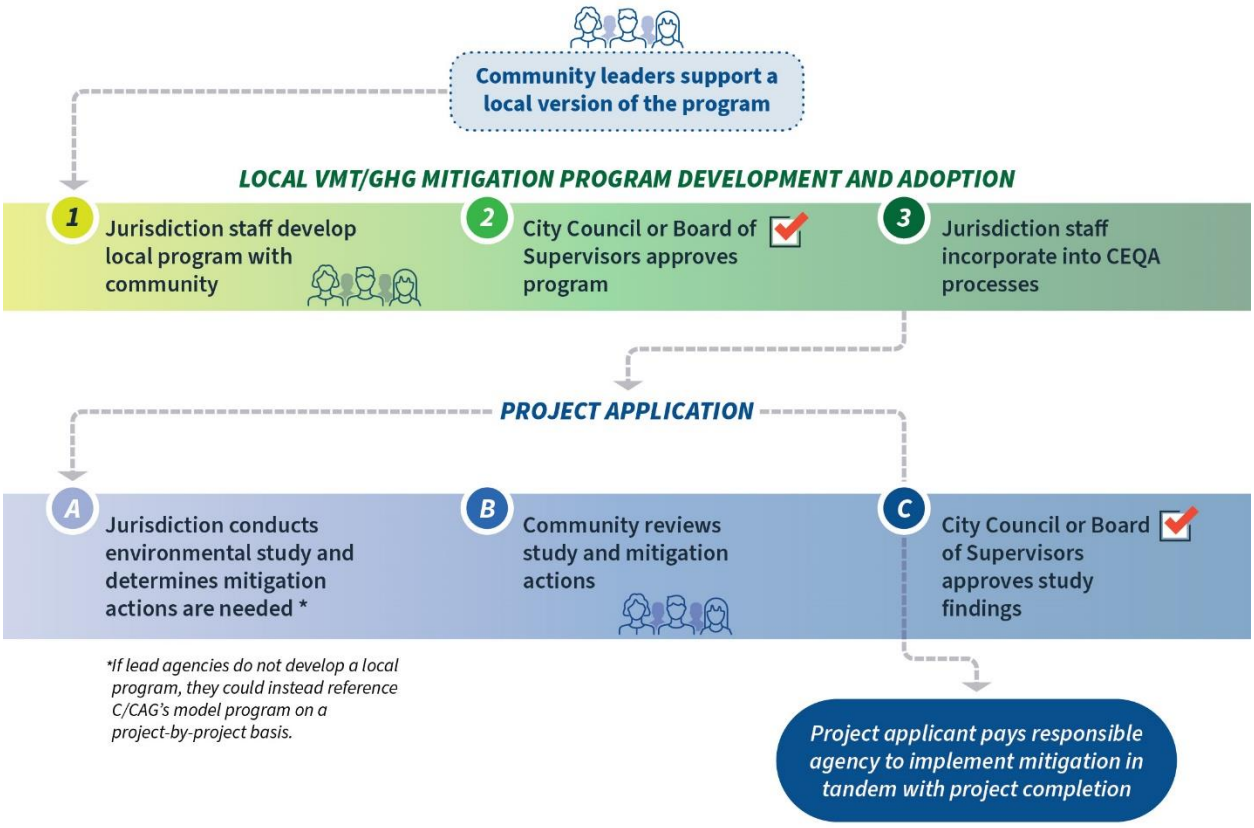
1. C/CAG's VMT/GHG Mitigation Model Program does not preclude use of any mitigation actions for local or countywide mitigation as described in **Chapter 4**. The actions recommended for countywide mitigation would require more intensive interjurisdictional coordination and be led by regional agencies and are therefore less likely to be feasible for local land use mitigation. The actions recommended for locally led programs are those that primarily address shorter trip lengths and local travel and are within the control of local jurisdictions. However, mitigation of countywide impacts could include coordination with local jurisdictions to implement this infrastructure among a package of different mitigation actions.

Source: Fehr & Peers, 2024

Implementation

This VMT/GHG Model Mitigation Program is intended to be implemented by countywide or local lead agencies in San Mateo County. No agency currently has the authority to administer a countywide program. Therefore, the VMT/GHG Model Mitigation program presented in this study presents guidance for lead agencies to incorporate into their existing CEQA processes. This approach is consistent with past voluntary VMT guidance prepared by C/CAG for member agencies and will include approval of this report by the C/CAG Board. This report provides voluntary implementation guidance for lead agencies, a guide for application of the Model Mitigation Program, equity, and future considerations for VMT and GHG mitigation in San Mateo County (see **Chapter 6**). **Figure ES-1** presents an overview of how the program could be implemented for local lead agencies and the points where community leaders can provide input to influence which mitigation actions would ultimately be selected during the environmental review process.

Figure ES-1: Program Implementation Overview



This page intentionally left blank.

1. Introduction

The City/County Association of Governments of San Mateo County (C/CAG) has developed this VMT/Greenhouse Gas (GHG) Model Mitigation Program (the "Program") to identify feasible options for mitigating the VMT and GHG emission impacts of land use and VMT-inducing transportation projects in San Mateo County. The intent of the Program is to expand the mitigation mechanisms available to land use development projects and transportation infrastructure projects that have significant VMT impacts as determined through California Environmental Quality Act (CEQA) review. The Program provides a menu of feasible off-site mitigation options that project sponsors can fund to reduce their VMT/GHG impacts. The C/CAG Board of Directors approves this report as voluntary guidance for lead agencies to use in their existing VMT/GHG mitigation processes but will not adopt or establish a mandatory VMT/GHG mitigation program.

The report is organized into six chapters:

1. ***Introduction*** – provides an overview of the study background, VMT/GHG Model Mitigation Program alternatives, and outcomes from this study.
2. ***Study Process and Outreach*** – describes the study's sponsors, stakeholder engagement, and the roles of project partners.
3. ***Equity and Environmental Justice*** – describes findings from engagement with CBOs representing EFAs and equitable VMT best practices and recommends approaches to incorporating equity and environmental justice into this program.
4. ***VMT Program Options & Statutory and Administrative Context***– describes the criteria used to evaluate program options and the resulting recommendations and key policy questions that were identified and investigated through this study.
5. ***VMT/GHG Mitigation Actions*** – describes the range of VMT/GHG mitigation strategies, including operational, capital, programmatic, and land use actions, lead agencies could use for VMT mitigation and introduces the C/CAG VMT/GHG Mitigation Action Tool, a spreadsheet tool that lead agencies or applicants can use to calculate the VMT reduction benefits of mitigation actions.
6. ***Implementation*** – outlines lead agency options, guidance for how to use the VMT/GHG model mitigation program and tool, and considerations for the future.

1.1 Study Background

Since the passage of SB 743, and adoption of VMT as the required CEQA transportation impact metric,[6] lead agencies have begun defining VMT impacts and imposing mitigations when those impacts are significant. CEQA requires that the project applicant mitigate any identified impacts to the fullest extent feasible. This study evaluates different ways that VMT impacts could be mitigated, and it provides recommendations for lead agencies to consider when developing feasible VMT mitigation actions or adopting a local VMT mitigation program.

VMT is generally measured in two forms: total VMT, which is the total amount of driving occurring in a community, and per capita VMT, which is a measure of the amount of VMT generated per person. VMT-inducing transportation projects, such as highway capacity enhancements, are analyzed using total VMT, while land use projects are typically evaluated using per capita VMT. City planning documents, such as general plans and specific plans, generally use both metrics. Land use projects focus on per capita VMT as it highlights the efficiency of locating projects in certain areas, such as more densely populated, transit-accessible, and job-rich areas of the county. These places may generate more total VMT than less populated areas, but people drive less on a per-person basis and thus generate fewer impacts on the environment related to VMT and transportation-related GHG emissions.

The Program is applicable to CEQA projects, which are defined as follows in Pub. Res. Code § 21065:

> "Project" means an activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and which is any of the following: (a) An activity directly undertaken by any public agency; (b) An activity undertaken by a person which is supported, in whole or in part, through contracts, grants, subsidies, loans, or other forms of assistance from one or more public agencies; (c) An activity that involves the issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies.

CEQA projects include city general, specific, precise, or commercial corridor planning documents; transportation infrastructure changes; and individual development projects. Local jurisdictions and regional agencies evaluate the amount of VMT generated in their communities on an individual project basis and at a local community or countywide scale. A local jurisdiction's general plan establishes a VMT growth "budget" for total and per capita VMT, based on the amount and location of its long-term population and employment growth and planned transportation infrastructure projects in the community.

[6] In response to growing concerns about the consequences of climate change, and the significant role of VMT in the generation of GHG emissions, the California State Legislature passed SB 743 in 2013. SB 743 required the adoption of a new methodology to replace motor vehicle delay, measured by level of service (LOS), for evaluating transportation impacts under the CEQA review process. The new methodology must serve to reduce GHG emissions; facilitate development of compact, transit-oriented communities; and encourage development of active transportation (bicycle and pedestrian) facilities and improvements. The governor's Office of Planning and Research (OPR) was tasked with identifying an alternative transportation impact methodology that best meets the criteria of SB 743. In 2017, OPR selected VMT as the preferred CEQA transportation impact metric.

A local jurisdiction's general plan, and its associated VMT growth budget, is the result of an extensive public and stakeholder outreach process (every 10-15 years), which includes city staff and elected officials. These general plans create a plan to implement a community's vision for the next 20 years and the resulting document is the outcome of extensive conversations across community stakeholders to balance competing concerns about housing development, jobs growth, quality of life, and environmental justice.[7] Regional agencies are responsible for determining the transportation infrastructure needed to support local communities and the resulting VMT effects of that infrastructure.

Local jurisdictions and regional agencies have a variety of policy actions that they can use to reduce the amount of VMT generated by the community. The most effective way to reduce VMT is by promoting denser infill housing and employment development and supporting that development with healthy transportation choices and transit programs and infrastructure. Dense and mixed-use communities create economic efficiencies that result in a greater variety of amenities and services close by, reducing automobile trip distances and making it easier to get around without owning a car. Local general plan policies can enable increased density in infill locations to encourage development that generates lower rates of VMT, which is also known as "low VMT by design" development. Local general plan and regional policies can also encourage or require provision of a range of transportation infrastructure and programs as part of these development projects, such as TDM strategies, that minimize the need for single-occupancy vehicle travel by supporting transit, bicycling, and walking. Designing projects with low VMT characteristics from the outset will generate less vehicle travel and fewer VMT impacts, and thus will not require VMT mitigation programs. For those land use or transportation projects that do result in significant impacts, project applicants can use one of two approaches to mitigate significant VMT impacts:[8]

- **On-site mitigation:** This typically involves physical design changes to the project or its site, and/or on-site TDM strategies designed to reduce personal vehicle travel. Most on-site mitigation strategies for land development projects are dependent on who will occupy the building(s), which may not be known at the outset of a project and may change throughout the project's lifespan. Further, there may be insufficient actions for a project sponsor to fully address the VMT impacts of the occupant's travel patterns in high VMT locations. In these cases, off-site mitigation is needed to fully off-set the VMT impacts generated by these projects.

[7] Starting in 2016, California cities have been required to create Environmental Justice elements if two or more elements are updated at once. The City of Burlingame and East Palo Alto with San Mateo County are collaborating to develop Environmental Justice elements with a coordinated approach and adoptions scheduled for 2025 (https://envirojusticeplanning.com/). In conjunction with this program, there are synergistic efforts underway to ensure consistent approaches to community engagement and development of impactful equitable VMT mitigation strategies also as way to advance Environmental Justice elements of General Plans. For more information on General Plan best practices, see OPR's General Plan Guidelines at: https://opr.ca.gov/docs/OPR_COMPLETE_7.31.17.pdf

[8] Caltrans guidance relating to mitigation: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/ser/mitigation-under-ceqa-a11y.pdf

- **Off-site mitigation:** Off-site mitigation options can be provided through VMT mitigation programs. A "programmatic" approach to VMT mitigation could expand a project's feasible VMT mitigation options to include off-site strategies that might extend from the neighborhood around the project site up to a regional or even statewide scale. These strategies may take the form of infrastructure expansion, such as new transit and bicycle facilities, new programs and services that reduce vehicle travel by changing traveler behavior, or other methods.

As shown in **Table 1**, the Program's primary purpose is to provide feasible off-site mitigation for individual land use or transportations projects that generate VMT impacts. The Program could be used by local jurisdictions as part of their general plan or specific plan planning efforts, in order to address VMT impacts that cannot be reduced through other policies, such as through existing TDM requirements in San Mateo County.

Table 1: Relationship to Other San Mateo County VMT Resources in CEQA Review

Lead Agency Decision Point in CEQA Process	Guiding Documents	Relationship to VMT/GHG Model Mitigation Program
Where should land use growth and transportation infrastructure be located?	Local General Plans and Specific Plans, Countywide Growth or Transportation Plans	This Program provides evidence for the VMT mitigation actions that could be incorporated as required measures (such as through local impact fees) in these citywide plans. For more information on this approach, see **Chapter 6.**
What features should be included in a land use or transportation project?	C/CAG's TDM Program[1] or local Objective Design Standards	This Program and C/CAG's VMT Estimation Tool provide evidence for what VMT reductions can be accounted for due to design features or on-site TDM measures.
What projects create significant VMT impacts?	Lead agency determinations for VMT analysis thresholds, metrics, and screening criteria informed by C/CAG's SB 743 Implementation Decisions whitepaper[2]. C/CAG's VMT/ Estimation Tool[3] available for VMT screening and estimates. Information on CAPCOA's mitigation strategies is available in **Table E-3** in **Appendix E** of this report.	This Program only applies to projects that create significant impacts as determined by lead agencies. Projects that are exempt from CEQA, such as affordable housing projects, would not be subject to this program.
What on-site VMT mitigation measures are available?	C/CAG's VMT Estimation Tool[3] provides evidence for the effectiveness of on-site VMT mitigation measures	While this Program is not designed explicitly for on-site mitigation measures, it could be applied to on-site mitigation measures where new research presented in this report supersedes that in C/CAG's VMT Estimation Tool.

Lead Agency Decision Point in CEQA Process	Guiding Documents	Relationship to VMT/GHG Model Mitigation Program
What off-site VMT mitigation measures are available for projects that cannot be mitigated on-site?	This study's VMT/GHG model mitigation program includes several programs and projects that could be used as off-site mitigation measures.	The primary purpose for this Program is to provide mitigation options that lead agencies can implement when a project's impact cannot be mitigated on-site.
What are the monitoring and administrative processes for mitigation measures?	Lead agency Mitigation Monitoring and Reporting Process (MMRP)	This Program presents implementation and monitoring guidance that can be incorporated into local processes.

Notes:

1. https://ccagtdm.org/
2. https://ccag.ca.gov/sb-743-los-to-vmt/
3. https://gis.smcgov.org/apps/CCAG_VMT_EstimationTool/#. This tool is based on research presented in CAPCOA's 2010 handbook, titled *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emissions Reductions from Greenhouse Gas Mitigation Measures*. This VMT/GHG Model Mitigation Program relies primarily on the evidence presented in CAPCOA's more recent research from the 2021 handbook titled *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*.

Source: Fehr & Peers, 2024.

1.2 Need for VMT and GHG Mitigation

1.2.1 Transportation Projects

Transportation infrastructure projects, such as freeway expansion improvements, can have significant VMT impacts through induced demand. These capacity enhancements, which include adding general-purpose or managed toll lanes on state highways or local arterials, generate VMT by making it easier to drive.[9] Simply put, when there is less road congestion (perceived and actual), people tend to drive more often as the default transportation choice. Caltrans, which is the lead agency for projects on the state highway system, considers every through lane-mile added as a potential source of induced VMT. Further, because Caltrans has set a CEQA threshold of zero VMT increases on the state highway system, any additional driving caused by these highway projects would cause a significant VMT impact.

In October 2024, Caltrans released a draft update to their Transportation Analysis under CEQA and Transportation Analysis Framework implementation documentation.[10] These documents, which are currently being circulated for public comments, are intended to guide local agency implementation of SB 743 and are used to make CEQA determinations for changes to the state highway system. Caltrans has made several key changes that are relevant to highway projects in the state. These include changes to

[9] While the addition of a general-purpose or managed toll lanes would induce VMT, Caltrans notes that the conversion of an existing general-purpose lane would not substantially increase vehicle travel. Fehr & Peers reviewed Caltrans guidance for HOT Lanes and VMT on September 23, 2024: https://dot.ca.gov/programs/esta/sb-743/resources/hot-lanes#:~:text=1%20of%20the%20Transportation%20Analysis,substantial%20increase%20in%20VMT%20and

[10] *SB 743 Implementation Resources.* California Department of Transportation. Accessed November 22, 2024. https://dot.ca.gov/programs/esta/sb-743/resources

screened out highway projects, more information on VMT mitigation measures, and a note to consider equity when selecting mitigation actions.[11]

Within San Mateo County, C/CAG and the San Mateo County Transportation Authority (SMCTA) typically sponsor projects that improve the state highway system. One project, the US 101 Managed Lane Project North of I-380, is currently analyzing several alternatives, including an alternative that would add an additional lane. Any similar transportation projects that add lane miles will be expected to cause significant VMT impacts and would require mitigation.

Some local agencies in San Mateo County may sponsor projects that add some lane-miles to local streets within their jurisdictions. Each local agency has discretion to set the CEQA VMT threshold that would be applied in those circumstances, and it is challenging to predict what VMT threshold each agency will set for these local street projects. For simplicity, the study team assumed there will be relatively few local roadway projects that would create significant VMT impacts, although the mitigation actions in this Program can be applied to future local roadway impacts.

1.2.2 Land Use Projects

Most of the added VMT in San Mateo County over the next ten years will come from growth in population and jobs throughout the county. All new population and jobs will add some VMT to the countywide road system, but not all new VMT would be considered a significant environmental impact under CEQA. Most of the local jurisdictions in San Mateo County have set a CEQA threshold that the VMT per capita from future development should be at least 15% lower than the existing VMT per capita to avoid a significant impact. As presented in the SB 743 Implementation Decisions whitepaper,[12] most residential land uses in San Mateo County generate less VMT than the 9-county Bay Area regional average, while most commercial land uses in San Mateo County exceed the regional average. Furthermore, growth in the county is primarily anticipated to occur in transit priority areas of the county. Transit priority areas include high-quality transit corridors and major transit stops; they are defined in **Figure 1** and illustrated on MTC's webmaps of the county.[13] Jurisdictions typically consider qualifying development in these transit-oriented locations to have less-than-significant VMT impacts. **The primary land uses that would require VMT mitigation therefore include those that generate high levels of per capita VMT due to their location, such as office space outside of high-quality transit areas, or due to their design, such as low-density residential land uses.** The amount of VMT that can be mitigated on-site at these high VMT projects is often not sufficient to reduce the VMT impacts to less-than-significant levels.

---

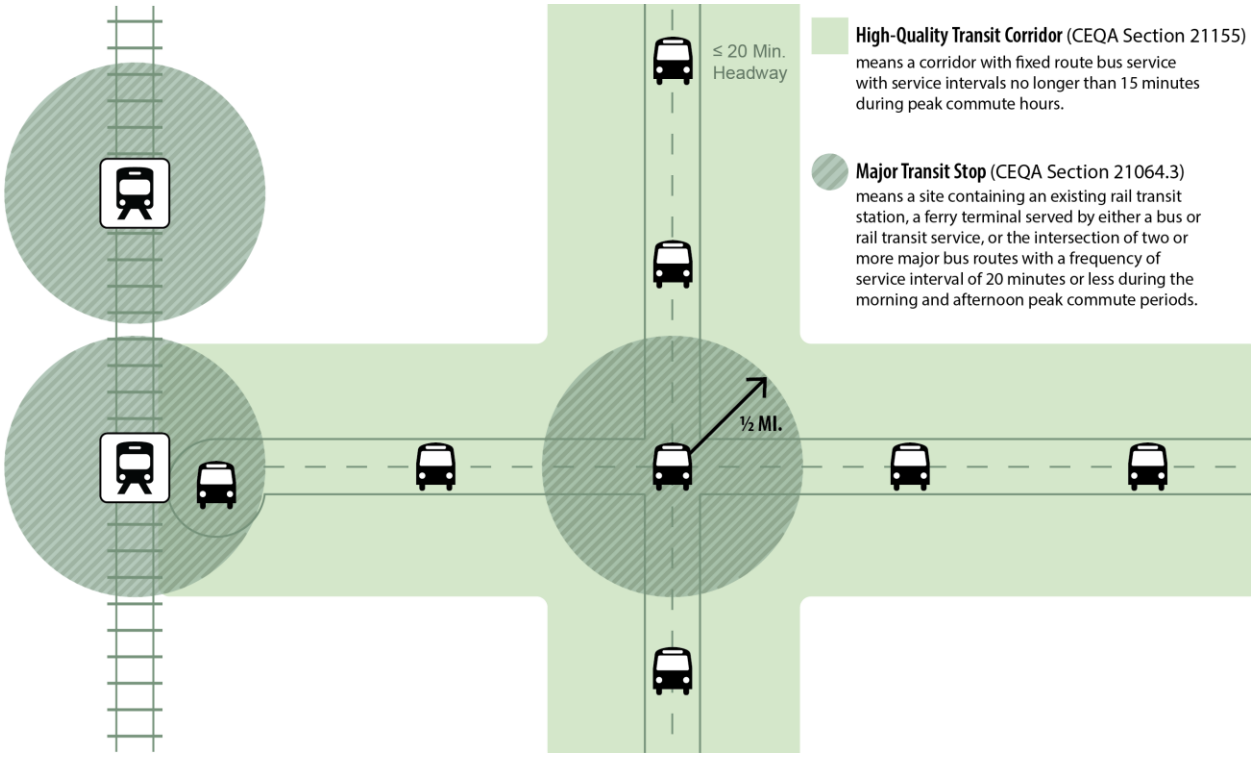
[11] *Transportation Analysis under CEQA: Evaluating Transportation Impacts of State Highway System Projects*. California Department of Transportation. September 2024. Second Edition (Draft). Accessed November 22, 2024. https://dot.ca.gov/-/media/dot-media/programs/esta/documents/vmt/taf-tac/tac-2nd-ed-a11y.pdf

[12] https://ccag.ca.gov/sb-743-los-to-vmt/

[13] MTC's webmap defines Transit Priority Areas, including Major Transit Stops and High-Quality Transit Corridors, according to the definition of Major Transit Stops that was in effect prior to January 1, 2025. It therefore does not include the intersection of two bus routes with 20-minute headways. Access MTC's webmap for San Mateo County here: https://mtc.maps.arcgis.com/apps/dashboards/6ff269ac90784909939f5ed8813ac5de

Most residential growth in the county is anticipated to occur in the form of affordable housing or multifamily, transit-oriented, and infill projects that are proven and quantified to result in low-VMT due to the factors described in this report's **Section 5.6 Land Use Actions**.[14] While there is some low-density, single-use, or greenfield residential growth that will result in significant VMT impacts, there is a substantial amount of commercial office growth that is anticipated to occur east of U.S. 101 along the bayside of the county that is likely to result in significant VMT impacts due to the distance from housing and high quality transit corridors. Therefore, while this program is designed to be flexible for any type of land uses that generate significant impacts, the case study presented in **Chapter 6** focuses on the type of office project that is likely to be the most frequent user of this program.

Figure 1: High-Quality Transit Corridor and Major Transit Stop Definitions



Note: AB 2553 revised the definition of a Major Transit Stop from the intersection of two bus routes with service intervals of 15 minutes or less to 20 minutes or less during the peak commute hours, effective January 1, 2025. A High-Quality Transit Corridor remains defined in CEQA Section 2115 as a bus route with service intervals no longer than 15 minutes.

[14] See the Land Use – Residential (density and affordability) section starting on page 15 of the *Caltrans SB 743 Program Mitigation Playbook*. Accessed here by Fehr & Peers on September 23, 2024: https://dot.ca.gov/-/media/dot-media/programs/esta/documents/vmt/vmt-mitigation-playbook-07-2022.pdf

1.3 VMT/GHG Model Mitigation Program Alternatives

There are several ways a VMT/GHG model mitigation program could be structured. These different program options can fund different types of VMT/GHG mitigation actions, and each option has distinct administrative needs. In all cases, the selection of an appropriate program option should be guided by the consensus of stakeholders with regard to the fundamental purpose of the VMT/GHG model mitigation program, and what types of mitigation actions should be included in the VMT/GHG model mitigation program. **Chapter 4** describes the different program options considered by this study. **Chapter 4** also includes a recommendation for a VMT/GHG Exchange, due to its flexibility to fund capital improvements, programs, and operational measures and because it has less administrative needs than other potential program options.

2. Study Process and Outreach

2.1 Study Sponsors

C/CAG has led this study with funding from the 2023 Sustainable Transportation Planning Grant provided by Caltrans.

2.2 Stakeholder Engagement and Outreach

This study's stakeholder engagement included two components: first, the study formed and convened a technical advisory task force (TATF) of local agency staff, and second, engagement with community-based organizations (CBOs). Participation in the TATF was open to a wide range of potential state, regional, and local partners, including representatives of San Mateo County lead agencies that are responsible for determining project impacts, and agencies who might implement the mitigation actions recommended through the Program. The study was informed by important conversations with CBO leaders, where the project team engaged and listened to community concerns, discussed transportation priorities for EFA communities throughout the county, and gathered input on potential solutions. The Outreach and Engagement Report with the findings from these CBO meetings is presented in **Appendix A**. Early TATF and CBO meetings included the development of potential mitigation actions that were later refined into the list of recommended mitigation actions based on stakeholder feedback, as presented in **Chapter 4**.

2.2.1 Technical Advisory Task Force

The TATF aimed to inform stakeholders, seek feedback on the study's analysis, hear potential implementation challenges, and determine the feasibility of establishing a countywide VMT mitigation program. The TATF included representatives from San Mateo County; local incorporated cities; state and regional transportation agencies, such as Caltrans and MTC; local and regional transit operators such as SamTrans, Caltrain, and Bay Area Rapid Transit (BART); and from advocacy organizations that promote sustainable transportation and land use policy.

The TATF's members met five times over the course of the study to discuss the following:

- **Meeting #1:** The first meeting, which was held in August 2023, included information on the scope and goals of the study. It addressed the history of VMT policy in California and its role in the CEQA process and it introduced potential VMT-reducing projects and programs that could be used as VMT mitigation.
- **Meeting #2:** The second meeting, which was held in November 2023, covered the role of a potential mitigation program in the CEQA process, the types of VMT/GHG-reducing projects and programs that would be suitable to mitigate county-level or city-level VMT/GHG impacts, the quantification approach that will be used to calculate VMT/GHG reductions, the role of equity in a VMT/GHG mitigation program, and the study's CBO outreach plan.

- **Meeting #3:** The third meeting, which was held in April 2024, presented the findings of the study's CBO engagement, provided equity and environmental justice considerations, shared recommendations on the structure of a VMT/GHG mitigation program, and included information on GHG reduction considerations.
- **Meeting #4:** The fourth meeting, which was held in July 2024, presented findings from interviews with affordable housing providers and funding agencies, provided an overview of the quantified VMT and GHG mitigation measures and their effectiveness, included the study's equity recommendations, and shared guidance on program implementation.
- **Meeting #5:** The fifth meeting, which was held in October 2024, presented an overview of the draft report with a focus on how the TATF, CBOs, and committees feedback was incorporated into the program.

Table 2 includes the full list of agencies that participated in at least one of the TATF meetings.

Table 2: Technical Advisory Task Force Participants

Organization	Agency Scale	Focus
Caltrans	State	Statewide transportation agency and funder
California Air Resources Board (CARB)	State	Statewide agency responsible for GHG reduction
Metropolitan Transportation Commission (MTC)	Regional	Transportation planning agency for Bay Area region
Caltrain	Regional	Transit service provider in San Mateo, Santa Clara, and San Francisco counites
BART	Regional	Transit service provider in San Mateo, Santa Clara, San Francisco, Contra Costa, and Alameda counites
San Mateo County Transportation Authority (SMCTA)	County	Transportation planning agency for San Mateo County
SamTrans	County	San Mateo County transit service provider
Peninsula Clean Energy	County	Electricity provider that administers GHG reduction programs such as EV charging and E-bike incentives
21 Elements	County	Collaborative group of San Mateo County planning agencies
Commute.org	County	Countywide transportation provider
City of Daly City	Local	Local lead agency
City of South San Francisco	Local	Local lead agency
City of San Mateo	Local	Local lead agency
City of Burlingame	Local	Local lead agency
County of San Mateo	Local	Local lead agency

Source: Fehr & Peers 2024

2.2.2 Conversation with Community Based Organizations

The study engaged with CBOs to inform them about the Program, to hear community transportation needs, and to help prioritize potential VMT reduction projects and programs. The study engaged with 20 community groups located in EFAs, including organizations that serve people of color, low-income households, seniors and youth, and the disability community. These CBOs are shown in **Table 3**.

Table 3: Interviewed Community Based Organizations

Organization	Equity Focus Area	Community Served
Ayudando Latinos a Soñar (ALAS)	Half Moon Bay	Latinx/o/a coastal community
Boys and Girls Club of the Coastside	Half Moon Bay	Coastside youth
Senior Coastsiders	Half Moon Bay	Coastside older adults
Pacifica Resource Center	Pacifica	Families and individuals along the coast
Farmworker Advisory Commission	Pescadero	Farmworkers advisory commission, which is not a CBO, is an advisory body to the San Mateo County Board of Supervisors and the County of San Mateo
Viviendas Justas	Half Moon Bay	Latinx/o/a coastal community
Rise South City	South San Francisco	Underserved communities facing environmental challenges
Peninsula Family Service	San Mateo / Daly City	Children, families, older adults throughout the Bay Area
Pilipino Bayanihan Resource Center (PBRC)	Daly City	Filipino community
Casa Circulo Cultural	North Fair Oaks	Low-income, vulnerable families. Latinx/o/a communities
Community Overcoming Relationship Abuse (CORA)	San Mateo	Those affected by intimate partner abuse
Saint James AME Zion church	San Mateo	Black community in North Central San Mateo County
Samaritan House	San Mateo	Anyone facing poverty in San Mateo County
Renaissance Entrepreneurship Center	North Fair Oaks / East Palo Alto	People facing systemic barriers to economic mobility
Youth United for Community Action (YUCA)	East Palo Alto	Young people of color, majority low-income, majority women
The Primary School	East Palo Alto	Early childhood, school-aged youth, parents, caregivers
El Concilio of San Mateo County	East Palo Alto	Underserved communities in San Mateo County including immigrant families, Latinx/o/a community
EPA CanDo	East Palo Alto	Residents of East Palo Alto in need of affordable housing
Center for Independence of Individuals with Disabilities (CID)	Countywide	People with disabilities
Silicon Valley Bicycle Coalition	Countywide	Cycling community throughout San Mateo and Santa Clara Counties

Source: Fehr & Peers 2024

2.3 Public Hearings and Committee Meetings

The study's progress and findings were presented at several public meetings, including multiple C/CAG Board of Directors and subcommittee meetings.

- **March 14, 2024**: C/CAG Board of Directors information session
- **April 18, 2024**: C/CAG Congestion Management Program Technical Advisory Committee
- **April 29, 2024**: C/CAG Congestion Management and Environmental Quality Committee
- **July 8, 2024:** 21 Elements Meeting
- **October 10. 2024**: C/CAG Board of Directors, draft final report
- **October 24. 2024**: 21 Elements Meeting
- **October 17, 2024**: C/CAG Congestion Management Program Technical Advisory Committee
- **October 28, 2024**: C/CAG Congestion Management and Environmental Quality Committee

The final public hearing will include C/CAG Board of Directors accepting the report as a guide for lead agencies to use in their VMT/GHG mitigation approach.

3. Equity and Environmental Justice

The Program is one of the first new C/CAG efforts to apply guidance from its recently adopted Equity Framework and serves as a learning opportunity on how to operationalize the Equity Framework at a project/program level.[15] In its agencywide Equity Framework, C/CAG commits to addressing historic harms and existing inequities by taking concrete steps through its planning efforts, projects, programming, and role as a countywide funder. C/CAG's definition of equity includes the following: [16]

- Acknowledging and addressing historic and existing disparities so that race, class, ethnicity, gender, age, disability, or other demographics do not determine economic, health, and quality of life outcomes.
- Removing systemic barriers and providing customized forms and levels of engagement and support for underserved and impacted communities.

Within the Program, C/CAG sees equity as a central objective in the mitigation of VMT. C/CAG commits to an equitable process and outcomes during and after the Program development process for those policies and actions within its control. C/CAG also seeks to support and provide guidance to cities and other countywide agencies in achieving process and outcome equity. C/CAG defines process and outcome equity for this Program as follows:

- **Process equity:** Engagement processes center Equity Focus Area (EFA) voices to foster greater understanding of issues, concerns, preferences, and needs of vulnerable and underserved communities.
- **Outcome equity:** Program policy and planning recommendations reduce existing disparities and mitigation actions focus benefits on EFA geographies and demographics.

Appendix A presents the approach and findings from an engagement process with leaders representing EFA communities. **Appendix B** presents the findings from Mariposa Planning Solutions in the memorandum *C/CAG Vehicle Miles of Travel (VMT) and Greenhouse Gas (GHG) Model Mitigation Program: Equity and Environmental Justice Recommendations Memorandum*. This memorandum includes the following sections:

- An environmental/environmental justice contextual summary of San Mateo County
- C/CAG's and the project's equity definition, commitment, and direction
- Research and best practices on equitable VMT/GHG mitigation
- A summary of CBO interview findings conducted for this project
- Recommendations for equity and EJ strategies based on best practices and local context, including community/stakeholder preferences.

[15] Equity Assessment, Framework, and Action Plan | C/CAG
[16] CCAG-Equity-Framework_Final-Report_12.18.23.pdf

The following sections summarize the recommendations in Appendix B and two case studies of agencies putting these recommendations into practice.

3.1 Equity and Environmental Justice Recommendations

The equity and environmental justice recommendations contained in **Appendix B** are based on insights from CBO interviews conducted by InterEthnica (presented in **Appendix A**), insights from conversations with affordable housing providers (presented in **Appendix C**), and the take-aways from a literature review and policy and planning analysis grounded in C/CAG's Equity Framework. The memorandum presents the following four overarching strategies for incorporating equity into the VMT/GHG model mitigation program:

- Prioritize EFA-Supported Mitigation Action Categories/Strategies
- Center EFA-Serving CBOs and EFA Leaders in the Design of Mitigation Actions
- Emphasize Equity Advancement and the Reduction of Disparities in the Application of Mitigation Actions
- Establish Policies and Procedures for Evaluating, Monitoring, Reporting, Learning, and Continuous Improvement

Below is a summary of the specific recommendations in the memorandum that are incorporated throughout this report and should be considered in transportation planning efforts when aligning actions with C/CAG's Equity Framework:

- **Recommendation 1: Further develop and refine CBO-supported mitigation actions.** C/CAG and other lead agencies should complete the vetting and design of mitigation actions that have support from the local community, well in advance of funds becoming available so that "project readiness" is not an impediment to implementation.
- **Recommendation 2: Co-create mitigation actions with EFAs and impacted communities.** Mitigation actions will become more concrete and specific over time. This presents an opportunity for community-based planning or co-creation with EFA-serving CBOs and EFA leaders in the areas where the actions are being considered. Such an approach can increase the utility of mitigation actions for local EFAs and the level of community support.
- **Recommendation 3: Identify and work towards addressing gaps in EFA representation in existing advisory and decision-making bodies.** It is important to consider what advisory and decision-making bodies are best suited to provide recommendations and make decisions regarding the selection of specific VMT/GHG mitigation actions and the direction of the VMT/GHG model mitigation program more broadly. It is also important to consider the composition of such bodies and the degree to which they are made up of EFAs and equity leaders.
- **Recommendation 4: Set a target for EFA investments to be greater than the proportion of the EFA population countywide or within the agency's jurisdiction (whichever is greater).** Lead agencies should determine the relative proportion of the population that EFA geographies and demographics represent within their jurisdiction and set a minimum investment threshold based on those figures. Ideally, agencies should strive to set investment targets that are

substantially higher than what the actual EFA population represents to avoid maintaining the level of investment status quo.

- **Recommendation 5: Use context-sensitive strategies to reach EFA investment targets. Appendix B** presents several options to consider so that mitigation action investment strategies can generate benefits for EFA geographies that reflect the unique context of local EFA geographies.
- **Recommendation 6: Analysis of project equity benefits and burdens and design of mitigation actions around achieving equitable outcomes should be required for the countywide program (and recommended for the local model program).** CEQA and the National Environmental Policy Act (NEPA) require environmental analysis and review of potential impacts of transportation and land use projects and a close nexus between project impacts and mitigation actions. While CEQA guidelines do not require analysis of socioeconomic or equity impacts in the environmental review process, they also do not preclude agencies from conducting such assessments through (or in addition to) the environmental review process.
- **Recommendation 7: Design mitigation actions with a universal access lens.** Universal access is a concept in which environments are designed to be usable by all people, to the greatest extent possible. Lead agencies should consider how mitigation actions are oriented around the preferences and needs of EFA populations, including youth, seniors, people with disabilities, people living below the poverty line, people without access to bank accounts, people with limited English proficiency, low-wage workers such as those in the agricultural and service industry, and single parent households.
- **Recommendation 8: Use metrics or key performance indicators (KPIs) to evaluate equity benefits of potential mitigation actions, track outcomes, report, and improve effectiveness over time.** In addition to VMT/GHG reduction effectiveness, mitigation actions should also prioritize equity advancement effectiveness/benefit (outcome equity) based on quantitative and qualitative metrics or KPIs. Such equity measurements should similarly be monitored over time as VMT/GHG reductions that are monitored during the MMRP. Ideally, ongoing monitoring and evaluation can and should lead to adjustments to the mitigation action(s) as applicable for both GHG/VMT and socioeconomic disparity reduction effectiveness.
- **Recommendation 9: Report and obtain input on mitigation action and program effectiveness and adjustments to EFA voices and other impacted populations over time.** Use communication and engagement strategies to ensure that progress and changes to mitigation actions and program outcomes are reported back to impacted communities and equity/EFA leaders.

These recommendations (discussed throughout the rest of this report) include prioritizing investments in affordable housing, where feasible (one of the most popular measures among CBOs and with the highest long-term, on-going VMT reductions and equity value), with complementary investments in transit pass incentives, e-bike rebates, community-based travel planning, last-mile mobility services, or the construction of bicycle or pedestrian infrastructure connecting new affordable housing projects to nearby transit services or other resources. Many existing affordable housing providers struggle to provide these types of amenities to their residents (see **Appendix C**) and, therefore, there is a role that the VMT/GHG model mitigation program can serve to provide services to existing and future low-income residents.

These recommendations align with Caltrans' recommendations to prioritize infill and affordable housing in the mitigation of VMT-inducing highway projects.[17]

3.2 Equity in Transportation Planning Case Studies

The following two case studies demonstrate how agencies have incorporated several of these recommendations into their transportation planning processes and could serve as examples for how San Mateo County agencies could incorporate them into future VMT mitigation programs.

Recommendation 2: Co-create mitigation actions with EFAs and impacted communities:

King County's Office of Equity and Social Justice (OESJ) helps standardize equity and supports equity advancement across the County's departments and 17,000 employees. One of OESJ's multiple roles is assisting the County in standardizing and conducting meaningful and inclusive community engagement.

A key element of King County's approach to community engagement is co-creation. "Co-creation uses an active and ongoing participatory process. It assumes shared power, responsibility, accountability, and decision-making with community members". The County's co-creation approach centers those most harmed by inequality and engages with community members to guide initiatives, goals, methods, and analyses, including at the earliest possible moment (Community Engagement & Co-Creation, 2024).

An example where co-creation was utilized is King County Metro's Mobility Framework. Metro went through an extensive community process to develop the Framework to inform how Metro allocates transit service, invests resources, and updates its policies. Metro co-created the Framework with its Mobility Equity Cabinet, composed of 23 community leaders representing low-income communities, Black, native and communities of color, immigrants and refugees, limited-English speaking people, and people with disabilities. The Cabinet "drove the development of Guiding Principles and recommendations, worked with Metro to direct the consultant analysis and research, and helped draft the Framework document" (King County Metro's Mobility Framework, n.d.).

Another example is the Gathering Collaborative. In 2021, the County Executive declared racism as a public health crisis and obtained $25 million in COVID relief funds, after which they went through a process of working closely with the community to identify their needs and fund interventions. The Gathering Collaborative was a key to the co-creation approach and was composed of community members that "collaborated with King County to equitably distribute the $25 million to undo the harms of racism compounded by the pandemic, influence the County's budget cycle and process, and establish a longer-term, multi-generational vision for King County to become an anti-racist government" (The Gathering Collaborative - King County, Washington, 2024).

An important result of the co-creation approach was that County staff realized that the federal funds were too restrictive. OESJ staff shared that they "worked to switch the funding based on the partnership with the community and what they felt was needed for their communities and businesses". Staff reflected that

[17] https://dot.ca.gov/-/media/dot-media/programs/esta/documents/vmt/vmt-mitigation-playbook-07-2022.pdf

the process reaffirmed the importance of verifying what the community's priorities are and not assuming their needs are what staff think they are. OESJ and other County staff also learned that government timelines are not always compatible with community timelines and that sometimes timelines need to be adjusted to meet the community where they're at. Although the prospect of longer timelines for deeper community engagement may not seem practical or feasible to some practitioners, OESJ staff noted "there are benefits to doing things the right the first time to reduce redundancy, waste of resources of funds, increase efficiency, and ultimately improve relationships with community. A co-creation approach also shows that you're being authentic in wanting to include the community and partner with them. This helps build relationships and community capacity for more positive outcomes for future projects, including in helping the community understand and anticipate government processes and timelines, and thereby be able to adapt for future projects" (OESJ interview, December 2024).

Recommendation 3: Identify and work towards addressing gaps in EFA representation in existing advisory and decision-making bodies and Recommendation 6: Analyze project equity benefits and burdens and design of mitigation actions around achieving equitable outcomes:

The Oregon Toll Program Equity and Mobility Advisory Committee was convened to assist the Oregon Department of Transportation (ODOT) in infusing equity in the planned I-205 and I-5 toll projects. The Committee consisted of 13 individuals of diverse professional or lived experience related to equity and mobility. ODOT collaborated with local partner agencies and put out an open call for applicants to form the Committee. Selection criteria included "commitment to, and experience in, supporting or advocating for equitable processes and outcomes; experience with the transportation system in the Portland metro area and/or Southwest Washington; and, interest in participating on the committee" (Oregon Department of Transportation : Equity and Mobility Advisory Committee : Oregon Tolling : State of Oregon, 2024).

The Committee was tasked with providing input and supporting ODOT during the technical and environmental review process, including the evaluation of toll program alternatives and performance measures, and the development of strategies and processes. This included:

- Helping identify the transportation needs of, and benefits for, people of color and people with low-incomes, and limited English proficiency or disabilities.
- Helping better understand neighborhood benefits and impacts for the communities near the tolled facilities.
- Articulating what was important to measure through the environmental review process and helping develop methodologies and metrics based on community knowledge and review of data.
- Assisting with the development of the environmental review process engagement strategy, including prioritizing reaching and listening to equity communities culturally and linguistically relevant approaches, hiring community engagement liaisons, and partnering with CBOs.

The Oregon Toll Program Equity and Mobility Advisory Committee's most notable contributions included their input in developing the program's Equity Framework, providing guidance in the development of the Low Income Toll Report, and co-creating the July 2022 Recommendations to the Oregon Transportation Commission.

4. VMT Program Options & Statutory and Administrative Context

This chapter outlines statutory and administrative considerations for the Program in San Mateo County. This framework includes the legal background and considerations for the Program and the Program's structure, statutory requirements, administrative needs, and governance. The Program's legal requirements, and its relationship with the existing countywide Congestion Management Program, are based on established CEQA statutes and case law. The administrative and governance requirements described in this section are based on a review of other programs, and they were shaped using guidance from the TATF and other stakeholders. While most of this section focuses on VMT mitigation programs, **Appendix D** provides additional guidance and legal and statutory considerations relating to greenhouse gas mitigation.

4.1 VMT/GHG Mitigation Program Options

There are several options for ways a VMT/GHG model mitigation program could be structured. These different program options can fund different types of VMT/GHG mitigation actions, and each program option has distinct administrative needs. In all cases, the selection of an appropriate program option should be guided by the consensus of stakeholders regarding the fundamental purpose of a VMT/GHG model mitigation program, and what types of mitigation actions the program should fund. Which stakeholders are relevant will be determined by each local city or project sponsor, and could include city planning and public works staff, local advisory committees, elected officials, and CBOs.

4.1.1 Program Evaluation Criteria

Developing a set of evaluation criteria can help guide the selection of a mitigation program's structure and inform the types of projects and programs the VMT/GHG model mitigation program could fund. C/CAG, the TATF, and the study team developed a list of evaluation criteria that fall into six categories, which are reflected through the rest of Chapters 4, 5, and 6:

1. **Legal Foundation:** Does the VMT/GHG model mitigation program meet statutory requirements established under CEQA and other relevant state laws?
2. **Agency Oversight & Funding:** Which entity would manage the VMT/GHG model mitigation program and how would the program administration be funded?
3. **Geography & Scale:** Could the mitigation program be used at multiple geographic scales? How would the location of VMT impacts relate to the location of mitigations?
4. **Applicability:** To what types of projects would the VMT/GHG model mitigation program apply and what types of mitigations would it support? Would the program promote equitable outcomes for members of underserved communities?

5. **Data Analysis & Monitoring:** Would the VMT/GHG model mitigation program establish a standardized approach to evaluating VMT impacts and reductions and have clearly defined methods for ongoing data collection and monitoring?
6. **Program Risk Management:** Is the VMT/GHG model mitigation program clear and easy to understand, and does it result in predictable and affordable results?

4.1.2 VMT/GHG Mitigation Program Options

Table 4 presents a summary of the trade-offs of the different program structures that C/CAG considered for the Program. These program options are described in more detail in the following sections.

Table 4: VMT/GHG Program Structure Option Pros and Cons

VMT-Based Impact Fee	VMT Exchange	VMT Bank
✓ Easy to understand	✓ Flexible	✓ Flexible
✓ Modest administrative burden (many agencies are already familiar with administering impact fee programs)	✓ Moderate administrative burden (less than a Bank)	✓ Can split funding among applicants
✓ Funds tangible improvements	✓ Can fund programs and operations	✓ Can fund programs and operations
— Can only be used toward capital improvements	— Applicants must fund an entire mitigation project	— High administrative burden
	— First-in problem. The most cost-effective measures will be funded first. Exchange programs need a wide variety of mitigation actions, at different price points, to provide applicants with more flexibility.	

Notes: Pros are denoted with a check mark (✓) and cons with a dash (—).
Source: Fehr & Peers, 2024.

4.1.2.1 VMT/GHG Mitigation Impact Fee

A VMT/GHG mitigation impact fee would be like a traditional impact fee program, and it would be governed by the Mitigation Fee Act.[18] The mitigation actions are typically included in a capital improvement program (CIP) and the relationship between the fees and the project's share of the CIP costs are established in a nexus study. These capital improvements could include VMT/GHG-reducing physical infrastructure and capital investments, such as bicycle lanes, pedestrian crossing improvements, and

[18] California Government Code §66000-66001, the Mitigation Fee Act (MFA), establishes the rules under which local agencies may establish mandatory fees to cover a portion of the costs of capital improvements for public facilities that are needed as a result of new development. More information on the MFA is available at https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=GOV&division=1.&title=7.&part=&chapter=5.&article=.

transit-related infrastructure or vehicles. The limitations placed by the Mitigation Fee Act mean that fee revenue cannot be spent on operational or programmatic VMT/GHG-reduction actions, such as operating transit services, offering transit pass subsidies, or operating a bike-share program. Impact fee programs can include costs for administering the program, such as staff time to track and report on use of the funds. These administrative costs are typically around 5 percent.

4.1.2.2 VMT/GHG Exchange

A VMT/GHG exchange would include a pre-analyzed and pre-qualified list of VMT/GHG mitigation actions. Project applicants would select and directly fund one or more VMT/GHG-reducing actions from this pre-qualified list. Unlike a mitigation fee program, this mitigation list could include operational and programmatic actions, in addition to capital improvement projects.

Because a VMT/GHG exchange program matches a project applicant with specific mitigation actions, an applicant would need to fund an entire mitigation action in full, meaning that a single mitigation action could not have its costs split between multiple applicants. Due to this limitation, a VMT/GHG exchange should have a larger selection of mitigation actions with a range of different costs, so that applicants can find the right VMT/GHG-reducing project or program to fit their mitigation needs. Mitigation costs for exchanges could include administrative costs similar to those allowed in an impact fee program.

4.1.2.3 VMT/GHG Bank

Like a VMT/GHG exchange, a VMT/GHG bank would include a pre-analyzed and pre-qualified list of VMT/GHG mitigation actions, which could include operational, programmatic, and capital improvement actions. The total cost of the mitigation actions on the list would be summed up and would be divided by the total VMT/GHG reductions from those projects and programs, to establish a cost per VMT/GHG credit. Project applicants could then purchase the specific number of credits necessary to mitigate their VMT/GHG impact. Unlike an exchange, this credit system would allow funds from multiple project applicants to be combined to fund a single mitigation action.

While a VMT/GHG bank is the most flexible of the three program options with respect to the types of mitigation actions that are funded, it also has more complex administrative requirements. A bank administrator, which would ideally operate at a subregional or regional level, would need to calculate the monetary value of VMT/GHG credits to develop a per-VMT/GHG credit price. Additionally, the bank administrator would need to operate a thorough accounting system to track funds. Banks can include administrative costs similar to those allowed in an impact fee program.

4.2 Legal Foundation

The legal foundation for the VMT/GHG model mitigation program is the collection of statutes and regulations that define legal expectations for a mitigation program. The specific structure selected for a mitigation program will affect which regulations apply. Any mitigation action or program, regardless of its administrative structure, needs to be consistent with CEQA requirements defining acceptable mitigation

for an environmental impact. **Appendix D** provides additional guidance on CEQA requirements and recommended approaches to substantiating the effectiveness of mitigation measures.

4.2.1 Relevant Case Law

Court decisions often provide critical guidance on areas that are unclear or unspecified in statutes and regulations. Given the complexity and nuance involved in the application of CEQA requirements to specific projects, many case law examples can be reviewed to inform the regulatory framework guiding the development of VMT/GHG mitigation programs. While a full case law review was not completed for this phase of the study, **Table 5** highlights major cases that are frequently cited when developing mitigation programs.

Table 5: Case Law Relevant to VMT/GHG Mitigation Programs

Case	Description	Impact Fee	Exchange	Bank
Nollan v. California Coastal Commission, 483 U.S. 825 (1987)	In *Nollan*, the Court held that a government could, without paying compensation, require an easement as a condition for granting a development permit the government was entitled to deny, provided that the exaction would substantially advance the same government interest that would provide a valid basis for denial of the permit, or, in other words, provided that there is an appropriate "nexus" between the project's effect and the mitigation. This is known as the "nexus" test.	✓	✓	✓
Dolan v. City of Tigard, 512 U.S. 374 (1994)	The Court further refined the *Nollan* requirement in *Dolan*, holding that an exaction requiring dedication of private property must also be "'roughly proportional' . . . both in nature and extent to the impact of the proposed development." This is known as the "rough proportionality" test.	✓	✓	✓
Sacramento Old City Assoc. v. City Council of Sacramento, 229 Cal App 3d 2011 (1991)	The Court established the conditions under which identification of mitigation specifics can be properly deferred beyond the point of CEQA compliance: If the specifics cannot be identified at the time of CEQA compliance, then 1) the agency must commit itself to the mitigation and identify one or more measures for the significant effect and must establish clear performance standards; or 2) alternatively the agency must provide a menu of feasible mitigation options that can be selected to meet the stated performance standards.	✓	✓	✓

Source: Fehr & Peers, 2024.

4.2.2 CEQA, Statutes, and Regulations

Table 6 provides an overview of relevant statutes and regulations and shows which mitigation program structure they are most applicable to. Although C/CAG is leading this countywide VMT/GHG mitigation study, C/CAG does not typically function as a lead agency for the purposes of CEQA, as the agency does not approve land use projects. Typically, C/CAG's involvement would also involve a lead agency for a CEQA evaluation, such as a local jurisdiction or Caltrans. Further, the CEQA lead agency can be a separate jurisdiction from the agency or organization implementing a VMT action (the "implementing agency"). Finally, an administering agency that takes on responsibilities for overseeing a mitigation program can also be a separate jurisdiction from both the lead agency and the implementing agency.

Table 6: Relevant Statutes and Regulations

Statutory Reference	Description	Impact Fee	Exchange	Bank
CEQA Statute[1] CEQA Guidelines[2,3]	The CEQA Statute and Guidelines establish that mitigation is required for potentially significant impacts. The significance of an impact is determined by the lead agency's choice of thresholds. Mitigation must be roughly proportional to the increment of VMT that occurs above the threshold. Proposed mitigation must be effective, enforceable, and feasible, and supported by substantial evidence. Mitigation must be monitored, and the form of monitoring may range from verification that the mitigation action was completed to periodic measurement of mitigation action results. The nexus and rough proportionality standards established by case law (i.e., Nollan/Dolan) also apply.	✓	✓	✓
Mitigation Fee Act[4]	This legislation outlines the requirements for establishing a mitigation fee program. It identifies requirements for the nexus study and specifies what types of projects can be funded through fee programs, limiting the use of impact fees to "public facilities" necessary to support a project. Public facilities are generally defined as capital projects, which prevents the use of impact fees to correct existing deficiencies or to maintain or operate transportation facilities or services.	✓		
Fish & Game Code Analogy[5]	This legislation outlines the necessary steps to develop a conservation bank for mitigation purposes. While not directly applicable to VMT mitigation programs, it is reasonable to use this statute as an analogy for VMT mitigation banks or exchanges, given that VMT mitigation banks and exchanges would be established to *conserve* (or avoid) trip generation and the associated emissions.		✓	✓

Standards for Regulatory Carbon Offsets[6]	The California standards for regulatory carbon offsets under the state cap and trade system identify conditions that make a valid carbon offset. While not directly applicable to VMT credits, these standards are useful in determining "additionality" for VMT reductions. The standards specify that to be valid, carbon offset credits should be real, additional, permanent, verifiable, and enforceable, and provide clear definitions of these terms.	✓	✓	✓

Notes:

1. California Public Resources Code §21000-21189
2. California Code of Regulations, Title 14, Division 6, Chapter 3, §15000-15387
3. California Code of Regulations, Title 14, Division 6, Chapter 3, §15041
4. California Government Code §66000-66001
5. California Government Code §1852
6. 17 California Code of Regulations §95802

4.2.3 General Plan and Congestion Management Program Requirements

C/CAG, as the congestion management agency of San Mateo County, is responsible for the preparation and implementation of a Congestion Management Program (CMP). The CMP identifies strategies and programs, such as appropriate TDM measures, to help alleviate congestion in the county. A VMT/GHG mitigation program would further those efforts by directing funding towards transportation measures that reduce single-occupancy automobile use.

A VMT/GHG mitigation program could also be paired with a local agency's general plan as an implementation mechanism for local policies. For example, a VMT/GHG mitigation fee could be applied to land use projects within a jurisdiction to mitigate any VMT or GHG impacts identified in a local agency's general plan EIR as described further in **Chapter 6**. Additionally, many local agency general plans include policies and measures to encourage alternative transportation modes, which a VMT/GHG mitigation fee could help support.

4.3 Eligible Mitigation Actions

Mitigation actions that have the potential to be funded through VMT mitigation programs typically fall into three categories:

- **Capital Improvement Projects and Land Use:** These are physical improvements to the transportation system that reduce VMT/GHG, such as pedestrian, bicycle, or transit infrastructure projects, the acquisition of transit vehicles and other related equipment, and infrastructure needed to support parking pricing or other forms of pricing. This typology also includes the funding of affordable housing, which brings people closer to jobs and community amenities.
- **Programs:** These are programmatic approaches to VMT/GHG mitigation, which include TDM strategies such as the provision of discounted or free transit passes, amenities to support the use of active modes, and incentive programs that encourage the use of carpooling, telecommuting, active transportation, or transit.
- **Operational Improvements:** These types of improvements involve providing ongoing services that encourage people to use modes other than single-occupant vehicles. These can include increases in the frequency or speed of transit services, the expansion of transit routes into formerly unserved areas, or the provision of carshare/bikeshare/micromobility programs.

Table 7 describes the potential to include each mitigation action type under each mitigation program structure.

Table 7: Mitigation Strategy Eligibility by Program Type

Action Type	Impact Fee	Exchange	Bank
Capital Projects/Land Use	**Straightforward:** Implementing capital projects through transportation impact fees or inclusionary housing fees is a routine and standard practice. However, there is often a lag between when projects are approved and developed versus when mitigation actions are implemented, since it takes time to accumulate enough fee revenues to complete a capital project.	**Doable (with caveats):** Exchange programs require project applicants to pay the full cost of one or more mitigation actions. Capital projects often have relatively high costs, so it may be difficult for an individual project applicant to match their project's mitigation obligation to a capital project's VMT reduction potential, which would result in slower implementation of the mitigation action list.	**Straightforward:** Once enough VMT reduction credits have been purchased to fund the capital project, the mitigation action can be implemented. Like impact fee programs, capital projects would likely be funded by accumulating revenues from multiple project applicants and thus are likely to experience a lag between project approval and mitigation action implementation.
Programs	**Challenging:** The inclusion of programmatic actions would be a new feature and has not yet been tested in court.	**Straightforward:** Programmatic actions can be included in an exchange program and can often be right sized to meet the project applicant's mitigation need.	**Straightforward:** Purchased VMT reduction credits could be used to fund programmatic actions.
Operational Improvements	**Challenging:** The Mitigation Fee Act (Government Code § 66000 *et seq., see also* §65913.8) excludes operating and maintenance costs from being funded through fees.	**Straightforward:** Like programmatic actions, operational actions can also be right sized to meet project applicant needs.	**Straightforward:** Purchased VMT reduction credits could be allocated to operational actions.

Source: Fehr & Peers, 2024.

4.4 Geography and Scale

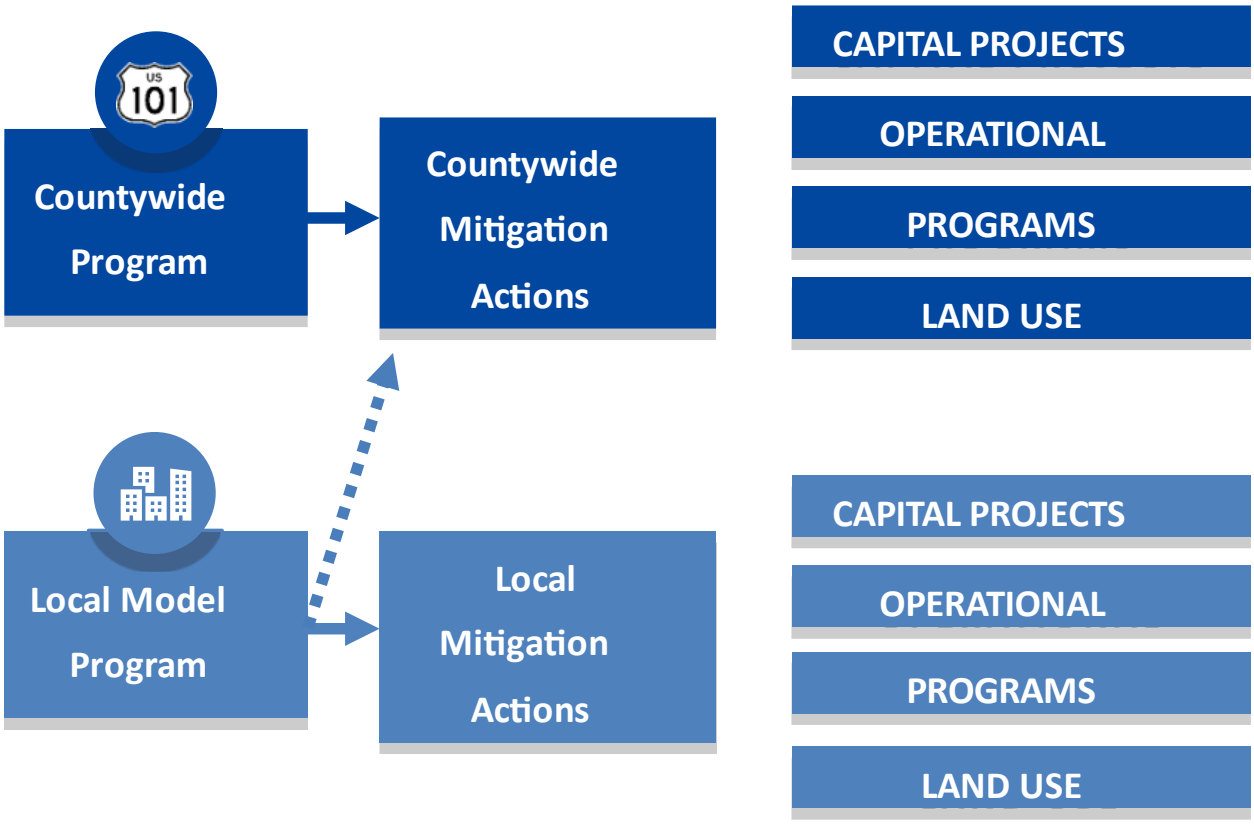
This section describes VMT and GHG mitigation at two geographic scales: countywide mitigation needs for larger scale VMT/GHG-inducing transportation projects and local VMT/GHG mitigation for local development projects. This section also introduces the concept of mobility zones, which provides a guide for the application of mitigation actions in different geographic contexts.

4.4.1 Program and Mitigation Action Types

This study analyzed two potential scales for mitigation program types: one implemented on a countywide basis and another that would provide local jurisdictions in San Mateo County with a model program option they could implement in their communities. The countywide program would be used by C/CAG or SMCTA to mitigate impacts from VMT/GHG-inducing countywide/regional transportation projects, such

as highway capacity enhancements. The local model program would serve as an optional tool for local municipalities to mitigate VMT/GHG impacts from land use projects within their jurisdiction. As presented in **Figure 2**, the models at both scales will contain a suite of mitigation actions that project applicants could choose from, with the option for local jurisdictions to direct local land use mitigation funding towards select countywide mitigation actions, as these larger scale improvements can have a larger potential to reduce VMT/GHG impacts.

Figure 2: VMT/GHG Model Mitigation Program Types

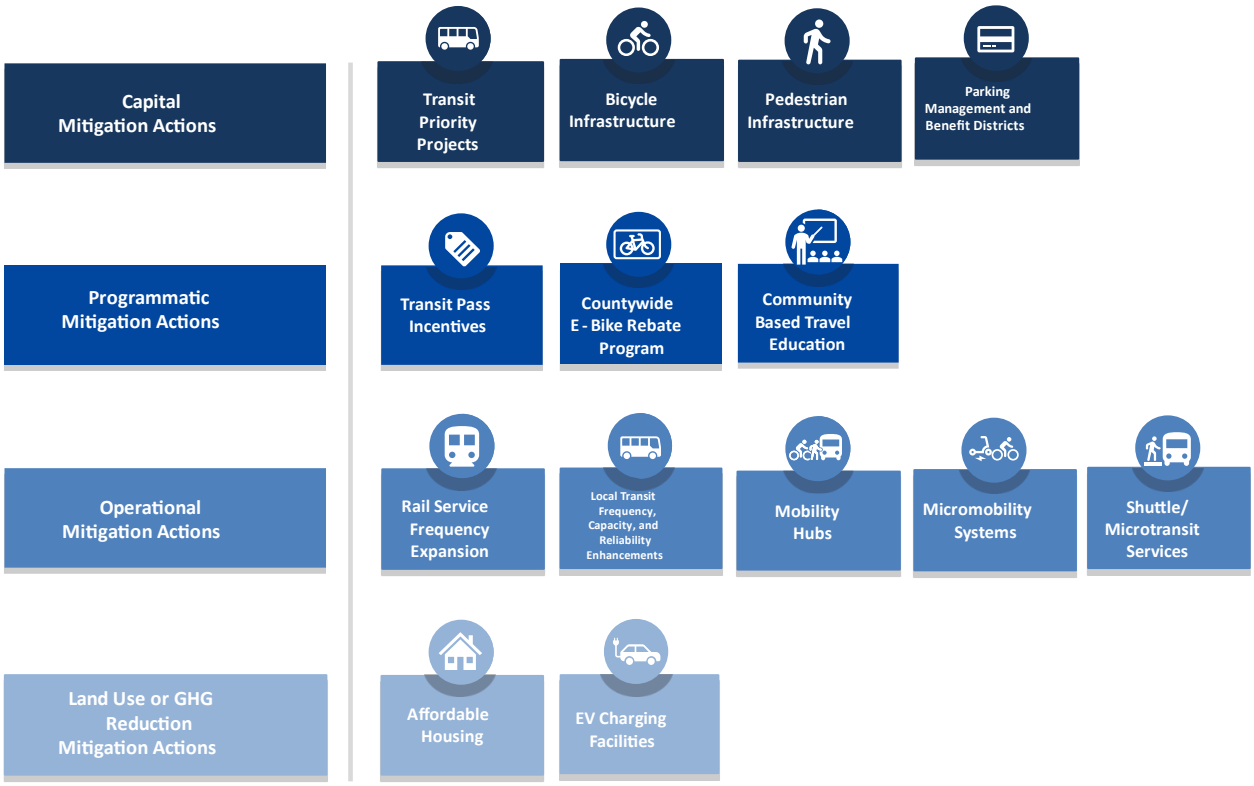


During the first two meetings with the TATF, the study team developed an initial list of potential mitigation actions that could be used for countywide or local mitigation and which were organized into the following categories:

- Transit Enhancements – Transit capital and service improvements
- Affordable Housing – Construct affordable housing
- Subsidy Programs – Subsize transit passes or e-bike purchase
- Community Travel Planning – Coordinated education and incentives
- First/Last Mile Services – Shuttle/microtransit, micromobility networks, mobility hubs
- GHG Reduction Measures – EV Charging
- Biking/Walking Paths – Bicycle and pedestrian infrastructure
- Parking Program and Curb Management – Parking pricing and curb management strategies

These categories of mitigation action were refined based on feedback from the TATF and CBO conversations into the final list of mitigation actions presented in **Figure 3,** organized by the type of action. Mitigation actions that were considered but ultimately did not meet the requirements of the program are presented in **Appendix E**.

Figure 3: VMT/GHG Model Mitigation Program Mitigation Actions by Mitigation Action Type



4.4.2 Countywide Program and Mitigation Actions

Mitigation actions that are best suited to address VMT and GHG impacts induced by county-led transportation projects include larger VMT/GHG-reducing transportation capital and operational mitigation actions that would be implemented by regional transit agencies, such as the Transit Priority Projects, Rail Service Frequency Expansion, and Local Transit Enhancements. While most of the remaining mitigation actions can be implemented by local or countywide agencies using existing administrative structures, and thus be scaled to serve small or larger populations through a VMT/GHG mitigation program, actions such as bicycle and pedestrian infrastructure or parking management and benefit districts are typically led by local agencies and, therefore, are less well-suited for countywide mitigation. In general, larger scaled transportation projects and programs have a higher potential to mitigate VMT/GHG impacts as they can address longer automobile trips that pass through multiple jurisdictions.

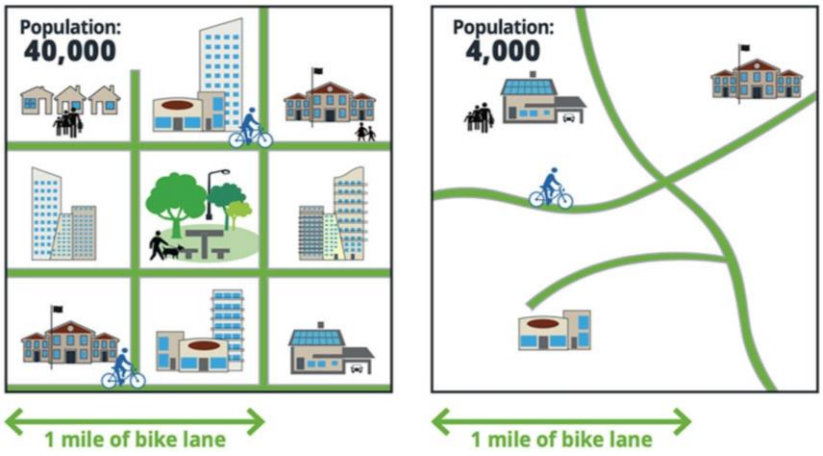
4.4.3 Local Model Program and Mitigation Actions

Locally led VMT/GHG mitigation programs typically need to address smaller scale VMT/GHG impacts than regional projects (e.g., residents or employees at a single project rather than the travel behaviors of residents and employees throughout the county) and therefore require smaller-scale VMT/GHG-reducing transportation improvements and programs. These local actions are most likely to be implemented by a local jurisdiction, like a city, and they would contribute funding to locally identified infrastructure improvements, such as projects within a citywide pedestrian or bicycle plan or the implementation of a parking and curb management program. Local agencies can also contract with a regional implementing agency to administer mitigations such as transit or e-bike subsidies or affordable housing within their local jurisdiction. These smaller-scale mitigation actions have a lower potential to reduce VMT/GHG impacts than regionally focused improvements, because the automobile trips they can reduce are generally shorter journeys within a local area. Therefore, these local mitigation actions are more suited to mitigate the VMT generated from local land use projects.

4.4.4 Mobility Zones

Many factors contribute towards how much VMT a resident or employee generates, such as density and proximity to transit.[19] Mitigation actions that are implemented in higher-density areas that have a mix of land uses and a better-connected pedestrian, bicycle, and transit network, will generally be more effective at reducing VMT than projects located in other areas of the county. This concept is illustrated in an example from the City of San Diego's Mobility Choices program, which is presented in **Figure 4**, where a city would need to build 27 miles of bike lanes in low density areas (shown on the right) to match the effectiveness of a one-mile bike lane in a more urbanized area (shown on the left).

Figure 4: VMT Reduction Effectiveness based on Context



Source: City of San Diego, https://www.sandiego.gov/complete-communities/mobility-choices

[19] See Environmental Protection Agency's (EPA's) MXD methodology for more information at https://www.fehrandpeers.com/mainstreet/ or see Getting Trip Generation Right Eliminating the Bias Against Mixed Use Development by the American Planning Association, May 2013.

Given the need to distinguish between the different geographic contexts in San Mateo County, combined with the Program's equity goals, the study team recommended designating four different mobility zones to distinguish different areas of the county. **Table 8** presents a high-level review of the four different mobility zones throughout the county with example communities, using C/CAG's established approaches to defining EFAs and transit-oriented areas. **Figure 5** presents the high-quality transit areas, priority development areas, and those neighborhoods with levels of density that support a broad range of mitigation actions, identified as "Transit-Oriented Area" in **Table 8**.[20] The table and figure are meant to be a guide for lead agencies illustrating that a diversity of areas around the county can support VMT mitigation actions. Lead agencies should confirm that there is substantial evidence supporting the use of VMT mitigation actions when implementing these measures based on the considerations outlined in **Appendix E** and the state guidance such as the CAPCOA 2021 Handbook.

Table 8: Mobility Zones

	Transit-Oriented Area[1]	Non-Transit-Oriented Area
Equity Focus Areas[2]	**Mobility Zone 1** – Examples include SSF west of 101, San Mateo North Central, North Fair Oaks	**Mobility Zone 3** – Examples include East Palo Alto, select areas of coast
Non-Equity Focus Areas	**Mobility Zone 2** – Examples include most of Caltrain and El Camino Real corridor within a half mile of stations/stops	**Mobility Zone 4** – Examples include bayside hills and the rest of coast

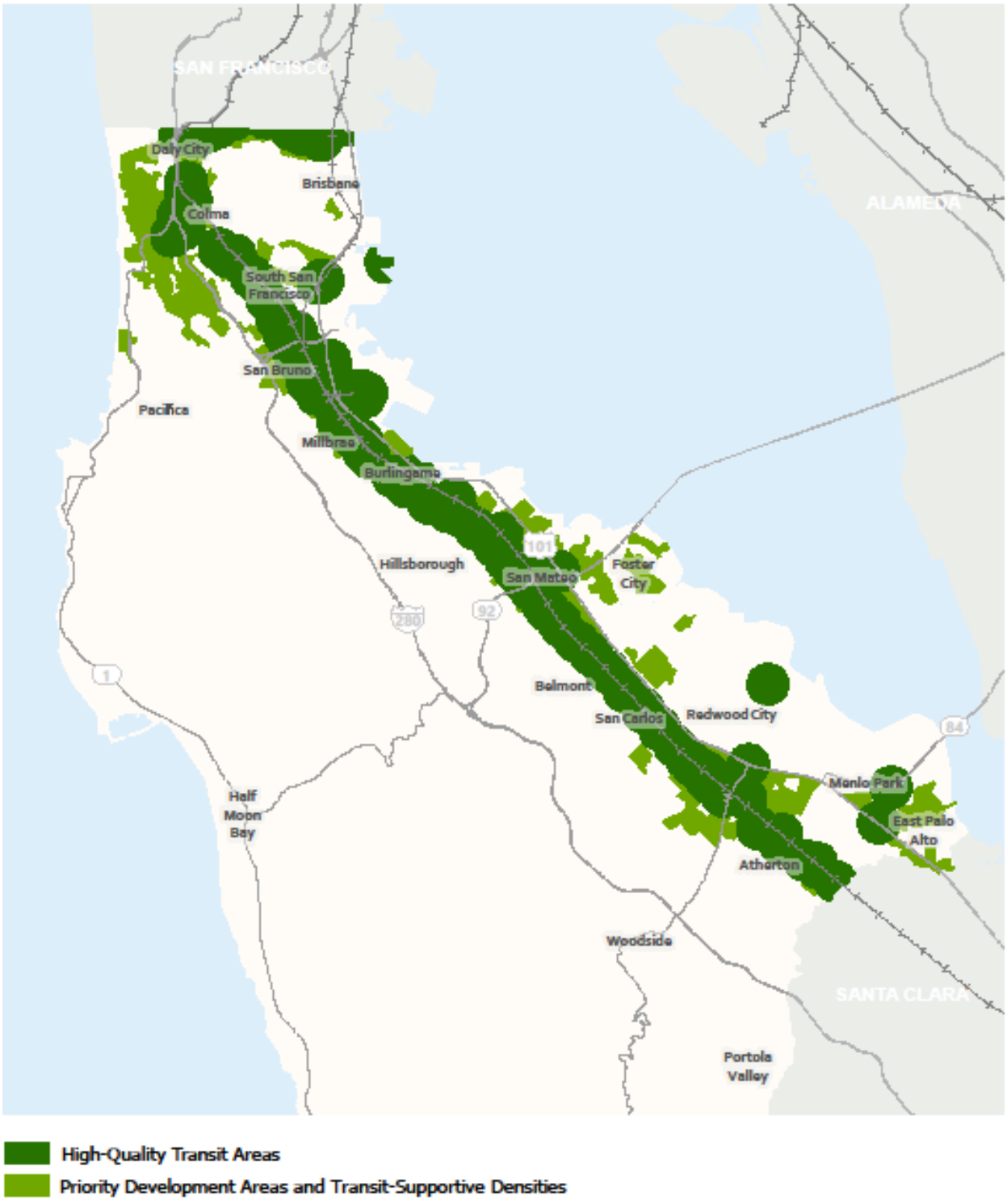
Notes:

1. Generally, areas aligning with a half-mile radius around Caltrain stations or El Camino Real bus stops, although as shown in **Figure 5**, other areas of San Mateo County provide transit-supportive levels of population density or are identified as Priority Development Areas in MTC's Plan Bay Area and thus are consistent with the regional land use plans. Transit-oriented areas are used as a proxy for the types of urban features (e.g., land use density and mix of uses, good walking, bicycling, and transit connections, etc.) that tend to be present in these areas in the county but not in others.
2. EFAs with an equity score greater than 8 out of 10, identified as a part of C/CAG's Comprehensive Bicycle and Pedestrian Plan.

Source: Fehr & Peers, 2024

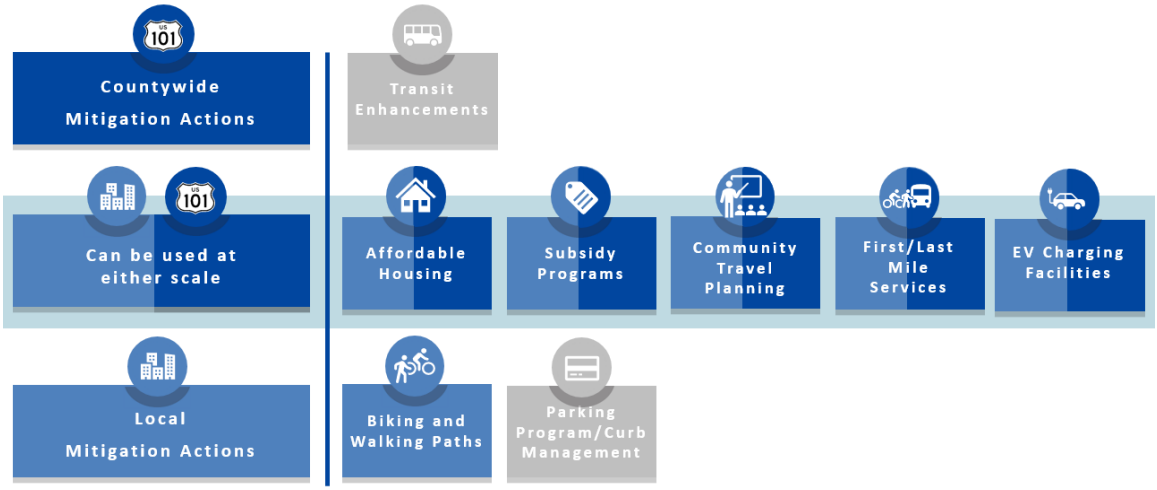
[20] The transit-oriented areas in **Figure 5** represent the definitions as of November 2024. AB 2553 revised the definition of a Major Transit Stop from the intersection of two bus routes with service intervals of 15 minutes or less to 20 minutes or less during the peak commute hours, effective January 1, 2025. A High-Quality Transit Corridor remains defined in CEQA Section 2115 as a bus route with service intervals no longer than 15 minutes.

Figure 5: Priority Development Areas, High-Quality Transit Areas and Transit-Supportive Densities



The four different mobility zones were used to estimate the VMT/GHG reduction capabilities of the study's mitigation actions in different locations. However, some mitigation actions may not be appropriate for non-transit-oriented areas due to lower population and employment densities. **Figure 6** presents an example of mitigation actions that may and may not be appropriate for non-transit-oriented areas because the research in the CAPCOA 2021 Handbook does not show that these actions would be effective in low-density environments. The greyed-out items in the figure are generally not appropriate for these lower density areas, due to limited effectiveness. In general, low density or non-transit-oriented areas should rely on measures that lead agencies determine as locally appropriate to address specific travel needs, such as those developed through the Connect the Coastside Plan for coastal San Mateo County.[21] If these communities want to include parking management or transit enhancement mitigation actions, local agencies would need to establish substantial evidence demonstrating under what circumstances they could be used (e.g., implement paid parking in town center environments where abundant nearby free parking is not available).

Figure 6: Mitigation Actions for Non-Transit-Oriented Areas



4.5 Recommended Program Structure

The study team presented potential program options to C/CAG and the TATF. C/CAG and the TATF shared their priorities for VMT/GHG mitigation and the types of mitigation actions they would like to fund in their communities. The study team provides the following recommendations based on that input:

> **Recommendation 1: Use a mitigation exchange for the countywide program.** A mitigation exchange's potential list of pre-qualified mitigation actions is well suited for this type of program structure. A mitigation exchange would allow the VMT/GHG model mitigation program to include a range of mitigation actions, from transit pass subsidies to infrastructure projects, which can address both larger and smaller VMT/GHG impacts.

[21] https://www.smcgov.org/planning/connect-coastside

An exchange is more suited to C/CAG and the TATF's mitigation goal when compared to the other program options. Unlike an exchange, an impact fee program would only be able to fund capital improvements, restricting the potential projects and programs that could be used as mitigation. Additionally, impact fee programs are intended to be applied to land use projects, so they could not be used to mitigate impacts from VMT-inducing transportation projects.

A mitigation bank, like an exchange, could direct funding towards operational and programmatic improvements and could be used to mitigate VMT-inducing transportation projects. However, mitigation banks have more administrative needs than exchange programs, such as having more complicated accounting requirements, and no countywide agency in San Mateo County has expressed interest in managing a program with that level of complexity.

Recommendation 2: Use a mitigation exchange for the local model program, with additional guidance on how to create a VMT-based impact fee program as an alternative program option. For either option, local agencies should review the list of example mitigation actions in **Chapter 5** of this study to help determine if they want to update their existing transportation impact fees, establish a new impact fee that focuses on VMT mitigation, or create a supplemental mitigation exchange. A mitigation exchange program would provide local agencies with the most flexibility of any of the options and an exchange could fund operational and programmatic mitigation measures. Impact fee funds could only go towards capital improvements, such as bicycle and pedestrian infrastructure.

Finally, updating an existing impact fee program to be used for VMT/GHG mitigation requires more review and local analysis than adopting the study's template impact fee program. Local agencies that plan to update an existing fee program would need to consider the relationship between their existing lists of capital improvement projects and this study's list of representative mitigation actions.

5. VMT/GHG Mitigation Actions

This chapter includes the list of this study's VMT/GHG mitigation actions, and it documents the technical analysis approach used to quantify the amount of VMT reduced by these projects and programs. These mitigation actions were selected based on input from C/CAG, the TATF, and CBOs, considering the program requirements presented in **Chapter 4**. Additional potential mitigation actions that the study team considered but did not recommend for inclusion are described in **Appendix E**. This analysis addresses the nexus between the Program's VMT/GHG-reducing actions and CEQA's requirements for off-site mitigation. This chapter provides quantification methods for each mitigation action, lists the key assumptions used in these estimates, and presents implementation considerations to use these projects and program as VMT/GHG mitigation.

The study team analyzed the amount of VMT reduced by 13 mitigation actions, which included a range of improvements that require only a one-time cost as well as programs that require ongoing funding commitments. In addition to these 13 VMT-focused improvements, this study also analyzed one mitigation action, installing electric vehicle chargers, that only reduces GHG and so could not be used as VMT mitigation. **Table 9** presents the list of these mitigation actions and it provides a recommendation for the agencies that are most appropriate to implement these improvements.

Reducing VMT also lowers GHG emissions, and the 13 VMT-focused mitigation actions that were analyzed in this study also have GHG reduction benefits. This relationship is described further in **Appendix D**.

Table 9: VMT/GHG Mitigation Action Project List and Implementing Agencies

Mitigation Action	Mitigation Type	Recommended Program Scale (Local or Countywide) [1]	Likely Implementing Agency/Organization
Rail Service Frequency Expansion	Operational	Countywide	Caltrain (evaluated in this report) or BART
Local Transit Frequency, Capacity, and Reliability Enhancements	Operational	Countywide	SamTrans
Transit Priority Projects on Major Corridors	Capital	Countywide	SamTrans, SMCTA, and Caltrans
Affordable Housing	Capital/Land Use	Both	San Mateo County Department of Housing or participating Local Jurisdictions
Transit Pass Incentives	Programmatic	Both	MTC (Evaluated in this report), C/CAG, SamTrans, Caltrain, or Commute.org
Countywide E-Bike Rebate Program	Programmatic	Both	Peninsula Clean Energy
Community Based Travel Education	Programmatic	Both	Commute.org, TMA's, CBO's

Mitigation Action	Mitigation Type	Recommended Program Scale (Local or Countywide) [1]	Likely Implementing Agency/Organization
Mobility Hubs	Operational	Both	Micromobility and vehicle sharing operators
Micromobility Systems	Operational	Both	Micromobility operators
Shuttle / Microtransit Services	Operational	Both	SamTrans or Commute.org
EV Charging Facilities[2]	Capital	Both	Peninsula Clean Energy
Bicycle Infrastructure	Capital	Local	Participating Local Jurisdictions
Pedestrian Infrastructure	Capital	Local	Participating Local Jurisdictions
Parking Management and Benefit Districts	Capital	Local	Participating Local Jurisdictions

Notes:

1. C/CAG's VMT/GHG Mitigation Model Program does not preclude use of any mitigation actions for local or countywide mitigation as described in **Chapter 4**. The actions recommended for countywide mitigation would require more intensive interjurisdictional coordination and be led by regional agencies and are therefore less likely to be feasible for local land use mitigation. The actions recommended for locally led programs are those that primarily address shorter trip lengths and local travel and are within the control of local jurisdictions. However, mitigation of countywide impacts could include coordination with local jurisdictions to implement this infrastructure among a package of different mitigation actions.
2. This measure can only be used for GHG mitigation purposes. Electric vehicles reduce GHG emissions but still contribute to VMT.

Source: Fehr & Peers, 2024

5.1 Mitigation List Development and Project Selection

This study's representative projects include the expansion of existing programs, such as increasing the frequency of SamTrans bus service, and the construction of planned infrastructure projects, such as the improvements identified in C/CAG's *San Mateo County Comprehensive Bicycle and Pedestrian Plan (2021).*[22] Most of the mitigation actions that were analyzed in this study required the selection of a specific project location to properly estimate the amount of VMT they may reduce. The study team used existing local and regional planning efforts to select a location of the representative projects listed in **Table 9**, such as the potential mobility hub locations in MTC's technical assistance work and the affordable housing opportunity sites identified in local general plans. This is intended to present an example of how each mitigation action might work in a specific location; other locations could be selected and could result in different VMT reduction estimates.

Despite the selection of these representative project locations, CEQA lead agencies have the ultimate responsibility to adopt mitigation measures. Lead agencies may choose from this study's representative

[22] https://ccag.ca.gov/programs/transportation-programs/active-transportation/

mitigation actions, or they can create their own list of similar mitigation actions in their communities. Lead agencies should consider the effectiveness of the representative measures presented in this report, along with local transportation, land use, and equity priorities, when selecting future mitigation actions for locations not identified in this study.

All mitigation actions in this study can be implemented in a way to benefit equity communities so that they align with the equity and environmental justice recommendations discussed in **Chapter 3**. Community-based transportation plans are an important first step to prioritizing local mitigation actions, so that they can more effectively address the needs of these communities.

5.2 Analysis Approach

The study team used research-based VMT quantification methods from a variety of sources to estimate these VMT reductions, including from the California Air Pollution Control Officers Association's (CAPCOA) *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (CAPCOA 2021 Handbook) and CARB's Climate Investments GHG Quantification Research. The study team used data from multiple sources as inputs in these VMT reduction formulas, including existing VMT, average daily traffic (ADT) volumes, population, and travel mode share information gathered from the C/CAG/VTA travel demand model.

The study team also estimated the cost of implementing each mitigation action, including the total cost of each project. This cost information was used to estimate how expensive it is to reduce a single VMT. This metric, which is known as the cost-per-VMT reduced, shows the cost effectiveness of each mitigation measure. This cost information was either gleaned from a mitigation action's implementing agency records or they were estimated using publicly available information. The cost-per-VMT reduced for mitigation actions with one-time costs is provided as both a one-year estimate as well as the cost over the mitigation action's lifespan. Capital projects, like bike lanes, have large upfront one-time costs, but these projects can then provide years of VMT reduction benefits. In contrast, other mitigation actions analyzed require ongoing annual funding to maintain their VMT reductions. The cost estimates for all mitigation actions, except affordable housing, include a 5 percent administration fee to cover the costs of running the VMT mitigation program, and the capital improvements measures include a 20 percent markup for engineering and design costs. The affordable housing costs include design costs and administrative costs built into the estimates consistent with the County of San Mateo's Department of Housing's current programs.

5.2.1 C/CAG VMT/GHG Mitigation Action Tool

The calculations presented in this report are included in an excel-based tool that incorporates the data and formulas used for each of the 14 mitigation actions. The tool allows users to change the key assumptions, such as deciding the scope of a project and editing cost estimates or inclusion of administrative costs. The C/CAG VMT/GHG Mitigation Action Tool is intended to provide a framework to calculate the potential VMT reduction associated with each of the mitigation actions included in this study, as it is expected that certain user inputs (such as project cost and project lifespan) will change over

time. It is the responsibility of the user to verify that any user input assumptions are supported by facts and evidence, are current, and are accurate.

5.3 Capital Actions

This section provides the analysis methodology and VMT reduction results for four capital mitigation actions. These capital improvements are physical infrastructure changes, such as adding transit priority infrastructure, bicycle lanes, and upgraded pedestrian facilities. These capital improvements have higher upfront costs than other VMT mitigation strategies, but they have zero to relatively minimal ongoing costs. The calculations in this section include VMT reduction estimates calculated over a 30-year period to account for these high upfront costs. Land use projects, which are also technically capital projects, are presented separately in the Land Use section.

5.3.1 Transit Priority Projects on Major Corridors

Transit priority projects, such as bus-only lanes, transit signal priority, and transit bulbs, encourage the use of transit by reducing travel times and improving route reliability, which increases transit ridership. The representative mitigation action selected for analysis includes the installation of bus-only lanes, bus queue jumps, and bus bulbs to El Camino Real. Bus-only lanes, which can also be used by emergency vehicles, allow buses to bypass traffic and reduce travel times. Queue jump signals give buses a head-start over other traffic at traffic signals, and bus bulbs allow buses to make stops within a travel lane, reducing the need to merge in and out of traffic. This representative mitigation action, which focuses on on-street capital improvements along El Camino Real, can be combined with the separate "Local Transit Frequency, Capacity, and Reliability Enhancements" measures that focus on increasing local transit service frequency.

5.3.1.1 Equity Considerations

The CBO leaders interviewed in this study expressed support for transit enhancements. Bus transit riders in San Mateo County are more likely to be lower income than the countywide population. Improving transit service by making it faster and more reliable directly benefits these riders. SamTrans riders have an average household income of $46,507, which is almost four times lower than the San Mateo County average, and transit corridors like El Camino Real pass through multiple EFAs.[23]

5.3.1.2 Implementation Considerations

The implementation of transit priority projects, such as this representative mitigation measure on El Camino Real, requires coordination between multiple agencies and jurisdictions, such as local cities, SamTrans, SMCTA, and Caltrans. Given the scale and interagency coordination required for these types of larger infrastructure projects, this measure is more appropriate to mitigate impacts from VMT-inducing transportation projects, such as highway expansions. The high cost of these transit improvements makes it infeasible to use this action as VMT mitigation for individual development projects.

[23] Short Range Transit Plan FY 2023-2028 (2022). SamTrans. https://www.samtrans.com/media/24946/

The SamTrans *El Camino Real Bus Speed and Reliability Study (2022)*[24] presents best practices for implementation of transit priority projects along El Camino Real. Other regional implementation guidance includes MTC's Transit Priority technical assistance program[25] and San Francisco Bay Area Planning and Urban Research Association's (SPUR) report *Making Roads Work for Transit: Strategies to Accelerate Bay Area Transit Priority Treatments.*[26] This representative action's results can be used to help inform other transit priority projects in San Mateo County. However, as noted in **Appendix E**, the research behind VMT mitigation indicates that transit service improvements often have limited effectiveness at reducing VMT for low density communities; thus, the use of these projects for VMT mitigation should be focused on the more populated areas San Mateo County.

5.3.1.3 Assumptions

The study team analyzed three representative segments of El Camino Real to determine the VMT-reduction benefit of this transit priority project. These three representative segments are those identified in SamTrans' *El Camino Real Bus Speed and Reliability Study*, which proposes the transit priority segments of El Camino Real in South San Francisco, San Bruno, Millbrae, San Mateo, Belmont, and San Carlos. This representative mitigation action includes the conversion of a general-purpose travel lane into a bus-only lane and adding queue jumps and bus bulbs.

The study team also evaluated a scenario that estimates the VMT reduction benefit of a more extensive implementation of these transit priority improvements on El Camino Real, where all segments of the corridor in San Mateo County that have at least three general-purpose lanes in one direction would receive a bus lane, queue jumps, and bus bulbs.

Key assumptions used in these calculations include:

- Cost per Mile of Transit Improvements: $2.8 million
    - *Source: El Camino Real Bus Speed and Reliability Study (2022)*
    - *Includes costs for transit lanes, signal priority, queue jumps, bus bulbs, and transit shelters. This estimate does not include the costs for additional pedestrian improvements along El Camino Real, such as sidewalk gap closures, widening, or pedestrian crossing infrastructure.*

5.3.1.4 Methodology

The VMT-reduction potential of these transit priority segments was quantified using two separate methods. First, the transit travel time benefits of the transit priority improvements were quantified using CAPCOA measure T-27 *Implement Transit-Supportive Roadway Treatments.* The assumptions and variables used for this CAPCOA analysis are shown in **Table 10**. These VMT reduction benefits are only from improvements in transit travel times and reliability from any physical infrastructure. The VMT reduction from increasing bus service frequency on El Camino Real was quantified in the separate "Local Transit

[24] El Camino Real Bus Speed and Reliability Study (2022). SamTrans. https://www.samtrans.com/ECRStudy
[25] https://mtc.ca.gov/operations/transit-regional-network-management/transit-priority
[26] https://www.spur.org/sites/default/files/2023-08/SPUR_Making_Roads_Work_for_Transit.pdf

Frequency, Capacity, and Reliability Enhancements" measure. For this analysis, C/CAG Travel Demand Model Transportation Analysis Zones (TAZs) that are located within a half mile of an existing Route ECR stop were selected for this calculation's VMT and mode-share data variables.

Table 10: Transit Priority Projects on Major Corridors – Transit Reliability Benefits

CAPCOA T-27 Variable	Source
B – Percent of plan/community transit routes that receive treatments	100% - Assumes that all transit routes along the El Camino Corridor will use the bus lane
C – Percent change in transit travel time due to treatments	TRB 2007[1]
D – Elasticity of transit ridership with respect to transit travel time	TRB 2007[1]
E – Transit mode share in plan/community	C/CAG/VTA Travel Demand Model[2] – based on a selection of model transportation analysis zones (TAZs) that are within 0.5 miles of a Route ECR bus stop
F – Vehicle mode share in plan/community	C/CAG/VTA Travel Demand Model[2] – based on a selection of model transportation analysis zones (TAZs) that are within 0.5 miles of a Route ECR bus stop
G – Statewide mode shift factor	FHWA 2017b[3]
Annual VMT Reduction	***-1 * (B * C * D * E * G / F)***

Notes:
1. Transportation Research Board (TRB). 2007. Transit Cooperative Research Program Report 118: Bus Rapid Transit Practitioner's Guide. Available: https://nacto.org/docs/usdg/tcrp118brt_practitioners_kittleson.pdf
2. Mode share data from C/CAG/VTA Travel Demand Model 2015 baseline at the TAZ scale.
3. Federal Highway Administration (FHWA). 2017b. National Household Travel Survey–2017 Table Designer. Average Vehicle Occupancy by HHSTFIPS. Available: https://nhts.ornl.gov/.

Source: Fehr & Peers, 2024

Second, converting a general-purpose lane on El Camino Real to a transit-only lane reduces roadway automobile capacity and makes the street less attractive to drivers. This dynamic is the inverse of the induced demand effects seen from capacity increases, such as adding a new lane to an existing roadway. A lane reduction would encourage drivers to rethink their trips and would decrease VMT. The study team used the California Induced Travel Calculator to calculate the expected VMT reduction benefit of removing a travel lane on El Camino Real.[27] The research behind the Induced Travel Calculator indicates that the removal of traffic lanes has the net effect of reducing total VMT, although it may increase traffic travel times or congestion along the corridor. These results, which are displayed in **Table 11**, are based on a 2016 analysis year and are for a Class 3 or 4 road facility.

These results are provided as planning level estimates to demonstrate potential VMT mitigation measures in the county. **There is currently no approved plan to convert a general-purpose lane on El Camino Real, and any effort to convert a travel lane would require extensive public and stakeholder**

[27] California Induced Travel Calculator, National Center of Sustainable Transportation, University of California, Davis. https://travelcalculator.ncst.ucdavis.edu/about.html

outreach and coordination by SamTrans, Caltrans, and cities along the roadway. To account for this uncertainty, the C/CAG VMT/GHG Mitigation Action Tool allows users to select if this lane conversion is part of the project, and if the VMT reductions from the lane conversion should be included in these VMT reduction estimates.

Table 11: Transit Priority Projects on Major Corridors - Lane Conversion Benefits

Scenario	Segment Length (miles)	Total Lane Miles Reduced	VMT Reduced per Year[1]
South San Francisco	2.8	2.7	-11,200,000
San Bruno & Millbrae	3.5	3.5	-14,800,000
San Mateo, Belmont, and San Carlos	4.4	3.2	-13,200,000
Entire Corridor (with 3+ general purpose lanes)	15.2	13.3	-55,900,000

Notes:
1. California Induced Travel Calculator, National Center of Sustainable Transportation, University of California, Davis.

Source: Fehr & Peers, 2024

The VMT reductions from this automobile lane capacity reduction were then combined with the VMT reductions from the transit lane's bus travel time and reliability benefits. **Table 12** shows the combined VMT benefit of these transit lanes, by each segment. Planning level cost estimates included in the SamTrans El Camino Real study were used to calculate each segment's capital costs.

Table 12: Transit Priority Projects on Major Corridors - Combined VMT Reduction

Scenario	VMT Reduction (Transit Benefit)	VMT Reduction (Lane Reduction)	VMT Reduction (Combined Total)	Segment Capital Costs[1]
South San Francisco	-437,450	-11,200,000	-11,637,450	$3.4M
San Bruno & Millbrae	-565,688	-14,800,000	-15,365,688	$4.4M
San Mateo, Belmont, and San Carlos	-1,132,978	-13,200,000	-14,332,978	$4.7M
Entire Corridor (with 3+ general purpose lanes)	-3,888,961	-55,900,000	-59,788,961	$17.8M

Notes:
1. Costs include per mile cost estimates for installing transit lanes and transit signal priority improvements on El Camino Real. This cost does not include the costs of bus bulbs/curb extensions or pedestrian enhancements. Source: *El Camino Real Bus Speed and Reliability Study (2022)* SamTrans.

Source: Fehr & Peers, 2024

5.3.2 Bicycle Infrastructure

Enhancing bicycle infrastructure helps to provide safe and comfortable pathways for people bicycling to and from nearby destinations or transit stops, allowing people to replace vehicle trips with bicycling or transit trips. This mitigation action would fund various Class I, II, and IV bicycle infrastructure projects in locations throughout San Mateo County. Five representative bicycle infrastructure projects, each in different mobility zones, were selected from the *C/CAG San Mateo County Comprehensive Bicycle and Pedestrian Plan* to demonstrate the effectiveness of this mitigation action in different location contexts.

The methodology presented in this section, and the calculations available in the C/CAG VMT/GHG Mitigation Tool, could be used for any bicycle infrastructure project within the county. Local agencies should consider the location of their VMT impacts and their equity goals when creating a list of bicycle infrastructure projects that could be used as mitigation actions.

5.3.2.1 Equity Considerations

Bicycle and pedestrian infrastructure projects were some of the highest supported measures by the EFA CBO leaders. Approximately 5 percent of San Mateo County households do not own a car and 29 percent of households only have access to a single automobile.[28] These households rely on biking, walking, and transit to get around the region. Adding new or improved bicycle facilities, which could be directed towards EFA communities, makes it safer to use a bicycle to commute and meet other travel needs for these residents, while providing a sustainable transportation option for the entire community. To ensure that these facilities meet the needs of EFA communities and do not result in disparate impacts when reallocating roadway space, lead agencies should select mitigation actions from community-based transportation plans or other local plans developed collaboratively with the community as described in **Appendix B**.

5.3.2.2 Implementation Considerations

These bicycle infrastructure projects, not including any improvements to state highways, would be installed on roadways that are owned and managed by local jurisdictions. This reduces the need for a local city to coordinate with other jurisdictions to use bicycle infrastructure as VMT mitigation. Developers building these bicycle facilities benefit their residents, their commercial tenants, and the local community, and they can help fulfill local requirements, such as those required by C/CAG's TDM program, to improve local bicycle facilities.[29] The VMT reduction benefits of building the required facilities (per local ordinance or C/CAG's TDM program) should be accounted for in the VMT mitigation calculation.

Many local jurisdictions maintain local bicycle plans that include implementation guidance based on local community feedback to ensure the selected mitigation actions reflect local community priorities. C/CAG's

[28] 2021 C/CAG San Mateo County Comprehensive Bicycle and Pedestrian Plan. C/CAG. https://ccag.ca.gov/wp-content/uploads/2021/05/6_A1_San-Mateo-County-Comprehensive-Bicycle-and-Pedestrian-Plan-Update-Final-Plan.pdf

[29] Measure 9 to Design Streets to Encourage Bike/Ped Access: https://ccagtdm.org/measures/design-streets-to-encourage-bike-ped-access/

San Mateo County Comprehensive Bicycle and Pedestrian Plan and MTC's *Regional Active Transportation Plan* also provide lead agencies with implementation guidance.[30]

5.3.2.3 Assumptions

The study team used cost estimates from the *C/CAG San Mateo County Bicycle and Pedestrian Plan* to estimate the cost of these representative mitigation actions. The plan, which was completed in 2021, includes per-mile planning level cost estimates for bicycle infrastructure projects. The plan also includes an annual cost escalation assumption of 5 percent per year, which was used to update these 2021 costs into 2024 dollars. Key assumptions used in these calculations include:

- Cost per mile of bicycle improvements by facility class (escalated to 2024 dollars):
  - Class I: $2.5 million per mile
  - Class II: $104,000 per mile
  - Class IV: $3.7 million per mile

5.3.2.4 Methodology

The study team used one of the quantification approaches listed in CARB's *Quantifying Reductions in Vehicle Miles Traveled from New Bike Paths, Lanes, and Cycle Tracks* technical documentation to calculate the VMT reduction potential of these bicycle improvements.[31] The assumptions and variables used in this CARB formula are displayed in **Table 13**.

The VMT reduction inputs and results from each bicycle infrastructure project are shown in **Table 14.** The length of each bicycle facility was calculated using GIS software, and average daily traffic estimates were collected from the C/CAG travel demand model. The CARB methodology does not require the use of any location-specific information (such as nearby travel demand model transportation analysis zones) for these calculations.

The facility type variable is based on both the planned and existing bicycle infrastructure on each street. Converting an existing Class II bike lane to a Class IV bikeway, for example, is expected to have a smaller VMT reduction than adding a new Class IV bikeway on a street without existing bicycle facilities. The activity center credit variable is based on the number of key destinations within a quarter- or half-mile radius of the planned improvement, which includes destinations such as grocery stores, schools, pharmacies, and places of worship. Per CARB's methodology, a higher score is given to destinations within a quarter mile of a facility, although a half-mile radius should be used if it would result in a higher score.

---

[30] https://mtc.ca.gov/funding/investment-strategies-commitments/climate-protection/regional-active-transportation-plan

[31] Quantifying Reductions in Vehicle Miles Traveled from New Bike Paths, Lanes, and Cycle Tracks. Technical Documentation, California Air Resources Board. Prepared by Jamey Volker, Susan Handy, Alissa Kendall, and Eliza Barbour. Institute of Transportation Studies, University of California, Davis. April 2019. https://ww2.arb.ca.gov/sites/default/files/auction-proceeds/bicycle_facilities_technical_041519.pdf

Table 13: Bicycle Infrastructure VMT Calculation

Variable	Source
Facility Type	C/CAG project descriptions.
Facility Length	Fehr & Peers. Based on mapping of the C/CAG project descriptions.
CARB Formula Inputs[1]	
D - Days of Use per Year	CAPCOA (Table T-19.4)[2]
ADT - Roadway Average Daily Traffic	C/CAG/VTA Travel Demand Model[3]
T – Facility Type	CARB, adjustment factor for facility type
A – Adjustment Factor	CARB, based on ADT and facility length
C – Activity Center Credit	CARB, based on number of destinations within a quarter- or half-mile radius
L – Bike Trip Length	FHWA 2017[4]
Total Annual VMT Reduction	***D * ADT * T * (A + C) * L***

Notes:
1. Volker et al., California Air Resources Board., March 2019., *Quantifying Reductions in Vehicle Miles Traveled from New Bike Paths, Lanes, and Cycle Tracks*.
2. California Air Pollution Control Officers Association (CAPCOA), December 2021, *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*.
3. ADT and VMT data from C/CAG/VTA Travel Demand Model 2015 baseline link level data.
4. Federal Highway Administration (2017). National Household Travel Survey—California Add-On.

Source: Fehr & Peers, 2024

Table 14: Bicycle Infrastructure VMT Reductions by Representative Project

Project Location[1]	Street Name	Bicycle Facility Type	Facility Length (Miles)	Annual VMT Reduction	Facility Capital Cost
Daly City and South San Francisco	Junipero Serra Blvd, Southgate Ave	Class II and Class IV[2]	4.6	-6,021	$27.3M
Daly City, Pacifica, San Bruno (Skyline Blvd)	Skyline Blvd	Class I, Class II, and Class IV	7.3	-50,101	$43.2M
East Palo Alto	Willow Rd	Class II and Class IV[2]	2.5	-29,233	$7.5M
Belmont and Redwood City	Old County Rd	Class II and Class IV[2]	3.8	-1,777	$35M
San Carlos	Alameda De Las Pulgas	Class II	5.2	-6,141	$3.5M

Notes:
1. Coastside projects could be calculated in a similar manner to these bayside projects. Plans to add Class I and Class II facilities along State Highway 1, for example, are proposed in the *C/CAG San Mateo County Comprehensive Bicycle and Pedestrian Plan*. The effectiveness of these projects would depend on the context of individual route segments, given the benefit that providing facilities adjacent to existing destinations within incorporated areas would reduce more VMT than facilities in rural areas of the coast.
2. Includes an upgrade of an existing Class II facility to Class IV bikeway.

Source: Fehr & Peers, 2024

In addition to this study's six representative projects, the C/CAG VMT/GHG Mitigation Action Tool includes the option to quantify the VMT reduction potential of other San Mateo County bicycle improvements. The tool allows users to estimate the VMT reductions from other bicycle infrastructure projects within their community. The tool includes a step-by-step guide on the data and analysis needed for these calculations.

5.3.3 Pedestrian Infrastructure

Enhancing pedestrian infrastructure helps to provide a safer and more comfortable pedestrian environment for people walking to nearby destinations or transit stops, allowing people to replace vehicle trips with walking or transit trips. This mitigation action would fund the installation of pedestrian improvements, such as adding pedestrian crossing upgrades, adding pedestrian warning beacons, and closing sidewalk gaps.

5.3.3.1 Equity Considerations

Bicycle and pedestrian infrastructure projects were some of the highest supported measures by the EFA CBO leaders. San Mateo County residents complete about 11 percent of their trips on foot. Pedestrian-focused improvements would improve crosswalks and sidewalks, improving safety and the pedestrian experience in these areas. These improvements could be directed towards EFAs as determined through community-based transportation plans and the pedestrian-focused areas identified in the Countywide Bicycle and Pedestrian Plan.[32]

5.3.3.2 Implementation Considerations

These pedestrian improvements, except for those on state highways, would be installed on roadways that are owned and managed by local jurisdictions. This reduces the need for local agencies, such as cities, to coordinate with other jurisdictions when using pedestrian improvements as a VMT mitigation measure. Developers adding these pedestrian enhancements benefit their residents, their commercial tenants, and the local community, and their installation can help fulfill local requirements, such as those required by C/CAG's TDM program, to improve pedestrian conditions.[33]

Many local jurisdictions maintain local pedestrian plans that include implementation guidance based on local community feedback to ensure the selected mitigation actions reflect local community priorities. C/CAG's *San Mateo County Comprehensive Bicycle and Pedestrian Plan* and MTC's *Regional Active Transportation Plan* also provide implementation guidance.[34]

[32] Draft 2021 C/CAG San Mateo County Comprehensive Bicycle and Pedestrian Plan. C/CAG.

[33] Measure 9 to Design Streets to Encourage Bike/Ped Access: https://ccagtdm.org/measures/design-streets-to-encourage-bike-ped-access/

[34] https://mtc.ca.gov/funding/investment-strategies-commitments/climate-protection/regional-active-transportation-plan

5.3.3.3 Assumptions

These estimates were calculated using a method included in CARB's *Quantifying Reductions in Vehicle Miles Traveled from New Pedestrian Facilities* technical documentation, which does not use any geographic data in its calculations.[35] The study team did not select any specific pedestrian safety projects for this analysis. This mitigation action's calculations are based on the installation of ten pedestrian upgrades in unspecified areas of the county. Key assumptions used in these calculations include:

- Cost per Improvement: $243,101
    - *Source: Cost of pedestrian hybrid beacon in the 2021 C/CAG San Mateo County Bicycle and Pedestrian Plan (with 5 percent annual cost escalation applied)*

5.3.3.4 Methodology

The VMT reduction potential of these pedestrian improvements were quantified using one of the quantification approaches in CARB's technical documentation. This methodology estimates the VMT benefits of installing spot location pedestrian safety features, such as pedestrian hybrid beacons. The assumptions and variables used in this CARB formula are displayed in **Table 15.**

Other quantification methods that lead agencies could use for these estimates include the CAPCOA Handbook, which includes a formula to estimate VMT reductions from sidewalk gap closures.[36] This approach requires inputs related to the existing sidewalk length in a community (defined as an approximately half-mile radius) and the amount of new sidewalk that is proposed to fix the gap closure.

[35] Quantifying Reductions in Vehicle Miles Traveled from New Pedestrian Facilities. Technical Documentation, California Air Resources Board. Prepared by Jamey Volker, Susan Handy, Alissa Kendall, and Eliza Barbour. Institute of Transportation Studies, University of California, Davis. April 2019. https://ww2.arb.ca.gov/sites/default/files/auction-proceeds/pedestrian_facilities_technical_041519.pdf

[36] https://www.caleemod.com/documents/handbook/ch_3_transportation/measure_t-18.pdf

Table 15: Pedestrian Infrastructure VMT Calculation

Variable	Source
CARB Formula Inputs	
D - Days of Use per Year	CAPCOA (Table T-19.4)[1]
PC – Average Daily Pedestrian Count	Fehr & Peers[2]
GF – Growth Factor	CARB, based on expected increase in pedestrian counts due to installation of the project
AS – Automobile Substitution Rate	CARB, based on expected rate of pedestrians who switched from driving due to installation of the project
C – Carpool Factor	Caltrans 2016[3]
T – Trip Type Factor	CARB, based on recreational walking trips that are not likely to replace automobile trips
L – Walking Trip Length (Miles)	California Household Travel Survey[4]
Total Annual VMT Reduction	***D * PC * S * GF * AS * C * T * L***

Notes:

1. California Air Pollution Control Officers Association (CAPCOA), December 2021, *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*.
2. Based on collected pedestrian counts from screenlines or nearby intersections.
3. California Department of Transportation. (2016). *Vehicle Operation Cost Parameters* (2016 Current Dollar Value). Retrieved from http://www.dot.ca.gov/hq/tpp/offices/eab/benefit_cost/LCBCAeconomic_parameters.html
4. California Department of Transportation. (2013). 2010-2012 California Household Travel Survey Final Report, (June), 1–349.

Source: Fehr & Peers, 2024

The study's ten hypothetical pedestrian crossing improvements were analyzed to demonstrate this measure's effectiveness at reducing VMT. The study team assumed that these pedestrian facilities would have an average level of pedestrian activity for a medium density or transit-oriented community. The VMT reduction from these ten hypothetical improvements is shown in **Table 16**. Local agencies can use the C/CAG VMT/GHG Mitigation Tool to calculate the VMT reductions from similar projects in their communities.

Table 16: Representative Pedestrian Improvements VMT Reduction

Number of Pedestrian Improvements	Average Pedestrian Hourly Count (at each improvement location)	Annual VMT Reduction	Capital Cost of Improvements[1]
10	20[2]	-646	$3,038,766

Notes:

1. Based on a cost estimate of $243,101 per pedestrian hybrid beacon in the 2021 C/CAG San Mateo County Comprehensive Bicycle and Pedestrian Plan, including a 5% per year cost escalation. Retrieved from https://ccag.ca.gov/wp-content/uploads/2021/06/San-Mateo-County-Comprehensive-Bicycle-and-Pedestrian-Plan-Update-Final-Plan.pdf
2. 20 pedestrians per hour at a crossing location is representative of a transit-oriented environment or community with medium density and moderate activity levels. Less dense and more suburban locations would be less effective at VMT reduction, while areas with higher pedestrian activity levels would be more effective.

Source: Fehr & Peers, 2024

5.3.4 Parking Management and Benefit Districts

Managing parking and curb space through pricing increases the total cost of driving to a location, which provides an incentive to shift from vehicle travel to other modes. Curb space is also a limited resource in high demand areas, such as local downtowns. Using paid parking better managed this scarce commodity by encouraging more turnover of parking spaces, which increases the availability of public curb space to meet parking and loading needs. This measure would fund parking management infrastructure in downtown districts and other commercial areas with high parking demand, including the installation of meters or other parking payment collection methods. Revenues collected from those meters could be retained by each city and do not need to be used for mitigation purposes.

5.3.4.1 Equity Considerations

Parking management and parking pricing were among the least supported mitigation actions of those presented to participants of this project's EFA interviews. The primary equity concern raised in these CBO interviews included the reduced affordability of parking for lower income residents and employees with expanded paid parking districts. The CBO representatives also shared concerns about how parking funds would be spent and if EFAs participants would be adequately represented on decision-making bodies implementing/administering the program.

The Equity and Environmental Justice recommendations discussed in **Chapter 3** highlight several avenues to address such concerns and align this mitigation action with equity. First, this measure was restructured to be focused on parking benefit districts after receiving feedback from the CBOs. Parking benefit districts are a proven strategy that can be tailored around providing benefits to low-income populations by reducing VMT and offering parking credits, discounts, or other affordability strategies to maintain parking access for these communities. Secondly, revenues collected by these parking programs should be directed towards equity-focused community investments in the priced parking area. These community investments could include streetscape improvements, shuttles services, and other measures identified by local EFA voices, especially service workers, students, and low-income residents. Finally, any board or advisory body established or identified to make or recommend adjustments to the program over time should include EFA leaders.

5.3.4.2 Implementation Considerations

This parking management infrastructure would be installed on roadways owned and managed by local agencies. This reduces the need for local agencies to coordinate with other jurisdictions when using parking benefit districts as a VMT mitigation measure.

Implementing a parking or curb management program would be consistent with MTC's Transit-Oriented Communities (TOC) policy.[37] MTC's Parking and Curb Management technical assistance resources provide implementation additional guidance and include examples for lead agencies to consider.[38] Other technical

[37] https://mtc.ca.gov/planning/land-use/transit-oriented-communities-toc-policy
[38] https://mtc.ca.gov/planning/transportation/driving-congestion-environment/parking-curb-management

resources include the Parking Reform Network's guide to Parking Benefit Districts,[39] Redwood City's parking management program,[40] and academic research from national parking expert Donald Shoup.[41, 42]

5.3.4.3 Assumptions

Three downtown areas in San Mateo County — San Mateo, Redwood City, and Burlingame — were analyzed to demonstrate the effectiveness of parking management as a VMT mitigation. These jurisdictions were selected as representative areas, and none of the cities have developed plans to increase the price of parking or to expand any existing paid parking areas. San Mateo and Menlo Park are launching comprehensive parking studies and policy update efforts that will include changes to parking policies across the board, from zoning to pricing and management. The methodology presented for this mitigation action could be applied to any local jurisdiction, and it could be adjusted to reflect local priorities and parking demand.

Key assumptions used in these demonstration calculations include:

- Cost per Parking Meter or Kiosk: $7,000 – 11,000
  - *Source: Fehr & Peers*
- Percent of Vehicles Parking On-Street in Parking Area: 50 percent
  - *Source: Fehr & Peers example assumption. This assumption should be updated once/if a candidate parking program area is selected.*
- Initial Parking Price: $1.00 per hour
  - *Source: Fehr & Peers example assumption. This assumption should be updated once/if a candidate parking program area is selected. A value of $0 should be used in areas that currently have unpaid parking spaces.*
- Proposed Parking Price: $2.00 per hour
  - *Source: Fehr & Peers example assumption. This assumption should be changed once/if a candidate parking program area is selected.*

5.3.4.4 Methodology

The VMT reduction potential of the parking management infrastructure was quantified using CAPCOA strategy T-24 *Implement Market Price Public Parking (On-Street)*. The study team used the downtown boundaries shown in the downtown area plans to estimate the boundary of each parking benefit district. This boundary was used to select the appropriate C/CAG Travel Demand Model TAZs for these calculations. The assumptions and variables used in this CARB formula are displayed in **Table 17.**

---

[39] https://parkingreform.org/playbook/pbd/

[40] Downtown Parking webpage for City of Redwood City's parking benefit district and 2009 presentation on setting up a parking benefit district (The Forum at Redwood City (ca.gov)).

[41] https://journals.sagepub.com/doi/10.1177/0739456X221141317#body-ref-bibr55-0739456X221141317

[42] https://www.youtube.com/watch?v=BstOH51sA8E&t=1s

Table 17: Parking Management and Benefit District VMT Calculation

CAPCOA T-24 Variable	Source
B – VMT in priced area without measure	C/CAG/VTA Travel Demand Model[1]
C – VMT in plan/community without measure	C/CAG/VTA Travel Demand Model[2]
D – Proposed parking price	Fehr & Peers Assumption
E – Initial parking price	Current parking price in downtown areas, use a $0 value for areas where parking is currently unpaid.
F – Default percentage of trips parking on street	Fehr & Peers Assumption[3]
G – Elasticity of parking demand with respect to price	Pierce and Shoup 2013[4]. Constant variable
H – Ratio of VMT to vehicle trips	CARB. Constant variable
Total Annual VMT Reduction	***(B/C) * (D-E/E) * F * G * H***

Notes:

1. ADT and VMT data from C/CAG/VTA Travel Demand Model 2015 baseline link level data. VMT was collected for TAZs in downtown San Mateo, Redwood City, and Burlingame.
2. Per CAPCOA, B – VMT in priced area without measure is equal to C – VMT in plan/community without measure when an entire business district, such as a downtown, is being analyzed.
3. Per CAPCOA, this percentage should be based on field observations in the paid parking area. These observations would be used to estimate the total number of off-street and on-street parking spaces that are occupied.
4. Pierce, G., & Shoup, D. (2013). Getting the Prices Right: An Evaluation of Pricing Parking by Demand in San Francisco. Journal of the American Planning Association, 79(1), 67–81. https://doi.org/10.1080/01944363.2013.787307.

Source: Fehr & Peers, 2024

The VMT reduction from these three representative downtown areas is shown in **Table 18**. These results do not include VMT reduction associated with any parking benefit district investments, such as a new shuttle service that is paid for with parking fees. This mitigation action's cost estimate is based on a quick review of the number of block faces in each downtown area, as each block face is expected to need at least one parking payment kiosk.

Table 18: Parking Management and Benefit District VMT Reductions by Representative Project

Project Location	Current Parking Price *(assumption)*	Proposed Parking Price *(assumption)*	Percent of Vehicles Parking On-Street *(assumption)*	Annual VMT Reduction	Parking System Costs
Downtown San Mateo	$1.00	$2.00	50%	-41,455,159	$4.9M
Downtown Redwood City	$1.00	$2.00	50%	-34,129,048	$3.3M
Downtown Burlingame	$1.00	$2.00	50%	-32,803,744	$2.5M

Source: Fehr & Peers, 2024

5.4 Programmatic Actions

This section includes three programmatic mitigation actions that fund transportation subsidies and education programs. These programs, which would target San Mateo County residents and employees, include transit pass discounts, e-bike rebates, and community-based travel education. These measures require ongoing annual funding to be used as VMT mitigation, and therefore agencies should consider the lifespan costs of these programs when using them as VMT mitigation actions. Unlike capital improvements, which require an engineering design process for each individual infrastructure project, these programmatic actions scale easily with increased funding, although there is a ceiling on how many residents would realistically want to participate in one of these programs.

5.4.1 Transit Pass Incentives

Reducing the cost of riding transit by lowering fares or providing discounts improves the competitiveness of transit as a transportation option over driving, which increases ridership. This mitigation action could direct funding towards any existing transit pass subsidy programs, such as Clipper Start, Caltrain GoPass, and the SamTrans Way2Go pass.

As a representative measure, this study estimated the VMT reduction benefit of expanding the Clipper Start program in San Mateo County. The Clipper Start program, which is managed by MTC, gives participants up to a 50 percent discount on transit fares. Participants must have a household income that is at or below 200 percent of the Federal Poverty Level to be eligible for this program.

5.4.1.1 Equity Considerations

Providing transit subsidies to riders reduces the cost burden of transportation for these households. Transit riders in San Mateo County have lower household incomes than the average San Mateo County resident, and these incentive programs can be further directed towards lower income households through existing subsidy programs, such as Clipper Start.[43] Clipper Start uses a household income limit of 200 percent or below of the Federal Poverty Level to be eligible for the program. Riders can submit their tax return, their CalFresh card, Medi-Cal card, Muni Lifeline card, or a county benefit eligibility letter to prove their eligibility.[44]

5.4.1.2 Implementation Considerations

The CAPCOA 2021 Handbook provides the following implementation guidance that lead agencies should consider related to transit pass distribution:

> The recipients of transit pass subsidies "should be accessible either within 1 mile of high-quality transit service (rail or bus with headways of less than 15 minutes), 0.5 mile of local or less frequent transit service, or along a designated shuttle route providing last-mile connections to rail service.

[43] Short Range Transit Plan FY 2023-2028 (2022). SamTrans.

[44] Clipper Start Frequently Asked Questions. Metropolitan Transportation Commission (MTC). https://www.clipperstartcard.com/s/faqs

> If a well-established bikeshare service (Measure T-22-A) is available, the site may be located up to 2 miles from a high-quality transit service. If more than one transit agency serves the site, subsidies should be provided that can be applied to each of the services available. If subsidies are applied for only one service, all variable inputs below should also pertain only to the service that is subsidized.[45]

The CAPCOA guidance provided above applies to places where transit passes are most effective at reducing VMT. Lead agencies could direct subsidized transit passes to all residents living in these transit accessible areas and use those passes as a VMT mitigation measure. Like other social benefit programs, lead agencies may also want to means-test this transit pass subsidy, only distributing passes to low-income households based on established income threshold.

Implementation of transit pass incentives would require coordination between the lead agency and the implementing agency, which would typically be a transit provider or regional agency such as SamTrans, Caltrain, C/CAG, MTC, or Commute.org. Many San Mateo County employers and residential property managers already provide transit passes to their employees and residents, which is required by C/CAG's existing TDM program, as an on-site measure.[46]

The transit pass subsidies evaluated in this study would provide off-site pass subsidies, such as giving discounts to local residents, through an existing regional program. Lead agencies could set up their own transit pass discount programs instead of using these existing regional programs, but the administrative needs of a new program would make this locally focused approach more complicated and expensive to implement.

Future project sponsors and lead agencies could apply the methodology presented within this section to expand other transit pass subsidy programs, such as C/CAG's Express Lanes Community Transportation Benefits Program.[47] MTC provides guidance on transit subsidy programs via the Lifeline Transportation Program.[48] Additional guidance on successful implementation of transit subsidies can be found Transform's 2015 report *Lifelines through Transit Passes: Best Practices in Residential Transit Pass Program,*[49] and the on-going monitoring of the Clipper BayPass program by MTC and Seamless Bay Area.[50]

[45] https://www.caleemod.com/documents/handbook/ch_3_transportation/measure_t-9.pdf
[46] Measure 6, which is required for all projects that generate more than 100 daily vehicle trips. https://ccagtdm.org/measures/transit-or-ridesharing-passes-subsidies/
[47] Community Transportation Benefits Program | San Mateo Express Lanes (101expresslanes.org)
[48] https://mtc.ca.gov/planning/transportation/access-equity-mobility/lifeline-transportation-program
[49] Based on a study of SamTrans Way2Go Pass Program. Transform, Lifelines through Transit Passes: Best Practices in Residential Transit Pass Program, Final Report, April 7, 2015.
[50] https://www.seamlessbayarea.org/blog/2024/7/24/its-amazing-its-a-big-deal-and-it-improves-your-life-a-lot-new-wave-of-baypass-enrollees-laud-the-program-baypass-extension-for-students-expected-through-2025

5.4.1.3 Assumptions

The cost estimates for this representative mitigation action are based on MTC's documentation and updates on the Clipper Start program. These quantifications are based on MTC's estimate that the Clipper Start program costs about $11 million annually, and that there are 13,800 active participants, which is about $800 per participant per year. Key assumptions used in these calculations include:

- Annual Cost per Clipper Start Participant: $800
  - *Source: MTC Resolution 4320 and MTC Blog Post*
- Amount of Transit Subsidy: 50 percent off transit fares for participants
  - *Source: Clipper Start website*
- Program Eligibility: Household income at or below 200 percent of Federal Poverty Level
  - *Source: Clipper Start website*

5.4.1.4 Methodology

The VMT reduction potential of expanding the Clipper Start program was quantified using CAPCOA strategy T-9 *Implement Subsidized or Discounted Transit Program*. The variables used for this quantification process are shown in **Table 19,** and the estimated annual VMT reduction from providing transit passes to all people in San Mateo County with a household income at or below 200 percent of the Federal Poverty Line, and its associated costs, are shown in **Table 20**.

Table 19: Transit Pass Incentives – Clipper Start/Bay Pass

Variable[1]	Source
B – Average transit fare without subsidy	Fehr & Peers. Based on the cost of a regular fare monthly Clipper Start/Bay Pass
C – Subsidy amount	Assumes that the VMT/GHG model mitigation program covers 50% of pass expenses, this assumption can be changed based on the specifics of the selected transit pass program.
D – Percent of residents eligible for subsidy	Assumes that all residents within a half-mile radius of transit are eligible for the transit subsidy
E – Percent of project-generated VMT from residents	CAPCOA input for mixed use development projects. Does not apply in this program, as all residents within the half-mile area would be eligible[1]
F – Transit mode share of all trips	C/CAG/VTA Travel Demand Model[2]
G – Elasticity of transit boardings with respect to cost	Taylor et al. 2008[3]. Constant variable
H – Percent of transit trips that would otherwise be made in a vehicle	Handy & Boarnet 2013[4]. Constant variable
I – Conversion factor of vehicle trips to VMT	CAPCOA assumption. Constant variable
Annual VMT Reduction	***((C / B) * G * D * E * F * H * I)***

Notes:
1. California Air Pollution Control Officers Association (CAPCOA), December 2021, *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*.
2. ADT and VMT data from C/CAG/VTA Travel Demand Model 2015 baseline data.
3. Taylor, B., D. Miller, H. Iseki, and C. Fink. 2008. *Nature and/or Nurture? Analyzing the Determinants of Transit Ridership Across US Urbanized Areas*. Transportation Research Part A: Policy and Practice, 43(1), 60-77
4. Handy, L. and S. Boarnet. 2013. *Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions.*

Source: Fehr & Peers, 2024

Table 20: Transit Pass Incentives VMT Reductions – Countywide Implementation

Cost of Annual Transit Pass Per Person[1]	Total Population Receiving Passes[2]	Annual VMT Reduction[3]	Annual Mitigation Action Cost	Lifespan Mitigation Action Cost[4]
$800	141,101	-1,663,589	$59.2M	$1.77B

Notes:
1. Cost per participant is based on MTC's estimated program subsidy per year (from MTC Resolution #4320 – about $11 million annually) and the VMT/GHG model mitigation program's estimated number of active participants (13,800). Retrieved from https://mtc.ca.gov/sites/default/files/documents/2021-06/RES-4320_approved.pdf and https://blog.bayareametro.gov/posts/clipperr-start-pilot-extended-through-june-30-2025
2. Eligible population is based on Clipper Start's program eligibility criteria of a gross household income that is at or below 200% of the Federal Poverty Level. Approximately 19% of San Mateo County residents would be eligible, per the Southeast San Mateo County Community-Based Transportation Plan. Retrieved from https://ccag.ca.gov/wp-content/uploads/2023/07/5.1-A3-SoutheastSanMateo_CBTP_2-9-2023_FINAL-1.pdf
3. This reduction assumes that 50% of transit expenses would be covered by Clipper Start.
4. Assumes that program would be funded 30 years.

Source: Fehr & Peers, 2024

5.4.2 E-Bike Rebate Program

Reducing the out-of-pocket cost of purchasing an e-bike improves the competitiveness of bicycling and reduces the need to drive. This mitigation action would fund multiple rounds of e-bike rebates that would be distributed to San Mateo County residents. These rebates would allow participants to purchase e-bikes and would partially reimburse them for those purchases.

5.4.2.1 Equity Considerations

E-bike rebate programs did not receive high levels of support in this study's CBO interviews. The EFA representatives highlighted that up-front discounts are preferred over rebate programs, as it can be difficult for lower-income households to provide the upfront costs of purchasing an e-bike. These e-bike subsidy programs could prioritize lower-income households when distributing funding. For example, the state's California E-Bike Incentive Project directs e-bike subsidies towards households that are at or below 300 percent of the Federal Poverty Level.[51] This state program provides point-of-sale discounts at authorized retailers, rather than rebates, for eligible purchasers.

5.4.2.2 Implementation Considerations

There are several existing e-bike rebate programs in San Mateo County, including Peninsula Clean Energy's *Bikes for Everyone Program*[52] and CARB's *California E-Bike Incentive Project*.[53] Both programs target low-income residents through $1,000 to $2,000 rebates that can be applied towards the purchase or lease of an e-bike. Implementation of e-bike rebates as a mitigation action would typically require coordination between the lead agency and the organization administering e-bike rebate programs, such as Peninsula Clean Energy. Lead agencies could also set up their own e-bike rebate incentive program and use it to mitigate VMT impacts, but the administrative needs of a new program would make this locally focused approach more complicated and expensive to implement.

E-bikes have a limited lifespan, and the bikes purchased through a single round of e-bike rebates are unlikely to be used for a long enough period to be used as VMT mitigation. Therefore, an e-bike rebate program would need multiple cycles of rebates to maintain year-over-year VMT reduction benefits.

5.4.2.3 Assumptions

This mitigation action's cost estimates are based on the cost of Peninsula Clean Energy's existing *E-Bikes for Everyone Program*, which distributes rebates up to $1,000 per participant. Key assumptions used in these calculations include:

- Cost per E-Bike Rebate: $1,000
    - *Source: Bikes for Everyone Program, Peninsula Clean Energy*

[51] E-Bike Incentive Project Eligibility. California E-Bike Incentive Project. https://ebikeincentives.org/eligibility/#
[52] https://www.peninsulacleanenergy.com/ebikes/
[53] https://ww2.arb.ca.gov/our-work/programs/california-e-bike-incentive-project

- Number of E-Rebates: 5,000
  - *Source: Fehr & Peers example, this could be tailored to mitigation needs*
- Bicycle Lifespan: 7 Years
  - *Source: Fehr & Peers assumption, can be edited if additional information is available*
- Program Lifespan: 30 Years
  - *Source: Fehr & Peers assumption that can be adjusted if additional information is available. This assumes that four cycles of rebates would need to be distributed to residents, if bikes have a 7-year lifespan*

5.4.2.4 Methodology

This mitigation action uses an equation developed using data gathered on three e-bike rebate pilot programs in Northern California, including one administered by Peninsula Clean Energy. The variables used for this quantification process are cycles is shown in shown in **Table 21**. The estimated annual VMT reduction from providing 5,000 e-bike rebates to San Mateo County residents over four distribution **Table 22**.

Table 21: E-Bike Rebate Program VMT Calculation

Variable	Source
Daily miles traveled by San Mateo County Residents	C/CAG/VTA Travel Demand Model[1]
Daily miles traveled by participants via e-bike	UC Davis, National Center for Sustainable Transportation [2]
Proportion of trips diverted from vehicles	Assumption, based on C/CAG/VTA Travel Demand Model
Daily VMT Reduction per Rebate	***Daily miles traveled by San Mateo County Residents * Daily miles traveled by participants via e-bike * Proportion of trips diverted from vehicles***
Number of Bikes	C/CAG Assumption
Weather adjustment	CAPCOA (Table T-19.4)[3]
Daily VMT per e-bike voucher (adjustment)	Constant
Total Annual VMT Reduction	***Daily VMT reduction potential * Weather adjustment***

Notes:

1. ADT and VMT data from C/CAG/VTA Travel Demand Model 2015 baseline link level data.
2. Johnson, N., Fitch-Polse, D., & Handy, S. (2023). Impacts of E-bike Ownership on Travel Behavior: Evidence from three Northern California rebate programs. UC Davis: National Center for Sustainable Transportation. http://dx.doi.org/10.7922/G2BK19PB Retrieved from https://escholarship.org/uc/item/5kb4b8jx.
3. California Air Pollution Control Officers Association (CAPCOA), December 2021, Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity.

Source: Fehr & Peers, 2024

Table 22: E-Bike Rebate Program VMT Calculation

Number of E-Bike Rebates per Cycle[1]	Program Cost per E-Bike Rebate[2]	Total Rebates Distributed	Annual VMT Reduction	Annual Mitigation Action Cost	Lifespan Mitigation Action Cost[3]
5,000	$1,000	20,000	-1,270,164	$666,667	$20M

Notes:

1. Fehr & Peers assumption for demonstration purposes. The cost per VMT reduction would remain the same no matter the size, so this measure could be scaled as large or small as needed for the mitigation.
2. Peninsula Clean Energy's maximum e-bike rebate. Retrieved from https://www.peninsulacleanenergy.com/ebikes/
3. Assumes that program will be funded for 30 years.

Source: Fehr & Peers, 2024

5.4.3 Community-Based Travel Education

Community-based travel education is a residential-based outreach approach that provides households with customized information, incentives, and support to encourage the use of non-automobile transportation modes. This mitigation action is like existing San Mateo County employer-based commute-trip reduction programs, but with a focus on targeting resident non-work travel needs. Community-based travel education involves teams of trained travel advisors visiting households in a target area, having tailored conversations to learn their travel needs, and informing residents about their various transportation options for commute and non-commute trips (e.g., shopping, school, heath, recreation, etc.). This action does not include discounts for those transportation modes, although it could be combined with the separate "Transit Pass Incentive" and "E-Bike Rebate Program" mitigation actions.

5.4.3.1 Equity Considerations

Community-based travel education programs are typically designed to meet the needs of low- income residents and EFA communities. Any materials and sessions provided as a part of a community-based travel education program should be culturally competent, accessible, and translated to ensure successful community-driven participation. Some innovative travel education programs hire local residents who are both transit experts and trusted ambassadors to the community, to provide these education sessions. As recommended in MTC's Mobility Hub playbook, an outreach and engagement strategy is most effective if meaningful financial incentives are given to program participants to reduce financial barriers to these alternative transportation modes.[54]

5.4.3.2 Implementation Considerations

Implementation of community-based travel education programs typically requires coordination between a local city and a third-party, such as a CBO, to identify target populations and to provide transportation

[54] Bay Area Regional Mobility Hubs: Mobility Hub Implementation Playbook. Metropolitan Transportation Commission (MTC). April 2021. https://mtc.ca.gov/sites/default/files/MTC%20Mobility%20Hub%20Implementation%20Playbook_4-30-21.pdf

education sessions. This could include partnering with an affordable housing provider or community-based organization that specializes in connecting with target populations.

There are a range of community-based or employer-based travel education programs in San Mateo County that are administered by local or regional agencies, such as Commute.org, and transportation management associations (TMA), such as those required by C/CAG's TDM program.[55] Lead agencies could set up their own community-based travel education program instead of using one of these existing programs, but the administrative needs of a new program would make this locally focused approach more complicated and expensive to implement.

5.4.3.3 Assumptions

The variables that are necessary to quantify this measure include the geographic scope of the community-based travel education program, such as cities that are participating in the VMT/GHG model mitigation program, and the percentage of households targeted by the community travel education efforts. Key assumptions used to estimate the effectiveness of this representative mitigation action include:

- Percent of Community households that are targeted by community travel education: 10 percent
  - *Source: Fehr & Peers review of typical programs, can be tailored to mitigation needs*
- Cost of Providing Community Based Travel Planning: $75 per household
  - *Source: Fehr & Peers review of typical programs, cost should be replaced with cost estimate from implementing agency, when available. Other sources indicate that this cost could range from $75-$100 per household.*

5.4.3.4 Methodology

The VMT reduction potential of community-based travel education was quantified using CAPCOA strategy T-23 *Provide Community-Based Travel Planning*. The variables used for this quantification process are shown in **Table 23**. The geographic scope of this measure, and the cities that would participate, have yet to be determined. Therefore, the effectiveness of this community-based travel education program was demonstrated using a representative program operating in the following San Mateo County cities: Daly City, East Palo Alto, Menlo Park, and South San Francisco. The effectiveness of this program at the entire county level is also included in these estimates. For all geographic scales, the percentage of households that would participate was capped at 10 percent based on MTC's Plan Bay Area 2050, although this factor would depend on the geographic area ultimately targeted by the mitigation action. The VMT reductions from these example programs are shown in **Table 24**.

[55] Measure 2 to provide Orientation, Education, Promotional Programs and/or Materials: https://ccagtdm.org/measures/orientation-education-promotional-programs-and-or-materials/

Table 23: Community Based Travel Education VMT Calculation

CAPCOA T-23 Variable	Source
B – Residences in plan/community	C/CAG/VTA Travel Demand Model[1]
C – Residences in plan/community targeted with CBTP	C/CAG/VTA Travel Demand Model
D – Percent of targeted residences that participate	MTC 2021[2]. Constant variable
E – Percent vehicle trip reduction by participating residences	MTC 2021[2]. Constant variable
F – Adjustment factor from vehicle trips to VMT	CAPCOA assumption. Constant variable
Total Annual VMT Reduction	***(C/B) * D * -E * F***

Notes:

1. Household data from C/CAG/VTA Travel Demand Model 2015 transportation analysis zone (TAZ) level data.
2. Metropolitan Transportation Commission (MTC). October 2021. Plan Bay Area 2050, Forecasting and Modeling Report. Available: https://www.planbayarea.org/sites/default/files/documents/Plan_Bay_Area_2050_Forecasting_Modeling_Report_October_2021.pdf.

Source: Fehr & Peers, 2024

Table 24: Community Based Travel Education VMT Reductions – Example Jurisdictions

City	Percent of Households Targeted by Travel Education Program	Number of Households Targeted	Annual Mitigation Action Cost Per City[1]	Lifespan Mitigation Action Cost[2]	Annual Home-Based VMT Reduction
Daly City	10%	3,094	$243,684	$7,310,520	-828,863
East Palo Alto	10%	6,923	$54,519	$1,635,559	-202,613
Menlo Park	10%	1,169	$92,075	$2,765,235	-298,478
South San Francisco	10%	2,176	$171,360	$5,140,800	-505,062
Countywide Implementation	10%	26.415	$2,080,142	$64,404,256	-7,568,724

Notes:

1. Assumes a $75 cost per household. This value can be changed in the C/CAG VMT/GHG Mitigation Tool.
2. Assumes that the program would be funded for 30 years.

Source: Fehr & Peers, 2024

5.5 Operational Actions

This section includes five operational mitigation actions that could fund the ongoing operational expenses of providing new transportation services. Examples of transit service enhancements are bikeshare, car share, and shuttle services. Like the programmatic actions, these operational actions require ongoing annual funding to maintain their VMT reduction benefits, and local agencies should consider the lifespan cost of these operational improvements.

5.5.1 Rail Service Frequency Expansion

Increasing rail service frequency encourages the use of transit by decreasing travel times, reducing wait times at stations, and improving route reliability. This mitigation action would fund an increase in rail transit service frequency in San Mateo County. This study's analysis focused on an increase to Caltrain's service frequency, as a representative mitigation action, but this measure could also fund other rail service providers, such as BART. This measure evaluated an increase in service frequency to all stations from San Francisco to San Jose, and the VMT reductions from increasing service outside of San Mateo County's boundaries can be used by San Mateo County lead agencies for VMT mitigation purposes.

5.5.1.1 Equity Considerations

Expanding and enhancing high quality rail service makes transit more accessible for the entire community. This is especially valuable for households with no or limited access to an automobile. Increasing the frequency of service also makes connections to other transit modes, such as local bus routes, more feasible. Caltrain estimates that about 20 to 25 percent of low-income riders use Caltrain to connect to other transit services, although Caltrain's riders are more likely to have higher household incomes than the residents who live along the corridor.[56]

5.5.1.2 Implementation Considerations

Implementing rail service frequency enhancements would require coordination between the lead agency and the implementing agency, which could include Caltrain or BART. Given the financial scale and interagency coordination required for this measure, this mitigation action is likely not feasible for individual development projects, and it should only be used as a VMT mitigation measure for VMT-inducing transportation projects. Caltrain's *2040 Long Range Service Vision (2019)*[57] presents the vision and best practices for implementing this service frequency increase.

5.5.1.3 Assumptions

The study team, based on discussions with Caltrain, assumed that this measure would increase service for all stations from 4th/King in San Francisco to San Jose Diridon station. This analysis assumes that Caltrain service frequency would be increased by 50 percent, from an average of four trains per hour per direction to six trains per hour per direction. This study also assumes, based on discussions with Caltrain, that one of those new trains per hour per direction will be an express service, stopping at half of the stations between San Francisco and San Jose. The study team factored this express service pattern into these calculations. The different variables used in this VMT reduction calculation are shown in **Table 25**. Key assumptions used in this VMT calculation include:

- Percent Increase in Transit Frequency: 50 percent increase

[56] Caltrain Business Plan Summary Report. Caltrain. May 2020. https://www.caltrain.com/media/24042/download?inline
[57] Caltrain Business Plan Summary Report. Caltrain.

- *Source: Fehr & Peers example, can be tailored to meet mitigation needs*

- Annual Cost of a 50 percent increase in Service Frequency: $25 million
  - *Source: Fehr & Peers assumption, based on Caltrain's Strategic Financial Plan*

5.5.1.4 Methodology

As shown in **Table 25**, the VMT reduction for increasing rail service frequency was quantified using CAPCOA strategy T-26 *Increase Transit Service Frequency*. The estimated VMT reduction for this mitigation action is shown in **Table 26**.

Table 25: Caltrain Service Expansion VMT Calculation

CAPCOA T-26 Variable	Source
B – Percent increase in transit frequency	User Assumption – Calculations assume a 50% increase in service, which was adjusted down to 38% to account for limited stop express train services.
C – Level of implementation	Assumption based on the portion of a broader multi-agency transit network that is receiving an increase in service. This variable is 50% in these calculations, due to Caltrain's proximity to the largely parallel SamTrans Route ECR service.
D – Elasticity of transit ridership with respect to frequency of service	Handy et al. 2013[1]. Constant variable
E – Transit mode share in plan/community	C/CAG/VTA Travel Demand Model[2]
F – Vehicle mode share in plan/community	C/CAG/VTA Travel Demand Model[2]
G – Statewide mode shift factor	FHWA 2017b[3]. Constant variable
Total Annual VMT Reduction	***-1 * C * (B*E*D*G) / F***

Notes:
1. Handy, S., K. Lovejoy, M. Boarnet, S. Spears. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. October. Available: https://ww2.arb.ca.gov/sites/default/files/2020-06/Impacts_of_Transit_Service_Strategies_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf.
2. Mode share data from C/CAG/VTA Travel Demand Model 2015 baseline.
3. Federal Highway Administration (FHWA). 2017b. National Household Travel Survey–2017 Table Designer. Average Vehicle Occupancy by HHSTFIPS. Available: https://nhts.ornl.gov/.

Source: Fehr & Peers, 2024

Table 26: Caltrain Service Expansion VMT Reductions

Project Scope	Percent Increase in Transit Service Frequency	Annual VMT Reduction	Annual Mitigation Action Cost	Lifespan Mitigation Action Cost[1]
All regular service Caltrain Stations from 4th/King to San Jose Diridon Station	50%	-40,038,712	$26.2M	$787.5M

Notes:
1. Assumes that the program would be funded for 30 years.

Source: Fehr& Peers, 2024

5.5.2 Local Transit Frequency, Capacity, and Reliability Enhancements

Increasing bus service frequency encourages the use of transit by decreasing travel times, reducing wait times at stops, and improving route reliability. This mitigation action would fund increased SamTrans bus service frequency in San Mateo County. As a representative measure, the study team selected Route El Camino Real (ECR) service frequency, which operates on El Camino Real, to estimate the VMT reduction potential of this measure. This service frequency increase can also be combined with the separate "Transit Priority Projects on Major Corridors" measure, which would add transit priority lanes and other physical bus speed improvements to El Camino Real.

5.5.2.1 Equity Considerations

SamTrans bus riders have lower household incomes than the countywide average and adding additional transit service to these bus routes can help improve access to jobs and other amenities.[58] The CBO leaders interviewed in this study expressed support for expanded transit service. Route ECR, and other local transit routes that could be funded by this mitigation action, pass through several EFAs, and would enhance mobility in these communities, especially for households without access to an automobile.

5.5.2.2 Implementation Considerations

Implementing these bus service frequency enhancements requires coordination between the lead agency and the implementing agency, SamTrans. Given the scale and interagency coordination required for these types of programs, this mitigation action is not feasible as a VMT mitigation action for individual development projects, and it should only be used as a VMT mitigation action for VMT inducing-transportation projects. SamTrans' *El Camino Real Bus Speed and Reliability Study (2022)* presents best practices for implementation of transit service enhancements along El Camino Real.[59] As noted in **Appendix E**, the research behind VMT mitigation indicates that transit service improvements often have limited effectiveness at reducing VMT for lower density communities. Therefore, agencies using increased transit service as a VMT mitigation measure should focus on major transit corridors in the more populated areas of San Mateo County, like the El Camino Real corridor.

5.5.2.3 Assumptions

The study team assumed that this Route ECR service enhancement would increase bus frequencies by 25 percent, from an average of four buses per hour per direction to five buses per hour per direction. The different variables used in this VMT reduction calculation are shown in **Table 27**. Key assumptions used in this VMT calculation include:

- Percent Increase in Transit Frequency: 25 percent increase
    - *Source: Fehr & Peers example, can be tailored to meet mitigation needs*
- Annual cost of mitigation action: $12.5 million

[58] Short Range Transit Plan FY 2023-2028 (2022). SamTrans.
[59] El Camino Real Bus Speed and Reliability Study (2022). SamTrans. https://www.samtrans.com/ECRStudy

- *Source: SamTrans Short-Range Transit Plan FY 2019-2028*
- *Based on an assumption of approximately 500,000 additional revenue service miles at a cost of $23.94 per mile*

5.5.2.4 Methodology

As shown in **Table 27**, the VMT reduction potential of enhancing local transit service was quantified using CAPCOA strategy T-26 *Increase Transit Service Frequency*. The estimated VMT reduction of the potential service frequency enhancement is shown in **Table 28**.

Table 27: Enhance Local Transit Frequency, Capacity, and Reliability VMT Calculation

CAPCOA T-26 Variable	Source
B – Percent increase in transit frequency	User Assumption
C – Level of implementation	User Assumption
D – Elasticity of transit ridership with respect to frequency of service	Handy et al. 2013[1]. Constant variable
E – Transit mode share in plan/community	C/CAG/VTA Travel Demand Model[2]
F – Vehicle mode share in plan/community	C/CAG/VTA Travel Demand Model[2]
G – Statewide mode shift factor	FHWA 2017b[3]. Constant variable
Total Annual VMT Reduction	***-1 * C * (B * E * D * G) / F***

Notes:
1. Handy, S., K. Lovejoy, M. Boarnet, S. Spears. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. October. Available: https://ww2.arb.ca.gov/sites/default/files/2020-06/Impacts_of_Transit_Service_Strategies_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf.
2. Mode share data from C/CAG/VTA Travel Demand Model 2015 baseline link level data.
3. Federal Highway Administration (FHWA). 2017b. National Household Travel Survey–2017 Table Designer. Average Vehicle Occupancy by HHSTFIPS. Available: https://nhts.ornl.gov/.

Source: Fehr & Peers, 2024

Table 28: Enhance Local Transit Frequency, Capacity, and Reliability VMT Reductions

Average Buses Per Hour Per Direction (without measure)	Average Buses Per Hour Per Direction (with measure)	Additional Revenue Service Miles	Annual VMT Reduction	Annual Mitigation Action Cost	Lifespan Mitigation Action Cost[1]
4	5	499,680	-19,801,196	$12.5M	$376.8M

Notes:
1. Assumes that program would be funded for 30 years.

Source: Fehr & Peers, 2024

5.5.3 Mobility Hubs

Mobility hubs are community anchors that bring together a diversity of transportation services, such as public transit, bike/scootershare, and car share, to help community members get around without a private vehicle.[60] This mitigation action would fund these services at designated mobility hubs located throughout San Mateo County.

The study team, for the purposes of this analysis, focused on the addition of electric car share, bikeshare, and scootershare services at five representative mobility hubs. This mitigation action could be implemented as part of a broader bike/scootershare network, such as the one included in this study's "Micromobility Systems" mitigation action (see **Section 5.5.4**). This representative mitigation action does not include capital improvements, although this measure may also be paired with supportive measures such as secure bicycle parking and wayfinding signage or real-time transit arrival screens.

5.5.3.1 Equity Considerations

These mobility hubs investments can be directed towards EFAs and in accordance with MTC's mobility hub planning guidance. MTC's Mobility Hub Implementation Playbook provides agencies with recommended practices for equitable implementation of these mobility hubs. These recommendations include making sure that mobility hubs are culturally appropriate, have resources in multiple languages, and identify community needs when developing the resources provided in each mobility hub.[61]

5.5.3.2 Implementation Considerations

Implementing these mobility hubs requires coordination between the lead agency and the agency or companies, such as Lyft, that operate the micromobility services. The mobility hubs also require use of the public right-of-way, which is managed by local lead agencies. These services are sometimes provided on-site, at larger development projects, or as a part of a TDM program.[62] Micromobility services provided at these private developments would need to be publicly available, or would need to provide new benefits to residents, to qualify as an off-site mitigation measure.[63, 64] MTC provides technical assistance on how to implement mobility hubs via their Mobility Hubs Program.

---

[60] Bay Area Regional Mobility Hubs: Mobility Hub Implementation Playbook. Metropolitan Transportation Commission (MTC).

[61] Bay Area Regional Mobility Hubs: Mobility Hub Implementation Playbook. Metropolitan Transportation Commission (MTC).

[62] Such as those in C/CAG's TDM program via Measure 21 – Bike/Scooter Share On-Site: https://ccagtdm.org/measures/bike-scooter-share-on-site/

[63] An example of a mobility hub program funded by outside sources for existing residents is at Betty Ann Gardens, an affordable housing project in San Jose: https://www.transformca.org/post/san-jose-affordable-housing-complex-celebrates-mobility-hubs

[64] Such as those in C/CAG's TDM program via Measure 21 – Bike/Scooter Share On-Site: https://ccagtdm.org/measures/bike-scooter-share-on-site/

5.5.3.3 Assumptions

The study team selected five representative mobility hubs based on MTC's map of potential mobility hub locations and using this study's four mobility zones.[65] These locations include mobility hubs in Daly City, Millbrae, San Mateo, Menlo Park, and Half Moon Bay. The CAPCOA Handbook does not include a quantification method for mobility hubs, but it does include measures that estimate VMT reductions from providing bikeshare, scootershare, and car share services. The different variables used in this VMT reduction calculation are described below. The C/CAG VMT/GHG Mitigation Tool allows users to change the number of bikes, scooters, and cars at each mobility hub.

These mobility hubs could include other services or facilities presented in MTC's Mobility Hub Implementation Guide, such as upgraded bus stops, but there was no available VMT quantification research on these improvements when this study was conducted.

Key assumptions used in the representative mitigation action VMT calculation include:

- Number of electric car share vehicles per mobility hub: 3
  - *Source: Fehr & Peers example, can be tailored to meet mitigation needs*
- Number of electric bikeshare bikes per mobility hub: 5
  - *Source: Fehr & Peers example, can be tailored to meet mitigation needs*
- Number of electric scootershare scooters per mobility hub: 5
  - *Source: Fehr & Peers example, can be tailored to meet mitigation needs*

5.5.3.4 Methodology

The VMT reduction potential of the five example mobility hubs was quantified using three CAPCOA strategies: CAPCOA strategy T-21b *Implement Electric Carshare Program*, which is shown in **Table 29**, CAPCOA strategy T-22b *Implement Electric Bikeshare Program*, which is shown in **Table 30**, and CAPCOA strategy T-22c *Implement Scootershare Program*, which is shown in **Table 31**. The study team selected C/CAG travel demand model TAZs that are within a quarter of a mile of each mobility hub for these VMT calculations. The estimated VMT reduction and cost estimates of the potential mobility hubs are shown in **Table 32**.

[65] https://mtc.maps.arcgis.com/apps/webappviewer/index.html?id=2885234dd1b447a6907aba83b343a0de

Table 29: Implement Electric Carshare Program VMT Calculation

CAPCOA T-21b Variable	Source
B – Number of electric vehicles deployed in plan/community	User Assumption
C – VMT in plan/community without measure	C/CAG/VTA Travel Demand Model[1]
D – Conventional VMT avoided with measure	Martin and Shaheen 2016[2]. Constant variable
E – Electric VMT added with measure	Martin and Shaheen 2016[2]. Constant variable
F – Emission factor of non-electric light duty fleet mix	CARB 2020a[3]. Constant variable. *GHG reductions only.*
G – Energy efficiency of carshare electric vehicle	CARB 2020b[4]; U.S. DOE 2021[5]. Constant variable. *GHG reductions only.*
H – Carbon intensity of local electricity provider	CA Utilities 2021[6]. *GHG reductions only*.
I – Conversion from lb to g	CAPCOA Constant variable. *GHG reductions only*.
J – Conversion from kWh to MWh	CAPCOA Constant variable. *GHG reductions only*.
Total Annual VMT Reduction	***-1 * B * (E - D) / C***

Notes:

1. ADT and VMT data from C/CAG/VTA Travel Demand Model 2015 baseline.
2. Martin, E. and Shaheen, S. 2016. The Impacts of Car2go on Vehicle Ownership, Modal Shift, Vehicle Miles Traveled, and Greenhouse Gas Emissions: An Analysis of Five North American Cities. July. Available: https://tsrc.berkeley.edu/publications/impacts-car2go-vehicle-ownership-modal-shift-vehicle-miles-traveled-and-greenhouse-gas.
3. California Air Resources Board (CARB). 2020a. EMFAC2017 v1.0.3. August. Available: https://arb.ca.gov/emfac/emissions-inventory.
4. California Air Resources Board (CARB). 2020b. Unofficial electronic version of the Low Carbon Fuel Standard Regulation. Available: https://ww2.arb.ca.gov/sites/default/files/2020-07/2020_lcfs_fro_oal-approved_unofficial_06302020.pdf.
5. U.S. Department of Energy (U.S. DOE). 2021. Download Fuel Economy Data. January. Available: https://www.fueleconomy.gov/feg/download.shtml.
6. California Utilities. 2021. Excel database of GHG emission factors for delivered electricity, provided to the Sacramento Metropolitan Air Quality Management District and ICF. January through March 2021.

Source: Fehr & Peers, 2024

Table 30: Implement Electric Bikeshare Program VMT Calculation

CAPCOA T-22b Variable	Source
B – Percent of residences in plan/community with access to electric bikeshare system without measure	User Assumption
C – Percent of residences in plan/community with access to electric bikeshare system with measure	User Assumption[1]
D – Daily electric bikeshare trips per person	MTC 2017[2]. Constant variable
E – Vehicle to electric bikeshare substitution rate	Fitch et al. 2021[3]. Constant variable
F – Electric bikeshare average one-way trip length	Fitch et al. 2021[3]. Constant variable
G – Daily vehicle trips per person	FHWA 2018[4]. Constant variable
H – Regional average one-way vehicle trip length	FHWA 2017[5].
Total Annual VMT Reduction	***-1 * (C - B) * D * E * F / G * H***

Notes:

1. For the purposes of this analysis, the percentage of residences in plan/community with access to the bikeshare system with measure is 100% because only TAZs within 0.25 miles of a mobility hub were selected for analysis.
2. Metropolitan Transportation Commission (MTC). 2017. Plan Bay Area 2040 Final Supplemental Report–Travel Modeling Report. July. Available: http://2040.planbayarea.org/files/2020-02/Travel_Modeling_PBA2040_Supplemental%20Report_7-2017.pdf.
3. Fitch, D., H. Mohiuddin, and S. Handy. 2021. Examining the Effects of the Sacramento Dockless E-Bike Share on Bicycling and Driving. MDPI: Sustainability. January. Available: https://www.mdpi.com/2071-1050/13/1/368.
4. Federal Highway Administration (FHWA). 2018. Summary of Travel Trends 2017–National Household Travel Survey. July. Available: https://www.fhwa.dot.gov/policyinformation/documents/2017_nhts_summary_travel_trends.pdf.
5. Federal Highway Administration (FHWA). 2017. National Household Travel Survey–2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/.

Source: Fehr & Peers, 2024

Table 31: Implement Electric Scootershare Program VMT Calculation

CAPCOA T-22c Variable	Source
B – Percent of residences in plan/community with access to scootershare system without measure	User Assumption
C – Percent of residences in plan/community with access to scootershare system with measure	User Assumption[1]
D – Daily scootershare trips per person	MTC 2017[2]. Constant variable
E – Vehicle to scootershare substitution rate	McQueen et al. 2020[3]. Constant variable
F – Scootershare average one-way trip length	PBOT 20214[4]. Constant variable
G – Daily vehicle trips per person	FHWA 2018[5] Constant variable
H – Regional average one-way vehicle trip length	FHWA 2017[6]
Total Annual VMT Reduction	***-1 * (C-B) * D * E * F / G * H***

Notes:

1. For the purposes of this analysis, the percentage of residences in plan/community with access to the scootershare system with measure is 100% because only TAZs within 0.25 miles of a mobility hub were selected for analysis.
2. Metropolitan Transportation Commission (MTC). 2017. Plan Bay Area 2040 Final Supplemental Report–Travel Modeling Report. July. Available: http://2040.planbayarea.org/files/2020-02/Travel_Modeling_PBA2040_Supplemental%20Report_7-2017.pdf.
3. McQueen, M., G. Abou-Zeid, J. MacArthur, and K. Clifton. 2020. Transportation Transformation: Is Micromobility Making a Macro Impact on Sustainability? Journal of Planning Literature. November. Available: https://doi.org/10.1177/0885412220972696.
4. Portland Bureau of Transportation (PBOT). 2021. Portland Bureau of Transportation E-Scooter Dashboard. Available: https://public.tableau.com/profile/portland.bureau.of.transportation#!/vizhome/PBOTE-ScooterTripsDashboard/ScooterDashboard.
5. Federal Highway Administration (FHWA). 2018. Summary of Travel Trends 2017–National Household Travel Survey. July. Available: https://www.fhwa.dot.gov/policyinformation/documents/2017_nhts_summary_travel_trends.pdf.
6. Federal Highway Administration (FHWA). 2017. National Household Travel Survey–2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/.

Source: Fehr & Peers, 2024

Table 32: Mobility Hub VMT Reductions by Location

Mobility Hub Location	Number of Electric Carshare Vehicles[1]	Number of Electric Bikes[1]	Number of Scooters[1]	Annual VMT Reduction	Annual Mitigation Action Cost	Lifespan Mitigation Action Cost[2]
Daly City	3	10	5	-332,190	$283,500	$8.5M
Millbrae	3	10	5	-304,128	$283,500	$8.5M
San Mateo	3	10	5	-189,850	$283,500	$8.5M
Menlo Park	3	10	5	-211,744	$283,500	$8.5M
Half Moon Bay	3	10	5	-98,508	$283,500	$8.5M

Notes:

1. Fehr & Peers assumption, the number of vehicles, bicycles, or scooters can be changed in the C/CAG VMT Mitigation Tool. One electric bicycle docking station is assumed to have 10 to 15 electric bikes. Additional vehicles, bicycles, or scooters beyond this would increase the cost but not result in a change based on this minimum amount serving a fixed population based on CAPCOA's formula.
2. Assumes that program would be funded for 30 years.

5.5.4 Micromobility Systems

Micromobility services provide smaller vehicles, such as bikes and scooters, which can be rented for short periods by residents and employees within a designated service area. These systems, which can use docking stations or can be dockless, allow people to more easily reach community destinations and transit services without using a private automobile.

This measure would provide micromobility services throughout a city, which differs from the mobility hub approach. This study analyzed, as a representative measure, the VMT reductions from providing a docked or dockless electric bikeshare program throughout San Mateo County. This calculation approach could also be applied to a scootershare system, using the research in CAPCOA for a scootershare system, as described below.

5.5.4.1 Equity Considerations

Micromobility programs, which did not receive high levels of support in this study's CBO interviews, can take several measures to ensure that these devices are available to all communities. Bikes can be directed towards EFAs and many bikeshare and scootershare programs have requirements to distribute a proportion of scooters in these neighborhoods.[66] Bay Wheels is the primary bikeshare provider in the Bay Area and is administered by MTC.. MTC, through its Bikeshare for All program, requires Lyft, the operator of Bay Wheels, to provide reduced price memberships to qualifying low-income households. These memberships, which cost up to $5 per month, allow unlimited 60-minute rides on classic pedal bikes.[67] MTC's management of Bay Wheels also ensures equitable access for cash-paying customers.[68]

5.5.4.2 Implementation Considerations

Implementation of micromobility systems would typically require coordination between the lead agency and the implementing agency or companies, such as Lyft, which provide bikeshare and scootershare services. The services typically require the use of public right-of-way, which is managed by local lead agencies. C/CAG provides technical assistance for the implementation of bikeshare and scootershare via the *San Mateo County Shared Micromobility Study and Implementation Plan*.[69] In October 2024, C/CAG approved an agreement with MTC to expand and operate the Bay Wheels Bikeshare program in the City of Daly City and is an example of what this mitigation action could include.[70]

5.5.4.3 Assumptions

This study assumed that all cities within San Mateo County would participate in the electric bikeshare program, although the participating cities and the number of bikes per city can be changed in the C/CAG

---

[66] Powered Scooter Evaluation Report. San Francisco Municipal Transportation Agency and Fehr & Peers. September 2023. https://www.sfmta.com/media/37148/download?inline

[67] Bikeshare for All, Bay Wheels. https://www.lyft.com/bikes/bay-wheels/bike-share-for-all

[68] Bay Wheels Bike Share Program. Metropolitan Transportation Commission. https://mtc.ca.gov/operations/traveler-services/bay-wheels-bike-share-program

[69] https://ccag.ca.gov/programs/transportation-programs/bikeandscootershare/

[70] https://ccag.ca.gov/wp-content/uploads/2024/10/101024-CCAG-Board-Agenda.pdf

VMT/GHG Mitigation Tool. The variables used in this VMT reduction calculation are shown **Table 33**. Key assumptions used in this VMT calculation include:

- Percent of residences in plan/community with access to electric bikeshare program: 75 percent
  - *Source: Fehr & Peers example, this can be tailored to meet mitigation needs.*
- Number of e-bikes per city: 5-70, depending on city population.
  - *Source: Fehr & Peers example, this can be tailored to meet mitigation needs and to achieve adequate geographic coverage of city households.*
- Annual Program Cost per E-Bike per Year: $15,000
  - *Source: Estimate based on Washington DC and LA Metro electric bikeshare programs*

5.5.4.4 Methodology

The VMT reduction potential of the electric bikeshare program was quantified using CAPCOA strategy T-22b *Implement Electric Bikeshare Program*. The estimated VMT reduction and cost estimates of the electric bikeshare program are shown in **Table 34**. Cities that wish to use scootershare as a mitigation measure should use CAPCOA strategy T-22c *Implement Scootershare Program.*[71]

Table 33: Implement Electric Bikeshare Program VMT Calculation

CAPCOA T-22b Variable	Source
B – Percent of residences in plan/community with access to electric bikeshare system without measure	User Assumption, based on the percentage of residences within 0.25 miles of a bikeshare station or a dockless bikeshare area
C – Percent of residences in plan/community with access to electric bikeshare system with measure	User Assumption, based on the percentage of residences within 0.25 miles of a bikeshare station or a dockless bikeshare area
D – Daily electric bikeshare trips per person	MTC 2017[1]. Constant variable
E – Vehicle to electric bikeshare substitution rate	Fitch et al. 2021[2]. Constant variable
F – Electric bikeshare average one-way trip length	Fitch et al. 2021[2]. Constant variable
G – Daily vehicle trips per person	FHWA 2018[3]. Constant variable
H – Regional average one-way vehicle trip length	FHWA 2017[4].
Total Annual VMT Reduction	***-1 * (C - B) * D * E * F / G * H***

Notes:

1. Metropolitan Transportation Commission (MTC). 2017. Plan Bay Area 2040 Final Supplemental Report–Travel Modeling Report. July. Available: http://2040.planbayarea.org/files/2020-02/Travel_Modeling_PBA2040_Supplemental%20Report_7-2017.pdf.
2. Fitch, D., H. Mohiuddin, and S. Handy. 2021. Examining the Effects of the Sacramento Dockless E-Bike Share on Bicycling and Driving. MDPI: Sustainability. January. Available: https://www.mdpi.com/2071-1050/13/1/368.
3. Federal Highway Administration (FHWA). 2018. Summary of Travel Trends 2017–National Household Travel Survey. July. Available: https://www.fhwa.dot.gov/policyinformation/documents/2017_nhts_summary_travel_trends.pdf.
4. Federal Highway Administration (FHWA). 2017. National Household Travel Survey–2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/.

[71] https://www.caleemod.com/documents/handbook/ch_3_transportation/measure_t-22-c.pdf

Table 34: Implement Countywide Electric Bikeshare Program VMT Reductions

Annual Program Cost per E-Bike Bike per year	Number of E-Bikes	Annual VMT Reduction	Annual Mitigation Action Cost	Lifespan Mitigation Action Cost[1]
$15,000	605	-3,594,848	$9.5M	$285.8M

Notes:
1. Assumes that program would be funded for 30 years.

5.5.5 Shuttle / Microtransit Services

Shuttles and microtransit are on-demand transit services that cover a designated service area. These services allow riders to reach community destinations and fixed-route transit routes without using a private automobile. As a representative mitigation measure, the study team analyzed the VMT reduction potential for expanding the operating hours of the existing SamTrans Ride Plus on-demand transit service in East Palo Alto/Belle Haven. The East Palo Alto/Belle Haven shuttle currently operates 7 days per week from 6 AM to 10 PM, and this representative mitigation action would expand those service hours to 24 hours per day. This methodology could be applied to expansions or establishment of other shuttle and microtransit services. Lead agencies that want to expand the service hours of fixed-route transit, like regular SamTrans buses, should use the methodology presented in this study's "Local Transit Frequency, Capacity, and Reliability Enhancements" measure.

5.5.5.1 Equity Considerations

Microtransit and shuttle programs can help improve access and mobility in a community, especially in areas with less access to automobiles. The CBO leaders interviewed in this study supported expanded access to transit, which could include these more local focused microtransit and shuttle services. These services can be directed towards EFAs to improve first mile-last mile transportation in these neighborhoods, providing a cheaper alternative to ride-hailing in these communities.[72]

5.5.5.2 Implementation Considerations

Implementing shuttle and microtransit services requires coordination between the lead agency and the implementing agency that is providing the services, which could include SamTrans or Commute.org. As noted in **Appendix E**, the research behind VMT mitigation indicates that transit service improvements often have limited effectiveness at reducing VMT for low density communities. Therefore, agencies using shuttles and microtransit services as a VMT mitigation measure should focus on more populated areas of the county, including communities that lack fixed-rail transit, such as East Palo Alto/Belle Haven. MTC

[72] *The first mile towards access equity: Is on-demand microtransit a valuable addition to the transportation mix in suburban communities*, A.M. Liezenga, T. Verma, J.R. Mayaud, N.Y. Aydin and B. van Wee. Transportation Research Interdisciplinary Perspectives. Volume 24, March 2024. https://www.sciencedirect.com/science/article/pii/S2590198224000575

provides guidance on how to implement community-based shuttle programs via the Lifeline Transportation Program.[73]

5.5.5.3 Assumptions

The variables used in this VMT reduction calculation are shown in **Table 35**. Key assumptions used in this VMT calculation include:

- Transit Service Hours After Expansion: 24
  - *Source: Fehr & Peers assumption, can be tailored to meet mitigation needs*
- Revenue Service Hour Cost: $158.23
  - *Source: Fehr & Peers assumption, based off SamTrans Short-Range Transit Plan FY 2019-2028 and LA Metro's MetroMicro Microtransit Program*

5.5.5.4 Methodology

The VMT reduction potential of the shuttle or microtransit services was quantified using CAPCOA strategy T-25 *Extend Transit Network Coverage*. The estimated VMT reduction and cost estimates of the shuttle or microtransit services are shown in **Table 36**.

Table 35: Shuttle / Microtransit Services – SamTrans Ride Plus

CAPCOA T-25 Variable	Source
B – Total transit service miles or service hours in plan/community before expansion	Existing service hours for shuttle service
C – Total transit service miles or service hours in plan/community after expansion	User Assumption
D – Transit mode share in plan/community	C/CAG/VTA Travel Demand Model[1]
E – Elasticity of transit demand with respect to service miles or service hours	Handy et al. 2013[2]. Constant variable
F – Statewide mode shift factor	FHWA 2017[3]. Constant variable
G – Ratio of vehicle trip reduction to VMT	CAPCOA Constant variable
Total Annual VMT Reduction	***-1 * (C-B/B) * D * E * F * G***

Notes:

1. Mode share data from C/CAG/VTA Travel Demand Model 2015 baseline.
2. Handy, S., K. Lovejoy, M. Boarnet, S. Spears. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. October. Available: https://ww2.arb.ca.gov/sites/default/files/2020-06/Impacts_of_Transit_Service_Strategies_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf.
3. Federal Highway Administration (FHWA). 2017. National Household Travel Survey–2017 Table Designer. Average Vehicle Occupancy by HHSTFIPS. Available: https://nhts.ornl.gov/.

Source: Fehr & Peers, 2024

[73] https://mtc.ca.gov/planning/transportation/access-equity-mobility/lifeline-transportation-program

Table 36: Shuttle/Microtransit Services VMT Reductions

Existing Service Hours	Proposed Service Hours	Annual VMT Reduction	Annual Mitigation Action Cost	Lifespan Mitigation Action Cost[1]
16	24	-1,744,406	$461,207	$13.8M

Notes:
1. Assumes that program would be funded for 30 years.

Source: Fehr & Peers, 2024

5.6 Land Use Actions

Housing developments that are in infill, compact, and accessible locations, and that are affordable to households with lower incomes, reduce VMT in several long-term ways. Residents currently priced out of more expensive areas can move closer to work, school, caregiving, and other activities, shortening their commutes and other non-work trips. Lower income households make fewer automobile trips and they are more likely to use non-car transportation modes like walking and transit.[74]

VMT-efficient housing development is one of the most effective strategies to mitigate VMT impacts.[75] Caltrans' *SB 743 Program Mitigation Playbook* describes how affordable housing reduces VMT and can be used as a VMT mitigation methods as follows:

> Affordable housing produces less VMT compared to market-rate housing. To the extent a project contributes to such housing, it can take credit for the VMT reduction compared to business as usual. Compared to other options, denser, more affordable housing is a powerful VMT-reduction tool.[76]

The Caltrans playbook mentions that it is best to prioritize funding towards existing affordable housing programs, such as those that target affordable infill housing near transit and other resources like jobs, shopping, recreation, and schools. In San Mateo County, the Department of Housing issues an annual Notice of Funding Availability (NOFA) for affordable housing and competitive criteria are, for the most part, aligned with reducing VMT while increasing housing affordability).[77]

San Mateo County residents generate less VMT than the Bay Area regional average, and the Peninsula is a VMT-efficient area for new housing growth.[78] San Mateo County has a substantial affordable housing

[74] CAPCOA Handbook,2021. Measure T-4. Intergrate Affordable and Below Market Rate Housing. Pg 80-82.
[75] Housing and VMT Mitigation. California Department of Transportation (Caltrans) https://dot.ca.gov/programs/esta/sb-743/resources/housing
[76] Caltrans SB 743 Program Mitigation Playbook.
[77] FY2024-25 Notice of Funding Availability (NOFA). County of San Mateo Department of Housing. https://www.smcgov.org/housing/fy2024-25-nofa
[78] C/CAG's VMT tool indicates that San Mateo County residents generate 13.8 VMT per day on average compared to 14.6 VMT per day for the region: https://gis.smcgov.org/apps/CCAG_VMT_EstimationTool/#.

need to support both existing and future residents. There are thousands of affordable housing units that are in the pre-development stage that will be seeking funding.[79,80] Despite the Peninsula's location-based VMT efficiency, San Mateo County is a geographically diverse area, and some places in the county are more suitable for affordable housing development than others. Housing should be prioritized in areas with access to high quality transit, jobs, and other community resources.

Lead agencies can also use land use strategies as a mitigation measure to fund market-rate infill housing projects in VMT-efficient locations, such as "Missing Middle" housing types as recommended by 21 Elements for San Mateo County jurisdictions.[81] Funding either deed-restricted affordable housing or market-rate infill "Missing Middle" housing is consistent with the State of California Executive Order N-2-24[82] to prioritize all types of infill housing as a VMT mitigation measure. Lead agencies that choose to fund infill housing that is not deed-restricted affordable housing would need to meet the substantial evidence threshold described in the executive order.

5.6.1 Affordable Housing

The CAPCOA 2021 Handbook provides evidence that supports the use of infill affordable housing in VMT-efficient locations as a mitigation action. Increasing the supply of affordable housing in infill areas increases the density of an area. Increasing an area's residential density puts more people closer to jobs and other community amenities, reducing the distance and frequency of automobile trips. Building affordable homes where people want to live is a form of preventative infrastructure because affordable housing that is developed in balance with jobs growth prevents the need to add the freeway or transit capacity needed to transport workers in from areas outside of San Mateo County.

The California Department of Housing and Community Development (2021) defines households that make 80 percent or below of an area's median household income as low income. Based on the agency's definition of affordability, households are considered rent burdened when their housing costs are 30 percent or more of their household income. Households that meet this threshold are eligible for subsidized affordable housing.

This study's affordable housing measure would be directed at households meeting these requirements. This study's mitigation measure focuses on funding multi-family housing developments that are 100 percent affordable. However, lead agencies may use the evidence and calculations presented in this study to fund a variety of affordable housing developments, such as those identified in the 2019 MTC CASA

[79] 21 Elements provides details on the countywide and jurisdiction specific housing needs, such as through the Countywide Housing Needs Assessment presented here: http://www.21elements.com/housing-elements-overview
[80] As noted in the Bay Area Housing Finance Authority's February 2023 Bay Area Affordable Housing Pipeline report, 1,817 affordable homes in 25 developments were in the pre-development stage: https://mtc.ca.gov/sites/default/files/documents/2023-03/Pipeline_Affordable_Housing_Enterprise_BAHFA_Brief_February_2023.pdf
[81] http://www.21elements.com/missing-middle-housing
[82] Housing Infill EO_ N-2-24.pdf (ca.gov)

Compact to Preserve, Protect, and Produce affordable housing. Additional considerations related to local housing affordability levels are presented San Mateo County's Department of Housing website.[83]

5.6.1.1 Implementation and Equity Considerations

The CBO leaders interviewed in this study expressed very strong support for the creation of affordable housing for VMT mitigation. For that reason, the study team conducted additional conversations to understand how affordable housing could be implemented as VMT mitigation in San Mateo County.

Implementing an affordable housing VMT mitigation measure requires coordination between the lead agency and the implementing agency, which includes existing county, regional, and state housing organizations along with private affordable housing developers. Lead agencies could direct project sponsors that need VMT mitigation to partner with local developers or countywide agencies that are seeking funding, and there are many existing implementing and affordable housing developers in San Mateo County that could serve in this role. Many San Mateo County local jurisdictions already collect inclusionary housing fees for residential and commercial development and provide grants to affordable housing developers within their jurisdiction.[84]

As documented in **Appendix C**, the study team spoke with affordable housing providers and regional and statewide housing organizations in June 2024 to document best practices regarding the use of local funding sources to fund affordable housing production. The San Mateo County Department of Housing (SMC DOH) has an existing affordable housing funding program that includes a local dedicated funding source through the half-cent sales tax called Measure K. SMC DOH also receives funding from other statewide and federal funding sources that it pairs with Measure K money to build affordable local housing projects. However, these various sources are not sufficient to fund all the local affordable housing projects in the pipeline nor meet the future anticipated demand for affordable housing. Even if a regional affordable housing bond is passed in the future (similar to the measure considered but withdrawn from the November 2024 ballot), there would only be sufficient funding for 143,000 out of the 180,000 affordable homes needed by 2031 to meet the demand identified in the Regional Housing Needs Assessment (RHNA) process for the Bay Area.[85] Therefore, this mitigation action would provide additional funding for affordable homes that would not be built but for this program, thus fulfilling the additionality requirement for CEQA mitigation.

Given the existence of a countywide program that has demonstrated success at building affordable housing and has a need for additional housing, the study team recommends using the SMC DOH's NOFA process to fund affordable housing for VMT mitigation action. SMC DOH administers grants on an annual basis to fund housing projects and can establish grant criteria that would ensure mitigation actions funded through this program would be in VMT-reducing locations. Lead agencies can also pair this

[83] https://www.smcgov.org/housing
[84] http://www.21elements.com/inclusionary-housing
[85] https://mtc.ca.gov/sites/default/files/documents/2024-05/BAHFA_Bond_Report_0.pdf

mitigation measure with other funding sources, such as future regional housing bonds, and could use the mitigation program for gap financing.

A statewide example of prioritizing affordable housing in VMT-efficient areas is the California Affordable Housing and Sustainable Communities Program (AHSC). This state program prioritizes housing VMT-efficient and high-resource locations and it quantifies the GHG reduction benefits of that development.[86] As noted in **Appendix A**, San Mateo County CBO leaders shared that it is important to place new affordable housing near community amenities and in high resource areas.[87] Lead agencies could combine this affordable housing strategy with other VMT mitigation actions to help future residents further reduce their vehicle travel, such as providing transit pass incentives, e-bike rebates, or mobility services.[88]

5.6.1.1.1 Where should affordable housing be located when being used as a VMT mitigation measure?

Affordable housing that is used for VMT mitigation purposes should be developed near transit, jobs, amenities, and services. California uses the following criteria to define proximity to these resources:[89]

1. One half-mile walking distance to a high-quality transit corridor, a major transit stop, or a bus station or ferry terminal.[90,91]
2. Low vehicle travel area (15 percent below regional or citywide VMT).
3. In close proximity to amenities and services of six or more of the following: a supermarket or grocery store, a public park, a community center, a pharmacy or drugstore, a medical clinic or hospital, a public library, or a school that maintains a kindergarten or any of grades 1 to 12.[92]

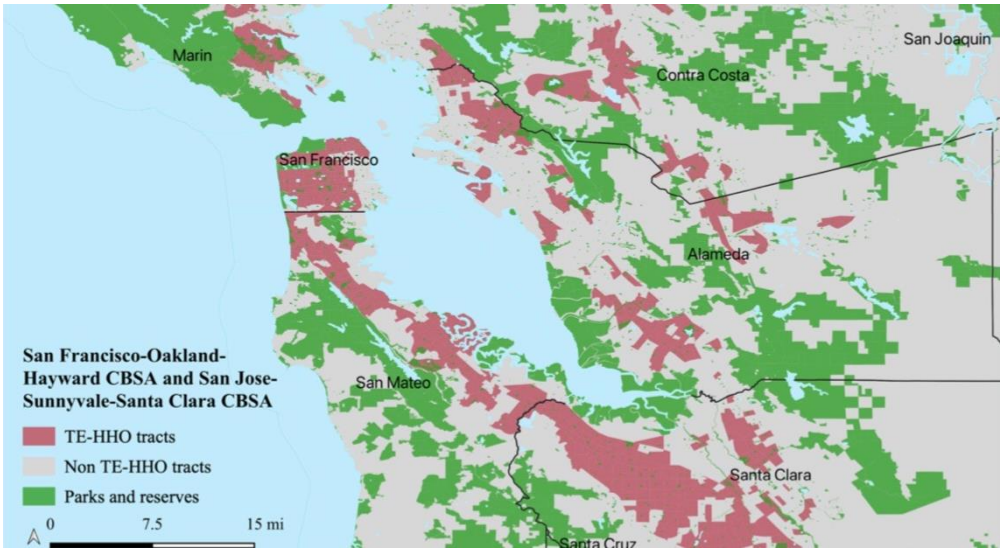
This state definition aligns with the research presented in the Environmental Protection Agency's (EPA's) MXD methodology.[93] This EPA methodology uses a project's location to estimate the number of vehicle trips a development is expected to generate. MXD uses factors such as the diversity of nearby land uses, demographics in the surrounding area, proximity to job centers, the presence of nearby bicycle and pedestrian infrastructure, and proximity to regional transit when estimating these automobile trips. MXD

[86] https://www.enterprisecommunity.org/sites/default/files/2024-04/AHSC_Report_2024-04192024.pdf
[87] High-resource areas are presented at: https://www.treasurer. ca.gov/ctcac/opportunity.asp
[88] Per CAPCOA 2021 Handbook, the benefits for individual residents are not additive and must be calculated using multiplicative dampening. Some measures, such as transit, pedestrian, and bicycle infrastructure, also provide benefit to the surrounding community.
[89] California Public Resource Code 65589.5 (h)(6)
[90] "High-quality transit corridor" has the same meaning defined in subdivision (b) of Section 21155 of the Public Resources Code. High quality transit corridors are corridors with fixed route bus service with a peak service frequency of 15 minutes or less.
[91] "Major transit stop" has the same meaning as defined in Section 21064.3 of the Public Resources Code. This includes rail and bus rapid transit stations, ferry terminals served by bus or rail transit, and the intersection of two or more major bus routes with a peak service frequency of 15 minutes or less.
[92] The housing development project is proximal to six or more amenities pursuant to subclause (IV) of clause (vii) of PRC §65589.5 (h)(6) as of the date of submission of the application for the project. Proximal is defined by being within one mile for urban areas, or for a parcel in a rural area, within two miles of a project site.
[93] For more information on the MXD methodology please visit https://www.fehrandpeers.com/mainstreet/ or see Getting Trip Generation Right Eliminating the Bias Against Mixed Use Development by the American Planning Association, May 2013.

indicates that lower density suburban development typically generates 35 percent more vehicle trips than denser mixed-use housing. Including affordable housing into those mixed-use developments would further reduce their expected vehicle trips. This is consistent with decades of research that show that residents in infill communities, such as most of San Mateo County, generate approximately 40 percent less VMT than the statewide average.[94,95]

CARB has identified areas that are both transportation efficient and have high access to employment centers. This work, which combines both VMT and equity metrics, identify areas in the state where additional housing should be prioritized to help achieve the state's VMT and GHG reduction targets. Building housing in these locations prioritizes enhanced socioeconomic mobility, particularly for residents of equity-priority communities.[96]

Inset 1 displays a map of these high efficiency locations. CARB's report also reviewed the importance of proximity to jobs, as is present in San Mateo County, noting on page 41 that: "two meta-studies combining the findings of dozens of individual studies indicate that jobs accessibility via automobile has a far larger impact on VMT reduction than land use mix, population density, or transit accessibility."



Inset 1: "TE-HHO tracts" shown in red represent locations in San Mateo County that are both "Transportation Efficient" (low VMT) and Healthy, High Opportunity Areas. Source: Evaluating the Potential for Housing Development in Transportation-Efficient and Healthy, High-Opportunity Areas in California

[94] Robert Cervero, 2007. Transit Oriented Development's Ridership Bonus: A Product of Self-Selection and Public Policies. Environment and Planning 39: 2074, 2075.

[95] Terner Center for Housing Innovation at UC Berkeley, 2024. How much can new housing contribute to state climate action? Accessed on November 11, 2024 by Fehr & Peers at: https://ternercenter.berkeley.edu/blog/how-much-can-new-housing-contribute-to-state-climate-action/

[96] Evaluating the Potential for Housing Development in Transportation-Efficient and Healthy, High-Opportunity Areas in California. Marantz N.J, et al. 2024. https://ww2.arb.ca.gov/sites/default/files/2024-03/II.1%20-%20DRAFT_FINAL_REPORT_20STC009.pdf

Affordable housing used for VMT mitigation should qualify for at least one of the location types mentioned in this section, or shown in **Inset 1**, so that residents are close to jobs and other community amenities. MTC presents additional context on how to quantify the VMT reduction benefits of infill housing in diverse locations in their white paper *SB 743 Policy Adoption Technical Assistance Program Establishing an Infill and Affordable Housing Screen* (April 2024).[97]

5.6.1.2 Assumptions

Below is a summary of the effectiveness and implementation requirements that are presented in the CAPCOA 2021 Handbook for these strategies:

- Strategy T-1: Increasing Residential Density can reduce up to 30.0 percent of GHG emissions from project VMT in the study area. The elasticity of VMT with respect to residential density is -0.22, meaning that a 1 percent increase in development density would reduce VMT by about 0.22 percent.[98] This strategy is referred to as "Infill" in this study.
- Strategy T-4: Integrating Affordable and Below Market Rate Housing can reduce "up to 28.6 percent of GHG emissions from project/site multifamily residential VMT based on lower vehicle trip generation rates for lower income households. Multifamily residential units must be permanently dedicated as affordable for lower income families." This strategy is referred to as "Affordable" in this study.

In addition to these CAPCOA measures, the study team also used data from the California Household Travel Survey (CHTS) to account for differences in average trip lengths in San Mateo County. Residents of San Mateo County drive 7 percent fewer miles, on average, than other Bay Area residents. This dynamic is more pronounced in areas of the county with a high number of jobs and nearby amenities. Brisbane residents, for example, drive about 31 percent fewer miles than the average Bay Area resident and San Bruno residents drive about 20 percent fewer miles. Locating affordable housing development in communities like these lowers VMT by placing people closer to jobs and other amenities, reducing the distance they need to travel when communicating.

The study team used existing affordable housing locations that are identified in city planning documents as representative sites for an affordable housing VMT mitigation measure. **Table 37** shows these representative affordable housing projects, which include sites from a diverse set of San Mateo County jurisdictions. These sites will add 1,175 affordable housing units, and the study team assumed that all these case study locations will provide 100 percent income-restricted affordable housing. Lead agencies could use this measure for similar 100 percent affordable housing projects, or they could fund a selection of affordable housing units that are part of a broader development project. The CAPCOA formula used in this study does not factor the affordability level of these units in these VMT calculations.

[97] https://abag.ca.gov/tools-resources/digital-library/mtcinfillhousingvmtwhitepaperpdf

[98] As noted in the CAPCOA Handbook, this elasticity is appropriate for residential uses that are greater than the average residential density in the U.S. of 9.1 dus/acre.

Table 37: Affordable Housing Representative Locations

Housing Site	City	Units	Transit-Oriented Area	C/CAG Equity Focus Area	Proximate to Resources
33 Arroyo Dr	South San Francisco	150	X	X	X
1015 El Camino Real	South San Francisco	220	X	X	X
732/740 El Camino Real	San Bruno	134	X	X	X
840 San Bruno Ave W	San Bruno	341	X	X	X
1876 El Camino Real	Burlingame	169	X		X
1804 Bay Road	East Palo Alto	50		X	X
1010 Metro Center Blvd	Foster City	111			X

Source: Fehr & Peers, 2024

5.6.1.3 Gap Financing

There are two approaches for determining how much credit can be taken for contributions to affordable housing construction. The first approach would be to only take VMT/GHG reduction credit for the share of an affordable housing development that a mitigation project would fund. The other approach would take full VMT/GHG reduction credit for providing funding towards an affordable housing project, even if the mitigation program only provides partial funding for those units. Lead agencies would need to demonstrate that these units would not have otherwise happened, if not for the mitigation program's gap financing, to use this second VMT mitigation approach.

The study team learned, in conversations with the San Mateo County Department of Housing, that existing countywide affordable housing programs typically only provide gap financing, and that affordable housing developers in San Mateo County typically use other funding streams, such as the Low-Income Housing Tax Credit Program (LIHTC), to finance the rest of their projects. The importance of gap financing for leveraging LIHTC and other creative affordable housing production strategies is explored in the Terner Center Report *Addressing the Housing Needs of Low-Income Households in the Bay area: the Importance of Public Funding* (August 2024).[99] Therefore, it is reasonable for lead agencies in San Mateo County that wish to use affordable housing as mitigation measure to fund approximately 25 percent of an affordable housing development's cost when using this strategy and take full credit for the VMT or GHG reduction associated with those new units.

5.6.1.4 Methodology

Table 38 shows the estimated VMT reductions from this study's seven representative affordable housing developments. The study team prepared these estimates using the CAPCOA strategies for affordable and infill housing. On average, these representative projects would reduce about 5,400 VMT per affordable unit per year.

[99] Addressing-the-Housing-Needs-of-Low-Income-Households-in-the-Bay-Area-Final.pdf (berkeley.edu)

Table 38: Estimated VMT Reductions from Representative Affordable Housing Locations

Source of VMT Reduction	Quantification Metric	Quantification Methodology	Maximum VMT Reduction[1]	Cumulative Projects Percentage Reduction	Total Yearly VMT Reduced	Per Dwelling Unit Yearly VMT Reduced
Infill Development	Change in Density Due to Infill Development	Elasticity Method[2]	-30.0%	-30.0%	-3,399,381	-2,893
Provide Affordable Housing	Percentage of Project Units Affordable	Percentage Reduction in VMT for Affordable Units due to Lower Trip Generation Rates	-28.6%	-28.6%	-2,339,343	-1,991
Locate Homes in VMT Efficient Locations	Average Trip Lengths in Target City vs the Bay Area Regional Average	Percent difference in Average Trip Lengths in City vs Regional Average[3]	N/A	-21.99%	-1,278,076	-1,088
Combined with multiplicative damping[4]				**-61%**	-7,016,800	-5,972

Notes:

1. Reductions presented in CAPCOA's 2021 Handbook for Strategy T-1: Increase Residential Density and Strategy T-4: Integrate Affordable and Below Market Rate Housing.
2. The increase in density was calculated using the percentage increase in dwelling units per acre for each identified housing site.
3. This difference in average trip lengths was calculated using data from the California Household Travel Survey (CHTS). The CAPCOA strategy for affordable housing only accounts for the difference in the number of vehicle trips between market rate and affordable housing units. However, building more affordable housing in jobs-rich and high amenity areas also reduces household trip distances, as those residents can live closer to work. CHTS data shows that residents of South San Francisco, for example, drive 15 percent fewer miles per trip than other Bay Area residents.
4. Per the CAPCOA 2021 Handbook, the maximum VMT reduction for all site-level reductions is calculated by multiplying the effectiveness as follows to account for multiplicative damping: 1-[(1-0.3) X (1-0.286)] = 0.50.

Source: Fehr & Peers, CAPCOA, 2024

The study team estimated the cost per VMT for this measure by dividing the cost of constructing each unit by the combined VMT reduction presented in **Table 38** over a life span of 55 years.[100] The cost per VMT of this measure varies, depending on if the project is providing full or gap funding to these developments. The study team estimated that these representative projects would have a cost per VMT of $0.76 if a gap financing rate of 25 percent is used for this measure. This gap financing percentage is consistent with the San Mateo County Department of Housing's existing grant programs.[101] For full funding, the cost per VMT reduced is higher, costing $3.04 per VMT reduced.

[100] $1 million per unit, or $250,000 for 25 percent of the cost reflecting a typical gap closure amount used in San Mateo County Department of Housing applications.
[101] https://www.smcgov.org/housing/doh-dashboards

Lead agencies can also apply the housing VMT reduction calculation methods provided in this chapter for any non-deed restricted "Missing Middle" housing developments in their communities. These developments could use the infill housing reductions mentioned in this report, if they are in high resource areas. Lead agencies should not include the affordable housing quantification methodology to these non-deed restricted projects but could use the density based CAPCOA formula. Finally, lead agencies that currently collect inclusionary fees for residential or commercial development, such as commercial linkage fees, could account for the VMT reduction associated with housing construction associated with that fee if the local jurisdiction can demonstrate that the qualifying housing projects would be constructed through the local inclusionary fee program.

5.7 Greenhouse Gas Reduction Actions

As described in **Appendix D**, the Regionally Integrated Climate Action Planning Support Program (RICAPS) provides San Mateo County jurisdictions with a range of GHG mitigation options. This includes guidance on GHG-reduction strategies related to energy, transportation, waste diversion, water conservation, and tree planting. Given this existing GHG support, this VMT/GHG mitigation study only focused on a single non-VMT GHG-specific reduction strategy: expanding electric vehicle (EV) charging infrastructure. As noted in **Appendix D**, the VMT reduction strategies presented in this study also reduce GHG emissions by reducing driving, and these VMT reducing projects and programs may also be used to fill GHG mitigation needs.

5.7.1 Electric Vehicle Charging Facilities

Installing more EV chargers in San Mateo County would make it more convenient for vehicle owners to shift from internal combustion engine vehicles to EVs. This mitigation action would fund EV chargers at the five mobility hub locations discussed in the "Mobility Hubs" mitigation action section. This mitigation action would only reduce GHG, as EVs still generate VMT, and this mitigation strategy could not be used for VMT mitigation purposes.

5.7.1.1 Equity Considerations

The CBO leaders interviewed for this study ranked EV chargers as one of their lowest mitigation priorities. These CBO leaders highlighted that they do not regularly see EVs in their neighborhoods and they do not see EV charging as a need in their communities. Lead agencies should take this into consideration when developing mitigation programs. This dynamic could also change in the future, as EVs become more widespread in San Mateo County's collective vehicle fleet.

5.7.1.2 Implementation Considerations

Implementation of EV chargers may require coordination between the lead agency and an implementing agency or organization, such as Pacific Gas & Electric (PG&E) or Peninsula Clean Energy.[102] Lead agencies could set up their own EV charging expansion program as GHG mitigation instead of using existing

[102] https://www.peninsulacleanenergy.com/ev-ready/

regional programs, but the administrative needs of a new program could make this locally focused approach more complicated and expensive to implement. Sustainable San Mateo County's *2024 Indicators Report: Equitable Paths to EV Charging* (October 2024) outlines creative strategies that local jurisdictions can take to expand local EV charging access that could be funded to mitigate GHG impacts.[103]

5.7.1.3 Assumptions

The study team used the GHG reduction included in RICAPS to estimate the reduction potential of adding EV chargers to the five representative mobility hubs. This GHG reduction formula, and the variables used in this equation, are shown in **Table 39**. Key assumptions used in this GHG calculation include:

- Average total installed cost per charging port: $1,283
  - *Source: RICAPS*
- Additional EV drivers per charging port: 1
  - *Source: RICAPS*
- Average annual miles driven per licensed driver: 14,435
  - *Source: RICAPS*

This measure's cost estimates only account for the installation of EV chargers, and they do not include any construction costs to build new parking spaces.

5.7.1.4 Methodology

RICAPS provides three different formulas to calculate the GHG reductions from installing electric vehicle charging stations: one for workplace charging, one for multi-family residential charging, and another for single-family residential charging. All these charging locations involve longer-term charging, with a single vehicle using a charging space for hours at a time. This mitigation action, on the other hand, proposes to install electric vehicle chargers at publicly accessible mobility hub locations, and does not neatly fit into either of the three categories. For the purposes of this analysis, and as shown in **Table 39,** the study team used the assumptions and variables for workplace charging; unless noted otherwise, it is the most applicable of the three calculation options.

[103] https://sustainablesanmateo.org/wp-content/uploads/2024/10/2024-Indicators-Report_Equitable_Paths_to_EV_Charging.pdf

Table 39: Electric Vehicle Charging Facilities GHG Calculation

Variables	Source
Number of Electric Vehicle Chargers	User Assumption
Average Total Installed Cost Per Charging Port (New Construction)	RICAPS[1]
Additional EV drivers per charging port:	RICAPS, (for multifamily)
Average annual miles driven per licensed driver:	RICAPS
BEV Fuel Efficiency *(kWh/mile - 2030)*	RICAPS
Gasoline vehicle emission factor *(MT C02e/VMT)*	RICAPS
Commercial PCE/PG&E/DA electricity emission factor *(MT C02e/kWh)*	RICAPS
Net Total Emissions Impact (MT of C02e per Year)	**Charging Electricity Emissions Impact + Gasoline Emissions Impact**

Notes:

1. The *Regionally Integrated Climate Action Planning Suite* (RICAPS) is a set of tools and a collaboration of all 20 incorporated cities and the County in climate action planning and implementation. The workplace RICAPS assumptions were used for these calculations, unless noted otherwise.

Source: Fehr & Peers, 2024

The results of this RICAPS equation, broken down by each mobility hub location, are shown below in **Table 40**. The study team assumed that each mobility hub location would receive five electric vehicle charging stations. The number of charging stations and locations of charging stations can be changed in the C/CAG VMT/GHG Mitigation Tool.

Table 40: Electric Vehicle Charging Facilities GHG Reductions by Location

Mobility Hub Location	Number of Electric Vehicle Charging Spaces	Annual GHG Reduction (MT CO_2e)	Mitigation Action Cost
Per Location	5	-22.31	$6,736

Source: Fehr & Peers, 2024

5.8 Results Summary

Figure 7 compares the relative community support and cost effectiveness for each of the categories of mitigation actions. The right side of the chart indicates that out of all the CBO interviews, the highest number responded that affordable housing would be most beneficial (see **Appendix A**). The only measure to receive more critical than positive feedback was the Parking Program and Curb Management Program, which was then revised in response to this feedback to focus on Parking Benefit Districts to ensure this mitigation action returns funding generated by parking pricing to EFA communities. The left side of the chart presents the relative cost effectiveness of each mitigation action as described in **Appendix E**.

Figure 7: VMT Mitigation Actions Results: Community Benefits versus Relative Cost Effectiveness

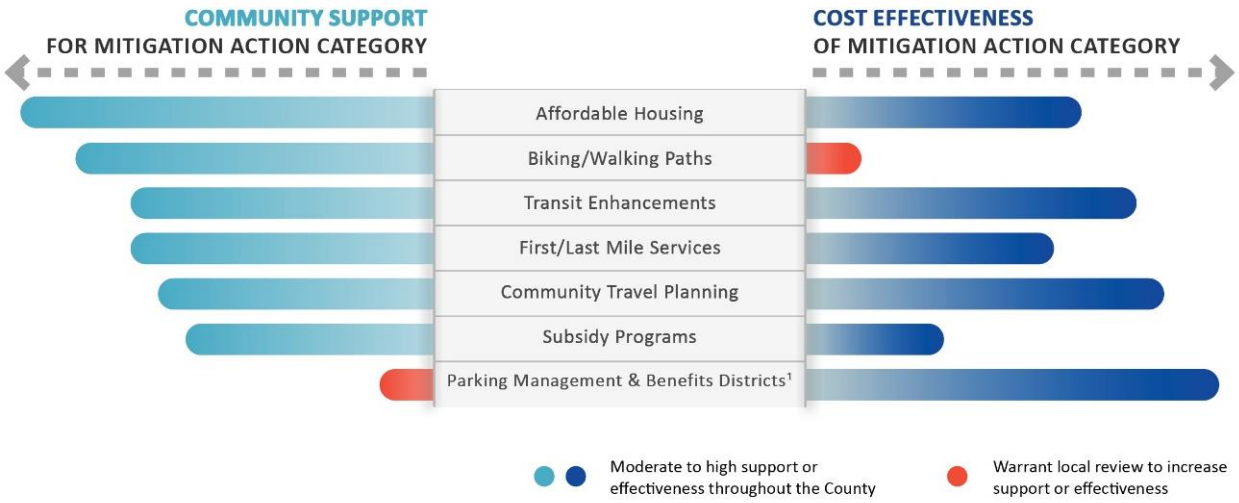


Table 41 presents detailed results for each recommended mitigation action, including the annual VMT reduction, cost estimates, and cost-per-VMT-reduced on an annual basis and over the mitigation action lifespan. As described in **Chapter 4,** the initial categories of mitigation actions presented in **Figure 7** were refined into the mitigation action list presented in **Table 41** based on CBO interviews. Lead agencies and project applicants should review the equity considerations for each mitigation action when considering which mitigation actions to use. **Appendix A** presents the results of conversations with CBOs where they rated the different actions, with the strongest support for provision of affordable housing and improving connections to EFA communities through transit service, bicycle and pedestrian facilities, and transit passes. **Appendix B** provides guidance on how lead agencies could evaluate the potential equity and environmental justice benefits and costs for each mitigation action and which mitigation actions have been included in recent community-based transportation plans. **Appendix D** provides guidance on how lead agencies could convert the VMT reductions presented in **Table 41** into GHG reductions.

Table 41: VMT/GHG Mitigation Actions

Mitigation Action	Mitigation Type (Category)[1]	Annual VMT Reduction	Annual Cost of Mitigation Action	Lifespan Cost of Mitigation Action[2]	Cost-per-VMT-Reduced (First Year)	Cost-per-VMT-Reduced (Lifespan)[2]	Description
Rail Service Frequency Expansion	Operational Project (Transit Enhancements)	-40,038,712	$26,250,000	$787,500,000	$0.66	$0.66	This mitigation action would fund increased rail service frequency. This analysis estimated the VMT reduction potential of increasing service levels by 50% between San Francisco and San Jose (2 additional trains per hour). The estimate assumes that one of those trains per hour will be an express service, which has a lower VMT reduction than the local service.
Route ECR Service Frequency Expansion	Operational Project (Transit Enhancements)	-19,801,196	$12,560,039	$376,801,175	$0.63	$0.63	This mitigation action would fund increased SamTrans Route El Camino Real (ECR) service frequency. For the purposes of this analysis, the entire extent of the bus route, from Daly City BART to Palo Alto Transit Center was analyzed for its VMT reduction potential.
Transit Priority Projects on Major Corridors	Capital Project (Transit Enhancements)	-44,540,289	$70,264,189	$70,264,189	$1.58	$0.05	This mitigation action would fund transit-supportive roadway treatments along El Camino Real in San Mateo County. For the purposes of this analysis, four different segments of El Camino Real were analyzed for the VMT reduction benefit of removing a general travel lane and adding a bus only lane. The values in this table include the three segments identified in the SamTrans *El Camino Real Bus Speed and Reliability Study*.
Affordable Housing	Land Use (Affordable Housing)	-7,016,800	$293,750,000	$293,750,000	$41.86	$0.76	This mitigation action would fund the development of affordable housing throughout San Mateo County. For the purposes of this analysis, seven representative affordable housing sites were selected throughout San Mateo County based general plan Housing Elements.

Mitigation Action	Mitigation Type (Category)[1]	Annual VMT Reduction	Annual Cost of Mitigation Action	Lifespan Cost of Mitigation Action[2]	Cost-per-VMT-Reduced (First Year)	Cost-per-VMT-Reduced (Lifespan)[2]	Description
Transit Pass Incentives	Programmatic Project (Subsidy Programs)	-1,663,589	$59,261,273	$1,777,868,190	$35.62	$35.62	This mitigation action would fund transit passes for all people in San Mateo County with a household income at or below 200% of the Federal Poverty Line.
E-Bike Rebate Program	Programmatic Project (Subsidy Programs)	-1,270,164	$666,667	$20,000,000	$0.52	$0.52	This mitigation action would fund an e-bike rebate program for 20,000 San Mateo County residents.
Community Based Travel Education	Programmatic Project (Community Travel Planning)	-7,195,472	$2,080,142	$62,404,256	$0.29	$0.29	This mitigation action would fund Community-Based Travel Education in participating San Mateo County cities
Mobility Hubs	Operational Project (First/Last Mile Services)	-1,136,420	$1,417,500	$42,525,000	$1.25	$1.25	This mitigation action would fund the installation of mobility hubs at several locations throughout San Mateo County. For the purposes of this analysis, five representative mobility hubs, each of which include electric carshare, electric bikeshare, and scootershare were evaluated to assess VMT reduction potential.
Micromobility Services	Operational Project (First/Last Mile Services)	-3,594,878	$9,528,750	$285,862,500	$2.65	$2.65	This mitigation action would fund an electric bikeshare program throughout San Mateo County. For the purposes of this analysis, the bikeshare program will include 605 e-bikes across 20 cities.
Shuttle / Microtransit Services	Operational Project (First/Last Mile Services)	-1,744,406	$461,207	$13,836,221	$0.26	$0.26	This mitigation action would fund the expansion of the existing on-demand transit system, SamTrans Ride Plus, in East Palo Alto. For the purposes of this analysis, the proposed service hours will increase from 16 for the existing service to 24.

Mitigation Action	Mitigation Type (Category)[1]	Annual VMT Reduction	Annual Cost of Mitigation Action	Lifespan Cost of Mitigation Action[2]	Cost-per-VMT-Reduced (First Year)	Cost-per-VMT-Reduced (Lifespan)[2]	Description
Bicycle Infrastructure	Capital Project (Biking/Walking Paths)	-93,273	$116,719,848	$116,719,848	$1,251	$41.71	This mitigation action includes implementing new Class I, Class II, and Class IV bike lanes on several roadways across San Mateo County.
Pedestrian Infrastructure	Capital Project (Biking/Walking Paths)	-646	$3,038,766	$3,038,766	$4,701.93	$156.73	This mitigation action would fund the installation of pedestrian infrastructure improvements across San Mateo County. For the purposes of this analysis, 10 hypothetical pedestrian improvements were used to assess this measure's VMT reduction potential.
Parking Management and Benefit Districts	Capital Project (Parking Management)	-108,387,950	$10,797,150	$10,797,150	$0.10	$0.003	This measure would fund parking management infrastructure in downtowns and other high activity areas with high parking demand. For the purposes of this analysis, three example downtowns in San Mateo County—San Mateo, Redwood City, and Burlingame—were analyzed for their VMT reduction potential

Notes:

1. Mitigation action categories correspond to those shown in **Figure 7** and to the preliminary list of mitigation actions that was reviewed with CBO's.
2. All of the mitigation actions are assumed to have a 30-year lifespan, except for the affordable housing measure, which was calculated with a 55-year lifespan.

Source: Fehr & Peers, 2024.

6. Implementation

This VMT/GHG Model Mitigation Program is intended to be implemented by countywide or local lead agencies in San Mateo County. Coordinated regional VMT/GHG mitigation programs transfer some responsibilities for demonstrating that mitigation actions are effective, enforceable, and feasible from a lead agency to an administering agency. This administering agency then needs to monitor the effectiveness of the program's mitigation measures to demonstrate their ability to reduce VMT and GHG. Coordinated regional VMT/GHG mitigation programs are complex mechanisms that require regular ongoing administrative attention and effort to function effectively, and the costs of administering a coordinated mitigation program can be a barrier to launching and maintaining such a program.[104] Given that no San Mateo County countywide agencies currently have the authority to assume responsibility to oversee a coordinated program such as a VMT Bank, the Program presented in this study includes guidance for lead agencies to incorporate the findings into their existing CEQA processes. This approach is consistent with past voluntary VMT guidance prepared by C/CAG for member agencies. To implement a coordinated program, local agencies would need to assign a portion of their CEQA oversight responsibilities to the regional agency. The voluntary program described within this report could be used to set up that program in the future.

This section provides implementation guidance for lead agencies, a guide for application of the VMT model mitigation program, case studies where elements of this model program are currently being implemented, and future considerations for VMT mitigation in San Mateo County. While this program can be used for GHG mitigation in addition to VMT mitigation, the remainder of this chapter focuses on VMT mitigation for clarity and simplicity.

The following case studies are presented in this chapter to illustrate how elements of this model program are currently being implemented:

- 21 Elements countywide Grand Nexus and Feasibility Study includes example impact fee studies, ordinances, and other guidance relating to transportation and commercial-housing impact fees that could be repurposed for VMT mitigation (see **Section 6.1**)
- South San Francisco's approach to General Plan tiering with TDM measures and off-site transportation fee (see **Section 6.1**)
- City of Roseville's approach to General Plan tiering through a VMT mitigation action menu (see **Section 6.1**)
- City of Escondido's VMT Mitigation Exchange program (see **Section 6.2.2.1**)

[104] Administering agencies could charge administrative fees to help manage a mitigation program. These administrative costs, which would be charged in addition to mitigation measure expenses, would be periodically reviewed and refined to ensure that the administrative burden is sustainable. These administrative costs are expected to be like other impact fee programs, ranging from 1 to 5 percent of a mitigation action's costs.

- San Mateo County Department of Housing standard agreements for ensuring money is spent in a manner consistent with a mitigation action (see **Section 6.2.4**)
- MTC's Clipper Start program mitigation action monitoring example (see **Section 6.2.5.1**)
- West Contra Costa County Subregional Transportation Mitigation Fee program example of an agreement providing a regional agency the authority to manage local jurisdictions impact fees (see **Section 6.3**)

6.1 Lead Agency Options

Cities, counties, and transportation agencies, in their role as lead agencies under CEQA, have discretion to pursue any type of VMT mitigation strategy, as long as those mitigation measures can be demonstrated to be effective, enforceable, and feasible. Lead agencies could use the information presented in this study for off-site VMT mitigation for individual project-level CEQA studies or to set up a programmatic mitigation program. For either approach, lead agencies will be responsible for demonstrating the effectiveness, enforceability, and feasibility of the selected mitigation actions or program.

Using this study for individual project-level CEQA allows lead agencies to incorporate the findings of this study into their existing CEQA processes with minimal preparation. Lead agencies and project applicants would select from the list of mitigation actions presented in **Chapter 5**, calculate the effectiveness of those mitigation actions using the C/CAG VMT/GHG Mitigation Tool, and document the monitoring requirements in their mitigation monitoring and reporting program. While this approach requires a lower near-term effort, lead agencies would not be able to tailor the mitigation actions list to local priorities and it does not provide agencies with the streamlining opportunities that a mitigation program entails.

Cities and counties also have a unique programmatic mitigation strategy associated with tiering under CEQA Guidelines Section 15183.[105] This section of the CEQA Guidelines relieves a project of additional environmental review if the environmental impact was adequately addressed in a general plan's environmental impact report (EIR) (meaning that project-level mitigation to lessen future VMT impacts must be included in the EIR) and the project is consistent with the general plan.

> *15183. Projects Consistent with a Community Plan or Zoning*
>
> *(a) CEQA mandates that projects which are consistent with the development density established by existing zoning, community plan, or general plan policies for which an EIR was certified shall not require additional environmental review, except as might be necessary to examine whether there are project-specific significant effects which are peculiar to the project or its site. This streamlines the review of such projects and reduces the need to prepare repetitive environmental studies.*

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

> *15130. Discussion of Cumulative Impacts*

[105] A General Plan EIR can also be used to streamline project-level VMT analysis though other methods such as tiered EIRs (CEQA Guidelines Section 15152) and Program EIRs (CEQA Guidelines Section 15168).

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

For San Mateo County jurisdictions, addressing transportation VMT impacts in city or county general plan EIRs could streamline subsequent project CEQA reviews. Under this approach, a VMT impact associated with a general plan's growth would be identified. The local agency would select mitigation actions that are both feasible and that could be implemented through standard conditions of approval or through a mandatory transportation impact fee or VMT mitigation programs. Lead agencies could also account for any VMT reductions that are associated with implementing C/CAG's TDM requirements and from contributing towards any existing commercial-housing linkage impact fee programs. Most jurisdictions in San Mateo currently maintain transportation impact and commercial-housing linkage fee programs and could thus consider updating these programs to mitigate the General Plan VMT impacts.[106] However, contributions to those local transportation impact fee programs could only be considered if they go towards VMT reducing projects, such as the ones identified in this study, and they could not go towards improvements that induce VMT, such as roadway capacity projects.

Under this tiering approach, any project VMT impacts would be able to remain significant if there are no sufficient mitigation actions to reduce VMT to less than significant levels, or if the cost of mitigating development project VMT impacts would make those projects infeasible. Subsequent development and transportation projects that are consistent with the city's general plan would simply tier from this finding, and no new VMT impact analysis would be required for these subsequent projects. These development projects would contribute to the general plan's VMT mitigation by implementing mitigation actions through standard conditions of approval or through VMT mitigation payments, if the jurisdiction decides to implement such a program. South San Francisco uses this approach to set TDM requirements and fund transit and active transportation infrastructure in the East of 101 area to address the significant VMT impacts generated in this area.

Using standard conditions of approval could take the form of a VMT exchange where specific mitigation actions in the general plan EIR are identified as part of a VMT mitigation menu. Individual project applicants would negotiate with the jurisdiction to select the menu items best suited for their project. Those actions would be incorporated into the project's conditions of approval representing their contribution to lessening future VMT growth consistent with the general plan expectations. An example of this approach is used by the City of Roseville – see mitigation measure 4.3.1.[107]

[106] 21 Elements developed a countywide Grand Nexus and Feasibility Study in 2016 for San Mateo County jurisdictions and maintains a database of example impact fee studies, ordinances, and other guidance relating to transportation and commercial-housing impact fees: https://21elements.org/housing-topics/affordable-housing/impact-fees-and-inclusionary-zoning/

[107] https://cdn5-hosted.civiclive.com/UserFiles/Servers/Server_7964838/File/Government/Departments/Development%20Services/Planning/General%20Plan/Final%20General%20Plan%20EIR/City%20of%20Roseville%20EIR.pdf

6.2 Guide to Using the Model VMT Mitigation Exchange Program

This section provides instructions and case studies that lead agencies can consider when utilizing the model VMT Mitigation Exchange program. **Figure 8** presents the process for using the VMT model exchange program. The C/CAG VMT Mitigation Action Tool is an excel-based tool to help lead agencies or project applicants calculate the effectiveness of the selected mitigation actions in Step 4. This tool incorporates the data and formulas used for each of the 14 mitigation actions based on selected representative actions used in this study. It is the responsibility of the user to verify that any user input assumptions are supported by facts and evidence, are current, and are accurate.

Figure 8: Process for Using VMT Exchange

6.2.1 Standard Household Size and Number of Employees

The following standard values will be applicable to all projects utilizing the VMT Exchange Program. The values should be reviewed and updated periodically. While there is no required timeline for updating these programs, lead agencies could reference impact fee nexus studies, which are updated every 8 years, or in coordination with general plan updates, which are typically every 10-15 years.

6.2.1.1 Standard Household Size

The average household size in San Mateo County is 2.8 persons per household.[108] This may change over time as new census data is available. The VMT Exchange Program user should apply the following persons per household to perform the VMT reduction needed calculation in Step 3 unless newer data is available:

- Studio: 1.0 persons per unit
- Single/Multi-Family Residences: 2.8 persons per unit

6.2.1.2 Standard Number of Employees by Employment Use

Nexus studies conducted for 21 Elements in San Mateo County illustrate the typical standard employee density for different types of land uses.[109] More recent studies for nearby jurisdictions include more recent data.[110] Lead agencies should confirm the appropriate employee density based on the latest available information. Below are some typical rates from these studies that are used for the case studies based on the data from the 21 Elements study:

- Office: 333 square feet per employee
- Retail and Services: 667 square feet per employee
- Hotel: 1,000 square feet per employee

6.2.2 Model Program Case Study

Figure 9 presents examples of how the calculations would work when using this program for the typical commercial development projects that are most likely to result in significant VMT impacts in San Mateo County using the C/CAG VMT/GHG Mitigation Action Tool. The commercial project example is a 500,000 square foot office building or complex of buildings. Office projects will typically result in a significant VMT impact when located outside of one-half mile of a Caltrain station or El Camino Real, such as the bayfront areas east of U.S. 101. This case study relies on information for a typical northern San Mateo County bayside jurisdiction and presents a mix of land use, programmatic, and capital mitigation actions as examples. The ultimate VMT reduction potential of mitigation actions would depend on the jurisdiction where the mitigation action is

[108] 2022 American Community Survey (ACS) 5-year estimates for San Mateo County. Retrieved August 2024 from: https://data.census.gov/table/ACSST5Y2022.S1101?q=household%20size&g=050XX00US06081

[109] http://www.21elements.com/documents-mainmenu-3/impact-fees-and-inclusionary-housing/763-redwood-city-revised-commercial-report-091415/file

[110] Commercial Linkage Fee Nexus Analysis prepared for the City of San Jose (July 2020).

located, which would include tailoring the inputs to the C/CAG VMT/GHG Mitigation Action Tool to reflect local conditions.

Figure 9: VMT Exchange Case Study

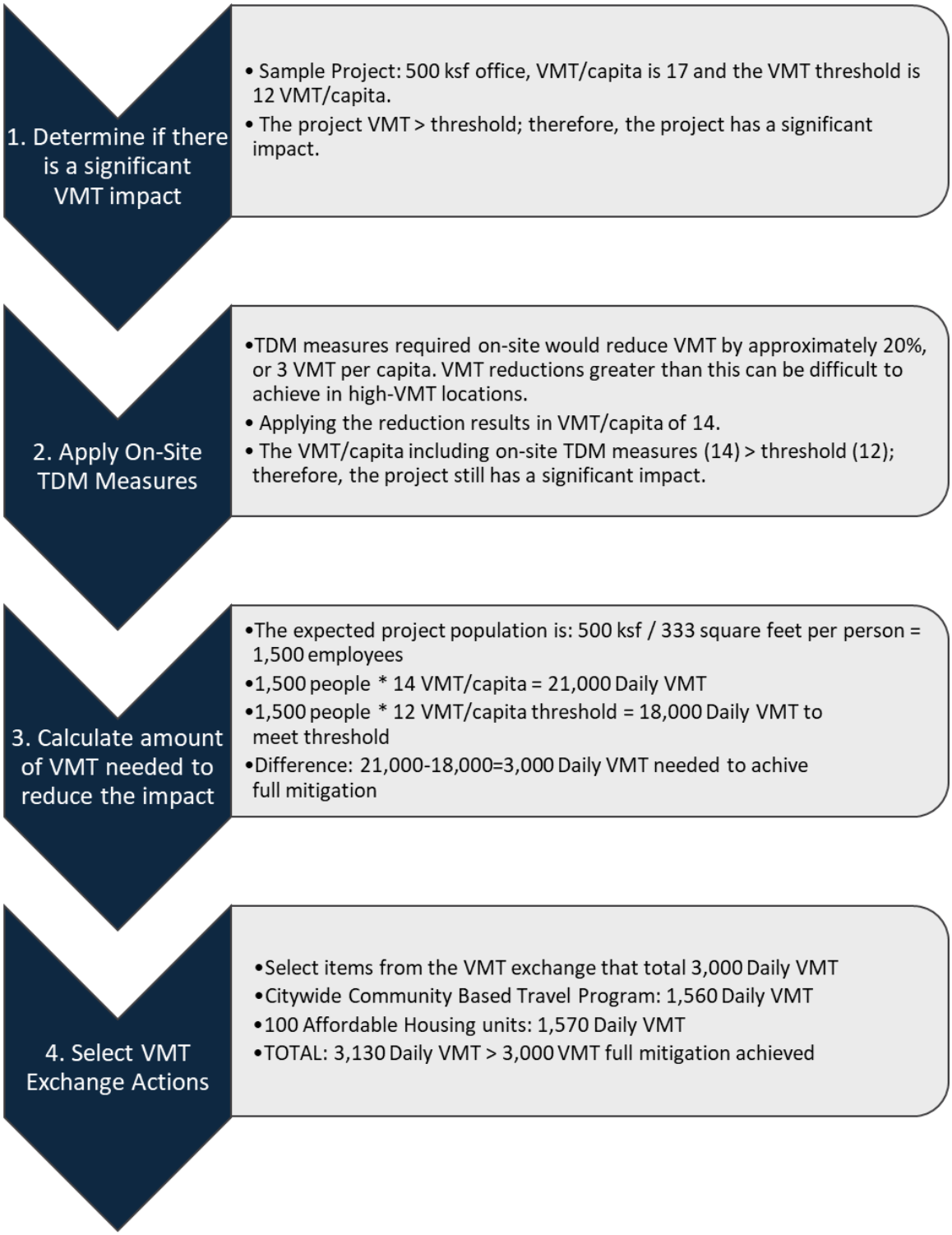


Table 42 compares the VMT reductions and the cost estimates for the mitigation actions for two different mitigation packages that could be applied to the hypothetical commercial project. A range of different local mitigation actions is presented for illustrative purposes and is not intended to be prescriptive for this type of project. This case study aligns with the Equity and Environmental Justice Recommendations depending on the local community needs, as expressed through studies such as community-based transportation plans and this study's interviews with CBOs. Residential projects that need VMT mitigation could use a similar approach to commercial projects where the per capita VMT values multiplied by the population would provide the daily VMT that needs to be mitigated. Retail or transportation projects would use total VMT in the significance thresholds and therefore the total daily VMT over the threshold would need to be mitigated.

Table 42: Commercial Project Case Study, Costs for Two Different Mitigation Packages

Mitigation Action	Amount	Equity Review	VMT Reduced	Lifetime Cost[1]	Cost per Project Sq. Ft. [2]
Affordable Housing Focus					
Affordable Housing	100 units of affordable housing	High CBO priority	1,720	$25,000,000	$50.00
Community-Based Travel Education and Outreach[3]	Citywide for approximately 2,000 low-income residents, including proposed affordable housing project[1]	Low CBO priority but could implement CBTP priorities	1,560	$5,140,800	$10.28
Total			**3,280**	**$30,140,800**	**$60.28**
Community Services Focus					
Mobility Hub	Construct one mobility hub with 5 shared EV's, 5 e-bikes, and 5 scooters	Low CBO priority but could implement CBTP priorities	880	$8,505,000	$17.01
Shuttles-Microtransit	Expand local shuttle service by 25%	Moderate CBO priority but could implement CBTP priorities	2,510	$6,918,100	$13.84
Total			**3,390**	**$15,423,100**	**$30.85**

Notes:

1. Programmatic measures such as Community Based Travel Education and Outreach and E-bike Rebates could be paid up front or on an annual or as requested basis. Lifetime costs are presented to normalize the costs for each.
2. Cost per square foot (sq. ft.) presented for comparison purposes to impact fees presented below.
3. VMT reduced is estimated based on South San Francisco for representative purposes, which assumes that 10 percent or approximately 2,180 households, qualify targeted by the Community Based Travel Education and Outreach.

Source: Fehr & Peers, 2024

To put the costs shown above in some context, **Table 43** shows the existing housing linkage fees and transportation fees that are charged by several jurisdictions in San Mateo County on new commercial projects, such as the one used in this case study.

One question that has arisen from the TATF is whether existing local fee programs, including commercial-housing linkage fees and transportation fees, might be able to serve as VMT mitigation. If jurisdictions can demonstrate that their existing impact fee programs meet the criteria for a feasible mitigation action, providing substantial evidence that the actions funded by the programs have VMT reducing effects, then it may be possible for the jurisdiction to use those fees as VMT mitigation. Additional information on the existing fees charged in San Mateo County is presented in the memorandum *Landscape Review of Impact Fees in Four Cities in San Mateo County* (January 2024) by Strategic Economics presented in **Appendix F**.

Table 43: Local Transportation and Housing Impact Fee Comparisons Applied to Commercial Projects

City	Commercial-Housing Linkage Fee	Transportation Fee	Office Total Housing + Transportation Fee
South San Francisco	$16.55	$37.28[1]	$53.83
East Palo Alto	$11.40	$8.60	$20.00
Redwood City	$23.62	$2.38	$26.00
San Francisco[2]	$69.60	$24.04	$93.64
Range of VMT Mitigation Costs Presented in Table 42			***$30 to $60***

Notes: All fees are per square foot.
1. Includes transportation fee of $30.53, traffic fee of $6.66, and Bicycle and Pedestrian fee of $0.09. All fees shown are per square foot.
2. San Francisco fees are presented here: https://codelibrary.amlegal.com/codes/san_francisco/latest/sf_planning/0-0-0-23588

Source: Fehr & Peers, 2024

6.2.2.1 VMT Exchange Program Case Study: Escondido

The City of Escondido VMT Exchange program was adopted in 2022 and provides a list of off-site transportation projects and programs that a project applicant can select to mitigate their VMT impact.[111] The program offers a variety of VMT reducing projects and programs, such as constructing bicycle and pedestrian facilities, improving transit stops, funding a City-run circulator shuttle, and funding commute trip reducing programs for City staff and residents/employees within Escondido. These projects and programs are those that have been identified through citywide plans but do not currently have funding allocated to them. After identifying the amount of VMT per day that the project would generate over the threshold, the project applicant selects from a list of qualifying measures that offer pre-determined levels of VMT reductions. The project applicant is then responsible for implementing these mitigation actions through their mitigation monitoring and reporting program (MMRP).

[111] https://www.escondido.org/Data/Sites/1/media/Planning/VMT/EscondidoFeeProgramDocumentation_PublicReviewDraft10212022_clean.pdf

6.2.3 CEQA Review of Mitigation Measures

Lead agencies must evaluate the potential secondary effects of mitigation measures to ensure they do not have a significant impact on the environment. The mitigation actions presented in this report generally qualify for statutory or categorical exemptions and therefore would not be subject to CEQA. This includes affordable housing projects, which generally qualify as exempt from CEQA in most locations in San Mateo County per Assembly (AB) 1449.[112] Most infrastructure and operational bicycle, pedestrian, and transit projects are exempt from CEQA per SB 922.[113] SB 922 applies to transportation projects that make streets safer for walking and biking or improve transit services that are located within the existing right-of-way, do not add automobile capacity, do not demolish affordable housing, and meet minimum labor requirements. In cases where projects are estimated to cost over $100 million, the lead agency must expand public participation, prepare a business case, and conduct a racial equity and displacement analysis to avoid disproportionate impacts. Lead agencies should consider the relevant local conditions to confirm these exemptions apply to the selected mitigation actions. OPR's *Technical Advisory on Evaluating Transportation Impacts in CEQA*[114] provides additional information about the types of projects that are not exempt from CEQA but would not likely lead to a substantial or measurable increase in vehicle travel and thus could be presumed a less than significant transportation impact on the environment.

6.2.4 Implementing Agencies

As presented in **Table 9** and described in **Chapter 5,** for each mitigation action, the implementing agency will often be different from the lead agency overseeing the environmental impact assessment. Lead agencies will be responsible for facilitating a contractual agreement between the project applicant, implementing agency, and lead agency that will determine responsibility for payment for the mitigation action; implementation of the mitigation action; and monitoring the effectiveness of the mitigation action. Most implementation agencies, such as the San Mateo County Department of Housing or Commute.org, currently have programs and contracts in place that can be used for this process. An example is the San Mateo County Department of Housing, which has contracts used for receiving money from a diversity of different funding sources and contracts used for distributing money and ensuring that the affordable homes are built and maintained for 55 years; these example contracts could be provided to the lead agency as a part of the mitigation monitoring and reporting program.[115] For countywide regional agency mitigation, joint agreements will be required similar to those used for the San Mateo 101 Express Lanes projects between C/CAG and SMCTA.

---

[112] https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240AB1449

[113] https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB922

[114] Technical Advisory on Evaluating Transportation Impacts in CEQA http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf

[115] San Mateo County Department of Housing includes their standard agreements for loans within their Notice of Funding Availability (NOFA). This is shown in the most recent NOFA request (round 12 from April 2024) in **Appendix** D. of the AHF12-NOFA: https://www.smcgov.org/media/148063/download?inline=

6.2.5 Monitoring Requirements

Lead agencies are required to prepare project or program-level mitigation monitoring and reporting programs (MMRP) as the final step of the CEQA process to demonstrate that the mitigation was completed as intended. Lead agencies should seek to incorporate monitoring of the mitigation actions presented in this report into their existing MMRP processes.

MMRP's typically include confirming whether the mitigation action was completed and how effective the measure is. Practically, this is a challenging process for local jurisdictions to maintain due to limited staff capacity or staff turnover. Demonstrating that the mitigation action was completed as a part of a MMRP is similar to how jurisdictions maintain impact fee programs. Impact fee programs are required to demonstrate that fee revenues are being directed towards the impact fee program's project list. These impact fee programs need annual financial reporting and need their project list to be verified every five years. This level of monitoring and documentation satisfies the requirements of the Mitigation Fee Act and aligns with how many lead agencies currently conduct their CEQA MMRP process. For lead agencies seeking to enhance the defensibility of their existing MMRP's, lead agencies will need to identify data sources that can demonstrate the effectiveness of the mitigation actions after implementation. For VMT mitigation purposes, this could include a variety of data sources, such as participation surveys, transit ridership, and connected vehicle data.

The following subsections present a summary for how MTC monitors transit passes usage as a case study for lead CEQA agencies and additional considerations related to monitoring the equity recommendations presented in this report.

6.2.5.1 Mitigation Action Monitoring Case Study

MTC's Clipper Start program distributes transit passes to low-income individuals throughout the San Francisco Bay Area. MTC provides data to help transit operators monitor use of the program, which is a mechanism that could be used by lead agencies to monitor transit passes. This data includes the following:

- Monthly summaries of data about usage of the transit passes, including number of trips by operator, transfers, number of unique cards used, amount of discounted fare, etc. The operators are also able to access some of this detailed data themselves if needed.
- Data about the applications for the program, including number of applications submitted, number of applications approved, and summaries of different fields in the application (demographics, city, county, etc.). This information is not provided to transit agencies for privacy reasons but could be incorporated at an aggregated level if needed for future mitigation programs.

This type of data sharing approach could serve as an example for other programmatic mitigation actions that lead agencies could incorporate into the MMRP process to demonstrate that the mitigation actions are being used as required for VMT mitigation.

6.2.5.2 Equity Monitoring Considerations

Equity metrics are not typically evaluated through lead agency CEQA processes. Lead agencies could use the MMRP process to report back through responsible commissions or committees that focus on equity at the city or countywide level. Jurisdictions could start by determining the appropriate equity metrics that should be evaluated for land use and transportation changes through the General Plan Environmental Justice elements. **Appendix B** presents recommendations for how lead agencies can incorporate equity metrics into routine monitoring processes, such as transportation and land use plans or the CEQA process, which are summarized below:

- **Recommendation 8: Use metrics or key performance indicators (KPIs) to evaluate equity benefits of potential mitigation actions, track outcomes, report, and improve effectiveness over time**. In addition to VMT/GHG reduction effectiveness, mitigation actions should also prioritize equity advancement effectiveness/benefit (outcome equity) based on quantitative and qualitative metrics or KPIs. Such equity measurements should similarly be monitored over time as VMT/GHG reductions that are monitored during the MMRP. Examples of metrics may include the number of low-income families benefiting from affordable homes built due to investment from the mitigation action program, or number of transit trips taken for participants in the affordable transit pass program. Ideally, ongoing monitoring and evaluation can and should lead to adjustments to the mitigation action(s) as applicable for both GHG/VMT and socioeconomic disparity reduction effectiveness.
- **Recommendation 9: Report and obtain input on mitigation action and program effectiveness and adjustments to EFA voices and other impacted populations over time**. Use communication and engagement strategies to ensure that progress and changes to mitigation actions and program outcomes are reported back to impacted communities and equity/EFA leaders. This can include indicators such as percentage of mitigation action spending in EFAs and number of mitigation actions funding needs within CBTPs and other equity-focused needs assessments. Strategies to improve communication with the community on progress for equity related outcomes could include online dashboards to track progress on goals, establishing equity and VMT mitigation advisory committees, and providing routine updates to CBOs and the community.

6.3 Future Considerations

Given that VMT is very new as a measure of transportation impacts under CEQA, there is substantial uncertainty about the legal and administrative requirements to create valid and well-supported mitigation strategies. Further, there continue to be major changes in how and when we travel, as a result of both the COVID pandemic and the continuing evolution of transportation-related technologies. All these uncertainties merit ongoing awareness, coordination, and planning by lead agencies to make necessary adaptations to any future VMT mitigation program, and to take advantage of emerging opportunities for cost-effective VMT mitigation. Examples of activities that C/CAG and lead agencies might take to facilitate this adaptation include the following.

- Monitoring case law on VMT as a measure of transportation impact in CEQA, and adequacy of VMT mitigation, will be critically important. It is a truism that CEQA is part statute and part case law, and changes in case law can occur relatively quickly. C/CAG can, on behalf of its member agencies, assist in tracking emerging case law and changes in statute that affect VMT mitigation.
- Several approaches to administratively implementing VMT mitigation have been discussed here (fees, exchanges, banks). At the time of this report, very few mitigation programs are in active operation, with exchange programs appearing to be the most feasible given the constraints facing San Mateo County (e.g., many jurisdictions with existing impact fee programs and lack of a coordinating agency that would administer a bank). Given the number of lead agencies working on this same issue around the state, novel approaches will undoubtedly be developed and implemented over time and C/CAG and its partners can and should continue to learn from other agencies.
- If, after successful implementation as a voluntary local and countywide model program, the C/CAG Board or other regional agency considers transitioning to a mandatory regional program, additional policy actions and authorizations would be required. One potential option for this sort of transition would be to integrate a mitigation program into the countywide Growth Management Program and identify a countywide agency to serve as an administrator that could fund more countywide mitigation actions, such as the transit actions that are identified as regional mitigation actions. The regional VMT mitigation programs that are currently in development around California are typically an extension of existing regional impact fee programs, and therefore these existing programs provide an example of what C/CAG could pursue for San Mateo County. One Bay Area example of this type of fee program is the West Contra Costa County Subregional Transportation Mitigation Fee program.[116]
- As it currently stands, the Mitigation Fee Act limits impact fee revenues to be used only on capital investments. As described in this report, while there are some infrastructure-related VMT reduction strategies, many other strategies involve non-infrastructure expenditures, such as operating transit services or funding programs that incentivize changes in travel behavior. In support of the state's policy emphasis on VMT reductions, C/CAG and its member agencies could advocate for legislative changes to the Mitigation Fee Act to allow impact fee revenues to be used for a wider range of investment categories, such as transit operations.
- All the research on VMT reduction potential used in this report is from the "before COVID" period. Indications are that the pandemic and the subsequent changes in economic and social norms are likely to have long-term effects on choices about travel. For example, current evidence shows that transit ridership has been slow to return to pre-COVID levels in the Bay Area. C/CAG and its partners should track continued post-COVID changes to travel, as well as newer research on VMT generation and reduction, and adjust VMT mitigation programs accordingly. At the same time, programs such as the Clipper BayPass program by MTC are being evaluated and may lead to new

[116] Information on the West Contra Costa Fee program is accessible here: https://www.westcontracostatc.gov/app_pages/view/210. The agreement used to assign responsibility from local to regional agencies for this role, which could serve as an example for future VMT mitigation programs, is here: https://www.westcontracostatc.gov/files/managed/Document/802/Fully%20Executed%202019%20STMP%20Master%20Coop%20Agreement.pdf

information about the potential for measures within this program to produce locally appropriate VMT reductions.

- All the research presented herein does not account for the adoption of autonomous vehicles or electric air taxis given the lack of substantial evidence supporting the conclusions for how these technologies will affect VMT. C/CAG has adopted an AV Strategic Plan[117] that will help establish procedures for monitoring how these technologies will affect travel. Regional or statewide agencies will need to continue to monitor these technologies to determine whether they are changing the effectiveness of VMT mitigation actions presented in this report.

[117] https://ccag.ca.gov/wp-content/uploads/2024/11/4.2-A1-SM-AV-Strategic-Plan-Final-Report.pdf