# Contra Costa Countywide Vehicle Miles Traveled (VMT) Mitigation Program Framework

Prepared for:
Contra Costa Transportation Authority

CONTRA COSTA
transportation
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# Executive Summary

## Introduction

With the passage of SB 743 and adoption of vehicle miles traveled (VMT) as the preferred 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 have historically focused on on-site actions such as 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. 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.

Through the effort documented in this report, the Contra Costa Transportation Authority (CCTA) has taken the lead on exploring the possibility of a countywide VMT mitigation program in Contra Costa, which could apply to land use or transportation projects that trigger significant VMT impacts and that require feasible mitigation. This was a need identified by the Contra Costa Planning Directors in 2019 and was included as a component of the 2020 Transportation Expenditure Plan for a new transportation sales tax measure in Contra Costa, which ultimately failed at the ballot in March 2020.

This study has been led by CCTA in partnership with Caltrans and was informed by a Project Advisory Committee made up of representatives from local jurisdictions, local and regional transit operators, state and regional transportation agencies, organizations that promote sustainable transportation and land use policy, and the development community.

## Potential Program Structure

There are 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.
- **VMT In-Lieu Fee Program:** Project applicants would pay a fee towards one or more VMT reduction strategies based on the lead agency's finding of a reasonable relationship between VMT reductions and the enhancement of the public welfare. Court decisions have indicated that

in-lieu fee programs may not be subject to the strict nexus requirements found in the Mitigation Fee Act; at the same time, with a lower level of rigor applied to the nexus determinations, an in-lieu fee program standing alone may not satisfy the CEQA requirements for substantial evidence.

This study is agnostic about the various program structure options and has been focused on evaluating a range of options based on stakeholder input and designing a program framework that seems to best serve the local context and needs in Contra Costa.

## Evaluation Criteria

In conjunction with the Project Advisory Committee, a set of evaluation criteria were developed that express the local priorities for the program. As program options were identified and discussed, the options were compared against these criteria to gauge the level of alignment with local priorities.

1. **Legal Foundation:** Does the program meet statutory requirements established under CEQA and other relevant state laws?
2. **Agency Oversight & Funding:** Which entity would manage the program and how would the program administration be funded?
3. **Geography & Scale:** Could the program be applied 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 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 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 program clear and easy to understand, and does it result in predictable and affordable results?

## Potential VMT Reduction Strategies

The purpose of a VMT mitigation program is to fund a set of off-site VMT reduction strategies (meaning strategies that occur on a broader scale than a single development site) that can be demonstrated to lessen the VMT impacts of projects that participate in the program. This study investigated a wide range of off-site VMT reduction strategies that might be suitable for inclusion in the Contra Costa VMT mitigation program, and looked at the costs of implementation, the estimated effects on VMT, and resulting calculations of cost effectiveness.

Because the purpose of this program would be to help projects comply with CEQA requirements, and because CEQA requires that substantial evidence be provided to support findings, particular emphasis was placed on strategies for which there is a substantive body of evidence about their effects. At the same time, VMT mitigation programs are extremely new and the literature about the VMT effects of different policies and actions is evolving rapidly; therefore, it will be important that the program be flexible and able to adapt as our knowledge about VMT changes.



To move in the direction of a program that satisfies CEQA expectations, this study explored several categories of potential VMT-reducing strategies that are supported by substantive evidence:

- **Infrastructure Strategies**
  - Improvements to the pedestrian or bikeway networks
- **Programmatic Strategies**
  - Trip reduction programs offering travel information and incentives to encourage people to choose low-VMT options
  - Carshare programs
  - Bikeshare programs
- **Transit Service Strategies**
  - Extending transit routes or hours of service
  - Increasing transit frequency or offering Bus Rapid Transit service
- **Pricing Strategies**
  - Pricing on-street parking
  - Reducing transit fares

In addition, the study explored several emerging **land use-related strategies,** such as financial incentives to facilitate infill development and rental or mortgage assistance allowing people to live closer to their workplaces, that show promise for VMT reduction but that do not yet have a body of research speaking to their effects. While an initial mitigation program may focus on strategies with more robust existing data, the project stakeholders supported continued exploration of these and other land use strategies to develop more quantitative information about the potential for substantive effects on VMT.

Considering the general categories of VMT-reduction strategies described above, the study identified a number of representative strategies that could occur in Contra Costa, along with estimates of the costs and the VMT reductions that could be associated with each one. These representative strategies included, among others, things like closing gaps along the Bay Trail, implementing Complete Streets improvements along major corridors such as Bailey Road, instituting bus shuttle services through downtown Concord or Bishop Ranch, implementing a countywide carshare or e-bikeshare program, and deploying a countywide Mobility on Demand (MOD) app that provides real-time trip planning and payment processes and incentives for the use of more efficient modes.

As shown in **Table ES-1**, the representative strategies explored here exhibit a wide range of cost-effectiveness, expressed as the total cost to implement the strategy for a 10-year period compared to the total amount of VMT reduced over that same period. This result indicates that the local context matters a great deal when implementing VMT reduction strategies, and that it can be challenging to develop uniform assumptions about costs or VMT effects that could apply consistently across the entire county, even within a particular category of strategies.

**Table ES-1: Ranges of Cost Effectiveness for Representative VMT Reduction Strategies in Contra Costa**

| Category | Estimated Cost per Total VMT Reduced over 10 years |
|---|---|
| Infrastructure Strategies: Improvements on bike and pedestrian facilities | $60 - $225 |
| Programmatic Strategies: Carshare or e-bike share programs, MOD app | $0.08 - $3 |
| Transit Service Strategies: Extend transit hours or routes, increase frequencies | $1 - $25 |
| Pricing Strategies: Parking pricing, transit fare reductions | $0.20 - $0.50 |
| Land Use Strategies: Subsidies for workforce housing | $1 - $2 |

## Development Costs and Test Cases

A VMT mitigation program will impose new costs on projects that trigger significant VMT impacts. As expressed in the evaluation criteria, the stakeholders were interested to learn more about the effects that those additional costs might have on the financial structure of the projects that would pay into the mitigation program. To explore those questions, the consultant team evaluated the overall development costs of several general categories of land development projects, and explored questions about whether additional costs could be absorbed while still achieving typically acceptable levels of investment returns.

Current development cost scenarios were investigated for several general categories of development: single-family residential, multi-family residential, office, and light industrial. Under current cost conditions, there appears to be limited potential for typical office or multi-family residential projects to absorb additional costs, as these development categories already experience challenging financial scenarios under current market conditions. The single-family residential and light industrial categories appear to have more potential for absorbing additional costs while still achieving the level of investment return that is typically considered feasible for project financing. More specifically, the analysis looked at scenarios where the additional cost associated with VMT mitigation payments ranged up to $5,000 per single-family unit or up to $4 per square foot for light industrial uses, and concluded that mitigation payments of that magnitude could generally be accommodated.

In light of those findings, two hypothetical test cases were developed, one as a prototypical single-family residential project and the other as a prototypical light industrial project. The VMT impacts of each project were calculated based on its location and size characteristics, and a variety of VMT reducing strategies were considered that could mitigate those impacts. Under a scenario where the lowest-cost VMT strategies were applied, the cost to fully mitigate each project's VMT impacts was calculated at $2,000 per unit for the prototypical single-family residential project and $5 per square foot for the prototypical light industrial project. Applying higher-cost VMT strategies would naturally result in higher mitigation costs for each of the test cases. Thus, if the objective were to achieve full mitigation for these prototypical development projects and to keep the mitigation payments generally within the magnitude of costs that



were found to be absorbable under current market conditions, the mitigation strategies selected would need to be highly cost-effective.

## Next Steps

As a first step toward a countywide VMT mitigation program, CCTA could establish a targeted pilot program that would allow for ongoing monitoring, testing, and refinement over time. Based on stakeholder feedback, it was determined that a future pilot program should be voluntary, in which local lead agencies and/or individual project sponsors could choose to participate as a means of lessening a project's VMT impacts. The program should be administered by CCTA and overseen by an Advisory Committee, made up of representatives from participating jurisdictions and interested stakeholders. If CCTA decided to pursue a future pilot program, it could conduct a subsequent study to develop a more detailed pilot program implementation plan, building upon the findings and framework from this initial study.

# 1. Introduction

The Contra Costa Transportation Authority (CCTA), in partnership with the California Department of Transportation (Caltrans) and local agency partners, is leading one of the first local efforts in the state to explore a Vehicle Miles Traveled (VMT) mitigation program framework for projects in Contra Costa 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. This report is the initial step in that effort. It identifies a series of program criteria for the development of a countywide VMT mitigation program, describes the cost and efficacy of potential VMT mitigation strategies that could be included in such a program, and outlines next steps for the roll-out of a pilot program.

**Key Terms:**

- **VMT:** Vehicle miles traveled
- **Mitigation Program:** The policy framework that enables off-site mitigation of VMT impacts
- **Mitigation Strategies:** Individual VMT-reducing actions, such as capital improvement projects, programs, services, or management approaches that could be delivered through a mitigation program
- **Project Applicant:** Sponsor of a land use or transportation infrastructure project that requires VMT mitigation

The report is organized into eight chapters:

1. ***Introduction*** – provides an overview of the study background, VMT 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. ***Program Criteria and Framework*** – describes the criteria used to evaluate program options and the resulting recommendations and key policy questions that were identified and investigated through this study.
4. ***Countywide VMT Context*** – describes VMT estimated to be generated by new residents and workers in Contra Costa and identifies the VMT reductions estimated to be needed to achieve the CEQA targets.
5. ***Potential VMT Reduction Strategies*** – describes the range of VMT mitigation strategies, including infrastructure, transit service changes, trip reduction programs, travel behavior change incentives, and land use strategies, that could be included in a mitigation program. This section also provides information related to equity considerations in Contra Costa and the relationships between VMT generation and under-resourced communities.
6. ***Development Costs and Test Cases*** – describes the potential costs associated with VMT reduction strategies and the projected effects on two prototypical land use development projects.
7. ***Considerations for Program Design*** – outlines program framework options, including legal foundations, administrative framework, and monitoring requirements, and recommends next steps for implementation.

8. ***Next Steps*** – describes an initial pilot program that could be implemented countywide, along with ideas for how local agencies could leverage a mitigation program for CEQA streamlining.

## 1.1 Study Background

With the passage of SB 743 and adoption of VMT as the preferred CEQA transportation impact metric,[1] lead agencies have begun defining VMT impacts and identifying mitigation options. This study does not address how the significance of VMT impacts is determined; each lead agency has the discretion and the responsibility to set significance thresholds for each CEQA topic area, and thus different agencies may define a significant VMT impact in different ways. Once a project has been found to cause a significant impact, CEQA requires that the project applicant mitigate that impact to the fullest extent feasible. This study focuses on exploring different ways that VMT impacts could be mitigated.

Mitigation options for project applicants typically include the following:

- **On-site mitigation:** This typically involves physical design changes to the project or its site, and/or on-site Transportation Demand Management (TDM) strategies designed to reduce personal vehicle travel to and from the project site. Most on-site mitigation strategies for land development projects are highly 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. The effectiveness of on-site VMT mitigation strategies can thus be difficult to quantify with a high level of confidence.
- **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 lead agencies and project applicants have worked through the initial transition to a VMT metric, there has been increasing interest in seeking a wide range of effective VMT mitigation approaches, which has led several jurisdictions throughout California to explore the establishment of a VMT mitigation program. Through the effort documented in this report, CCTA has taken the lead on exploring the possibility of a countywide VMT mitigation program in Contra Costa, which could apply to land use or transportation projects that trigger significant VMT impacts and require feasible mitigation. This was a need identified by

[1] In response to growing concerns about the consequences of climate change, and the significant role of vehicle miles traveled (VMT) in the generation of greenhouse gas (GHG) emissions, the California State Legislature passed Senate Bill 743 (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 California Environmental Quality Act (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.

the Contra Costa Planning Directors in 2019, and a potential mitigation program was included as a component of the 2020 Transportation Expenditure Plan for a new transportation sales tax measure in Contra Costa, which ultimately failed at the ballot in March 2020.

## 1.2 VMT Mitigation Program Alternatives

There are several ways a mitigation program such as this could be structured. The program alternatives considered here include the following:

- **VMT Impact Fees:** allow a project applicant to pay a fee toward the cost of a set of mitigation strategies that effectively reduce VMT and are enforceable by the lead agency. Subject to the requirements of the California Mitigation Fee Act [California Government Code §66000-66001], strategies funded through impact fees should be capital improvements that can be demonstrated to have effects related to the impact being mitigated. The strategies are typically described in a capital improvement program (CIP) and the relationship between the fees and the project's share of the CIP cost are established in a nexus study.
- **VMT Exchanges:** allow a project applicant to fund and/or implement a specific mitigation strategy selected from a pre-qualified list, or to propose and fund a new strategy that can be demonstrated to achieve VMT reductions.
- **VMT Banks:** create a monetary value of VMT reduction such that a project applicant could purchase a specific number of VMT reduction credits commensurate with the level of VMT impact caused by the project. VMT reduction credits would be generated by qualified projects reducing VMT separate from any mandates or other requirements (that is, the VMT reductions eligible for credits would be in addition to reductions that are already required by law or regulation).
- **VMT In-Lieu Fee Program:** allow project applicants to pay a fee towards VMT reduction strategies based on the lead agency's finding of a reasonable relationship between VMT reductions and the enhancement of the public welfare. Court decisions have indicated that in-lieu fee programs may not be subject to the strict nexus requirements found in the Mitigation Fee Act; at the same time, with a lower level of rigor applied to the nexus determinations, an in-lieu fee program standing alone may not satisfy the CEQA requirements for substantial evidence.

The nuances of these alternatives are summarized in the factsheet included as **Appendix A** and discussed throughout the report. The program evaluation criteria established through this effort are agnostic about the program alternatives and are designed to help CCTA choose the strongest alternative for the area. The final program design for the Contra Costa VMT mitigation program may draw inspiration from each of the options, based on the preferences of participating stakeholders and the determination about the policy choices identified in this report. Therefore, rather than framing this process as a selection of one of the specific program options, this procedure is more about designing a program framework that meets the needs of diverse stakeholders across a county that experiences substantial variation in land use development context, VMT generation and mitigation needs, and capacity to implement a new mitigation program. Information in this report may also be used by CCTA member agencies that want to create their own programs tailored to their jurisdictional needs.

# 2. Study Process and Outreach

## 2.1 Study Sponsors

This study has been led by CCTA, using funding from a planning grant awarded by the California Department of Transportation (Caltrans).

## 2.2 Stakeholder Engagement and Outreach

Stakeholder engagement for this study primarily consisted of the formation and convening of a Project Advisory Committee (PAC). PAC participation was open to a wide range of potential state, regional, and local partners, including those who might implement the program and those whose work and interests would be affected by the program. This included representatives from Contra Costa County and its incorporated cities, state and regional transportation agencies such as Caltrans and MTC, local and regional transit operators, advocacy organizations that promote sustainable transportation and land use policy, and the development community. The Stakeholder Outreach Plan is in **Appendix B**.

## 2.3 Project Advisory Committee

The purpose of the PAC was to inform and seek feedback from stakeholders on the opportunities, challenges, feasibility, and overall interest in the establishment of a countywide VMT mitigation program. Throughout the course of the study, members of the PAC met five times and responded to one survey:

- **Introduction to the Project:** The first meeting was held virtually in September 2021 and was aimed at informing PAC members of the purpose and scope of the study, as well as hearing from the PAC on their insights and interest in a multi-agency VMT mitigation program and key considerations.
- **Survey:** A survey was sent to the PAC in November 2021 to solicit input from PAC members on their priorities for a VMT mitigation program in Contra Costa County. The survey is presented in **Appendix C**.
- **Program Criteria:** The second meeting was held virtually in November 2021 to present results from the PAC survey and discuss evaluation criteria for program alternatives. PAC members participated in breakout sessions to discuss concerns, desired program elements, and external challenges for a potential VMT mitigation program.
- **Mitigation Strategy Identification:** The third meeting was held virtually in August 2022 to provide an update to the PAC on recent Caltrans guidelines for VMT mitigations and to describe potential mitigation strategies and their relationship to program structure alternatives.
- **Mitigation Strategy Cost Effectiveness:** The fourth meeting was held virtually in October 2022. The project team presented estimates of the cost effectiveness of a variety of VMT mitigation strategies and solicited input on a potential program structure.

- **Proposed Pilot Program**: The fifth and final meeting was held virtually in January 2023. The project team provided an update on the calculated cost effectiveness of mitigation strategies and presented an overview of the proposed pilot program.

Presentations and notes from the PAC meetings, along with a copy of the PAC survey, are included in **Appendix C**. **Table 1** includes the full list of agencies that participated in one or more of the PAC meetings.

**Table 1: Project Advisory Committee Participants**

| Organization | Sector | Focus |
|---|---|---|
| ***Advanced Mobility Group*** | Private | Transportation consultant |
| ***Bay Area Rapid Transit (BART)*** | Public | Rail transit service provider |
| ***Building Industry Association, East Bay Chapter*** | Private | Land development |
| ***Caltrans Headquarters*** | Public | Transportation, statewide |
| ***Caltrans District 4*** | Public | Transportation, Bay Area region |
| ***City of Concord*** | Public | Local government |
| ***City of Martinez*** | Public | Local government |
| ***City of Pinole*** | Public | Local government |
| ***City of Pittsburg*** | Public | Local government |
| ***City of San Ramon*** | Public | Local government |
| ***City of Walnut Creek*** | Public | Local government |
| ***County Connection*** | Public | Bus transit service provider |
| ***Contra Costa County*** | Public | Local government |
| ***East Bay Leadership Council*** | Private | Economic development |
| ***Metropolitan Transportation Commission (MTC)*** | Public | Transportation, Bay Area region |
| ***Town of Danville*** | Public | Local government |
| ***Save Mount Diablo*** | Nonprofit | Land use, land conservation |
| ***Tri Delta Transit*** | Public | Bus transit service provider |
| ***West Contra Costa Transportation Advisory Committee (WCCTAC)*** | Public | Transportation |
| ***Western Contra Costa Transit Authority (WestCAT)*** | Public | Bus transit service provider |

Source: Fehr & Peers, 2023.

## 2.4 Small Group Meetings

The project team also conducted a small group meeting with a group of land developers active in Contra Costa County, to discuss ideas about how a VMT mitigation program might affect the costs of their projects and get their input about program design. The presentation discussed at that meeting is provided in **Appendix D**.

# 3. Program Criteria and Framework

Because a range of program options will be considered, it is important to develop criteria about what the Contra Costa program is intended to accomplish and what program features are most important to local stakeholders. The consultant team developed an initial list of evaluation criteria, which was reviewed and refined with the project team and the PAC.

The criteria fall into six categories:

1. **Legal Foundation:** Does the program meet statutory requirements established under CEQA and other relevant state laws?
2. **Agency Oversight & Funding:** Which entity would manage the program and how would the program administration be funded?
3. **Geography & Scale:** Could the program be applied 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 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 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 program clear and easy to understand, and does it result in predictable and affordable results?

A description of the process of developing and refining the evaluation criteria is provided in **Appendix E**.

## 3.1 Legal Foundation

The legal foundation for the program is the collection of statutes and regulations that define legal expectations for a mitigation program. The specific structure selected for the program (that is, impact fee, in-lieu fee, mitigation bank, or mitigation exchange) will have some effect on which regulations apply. In addition, any program, regardless of its structure, should be consistent with CEQA requirements defining what constitutes acceptable mitigation for an environmental impact. Therefore, the project team identified one criterion for evaluating the legal foundation of a program alternative:

- **CEQA Requirements:** Does the program meet statutory requirements established under CEQA?

## 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 mitigation programs. While a full case law review was not completed for this phase of the study, **Table 2** highlights major case law examples that are frequently cited when developing mitigation programs.

**Table 2: Case Law Relevant to VMT Mitigation Programs**

| Case | Description[1] | Impact Fee | Exchange | Bank | In-Lieu Fee |
|---|---|---|---|---|---|
| Nollan v. California Coastal Commission, 483 U.S. 825 (1987) | In *Nollan*, the Court held that a government could, without paying compensation, demand 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 furnish a valid ground for denial of the permit, or in other words that there is an appropriate "nexus" between the project's effect and the mitigation. This is known as the "nexus" test. | ✓ | ✓ | ✓ | ✓[2] |
| Dolan v. City of Tigard, 512 U.S. 374 (1994) | The Court further refined the Nollan requirement in *Dolan*, holding that an adjudicative 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. | ✓ | ✓ | ✓ | ✓[2] |
| Sacramento Old City Assoc. V City Council of Sacramento, 229 Cal App 3d 2011 (1991) | In this case, 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. | ✓ | ✓ | ✓ | ✓ |

Notes:

1. https://blog.aklandlaw.com/2013/07/articles/exactions-impact-fees-service-charges-and-property-taxes/the-us-supreme-courts-nollandolan-jurisprudence-is-catching-up-with-the-california-supreme-court-in-ehrlich-v-culver-city/
2. Case law indicates that the Nollan and Dolan requirements do not apply as strongly to in-lieu fee programs as to other forms of exactions.

Source: Fehr & Peers, 2022.

## Relevant Statutes and Regulations

**Table 3** provides an overview of relevant statutes and regulations and which mitigation program structure they are most applicable to.

### Table 3: Relevant Statutes and Regulations

| Statutory Reference | Description | Impact Fee | Exchange | Bank | In-Lieu Fee |
|---|---|---|---|---|---|
| **CEQA Statute**[1] **CEQA Guidelines**[2,3] | The CEQA Statute and Guidelines establish that for mitigation to be imposed, a potentially significant impact must occur. 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 mitigations must be effective, enforceable, and feasible, at the determination of the lead agency, provided that such determination is supported by substantial evidence. Mitigations must be monitored, although 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 noted above) also apply. | ✓ | ✓ | ✓ | ✓[7] |
| **Mitigation Fee Act**[4] | This legislation outlines the requirements for establishing a mitigation fee program. It includes specifications on the nexus study and 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 application 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 a proxy given that VMT banks and exchanges would be established to *conserve* (or avoid) trip making 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 provided 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

7. Case law indicates that these requirements do not apply as strongly to in-lieu fee programs as to other forms of mitigation requirements.

Source: Fehr & Peers, 2021.

## 3.2 Agency Oversight & Funding

A VMT mitigation program would be a complex mechanism that would require ongoing attention and effort in order to function effectively and efficiently. This topic included three areas of consideration:

- **Administering Agency:** Has a public agency been identified to administer the program? Does that agency currently have authority to implement the program? If not, would the agency leadership be willing to acquire that authority?
- **Transparency and Accountability:** Does the program have transparency and accountability measures built into its design?
- **Funding Source:** Is the program structured to allow the administrator to recoup administration costs?

### Administering Agency

The responsibilities of a program administrator could include program oversight and financial administration, demonstration of CEQA compliance and establishment of a nexus between VMT impact and mitigation action, data collection, analysis, and performance monitoring. Ideally, an administering agency would have the following characteristics:

- Familiarity with and connections to transportation and land use decision-making across Contra Costa County
- Willingness to lead a countywide program
- Established, trusting relationships with local and regional partners
- Sufficient staffing and resource capacity for program administration, including funding upfront financial obligations to initiate the program
- Relevant technical expertise, including staff capacity to undertake or manage nexus studies and VMT analysis

Given these considerations, the PAC unanimously supported CCTA undertaking the administrator role for a VMT mitigation program in Contra Costa County. CCTA has a long history of administering transportation funding programs throughout the county, plays a role in transportation and land use decision-making through the countywide Growth Management Program, has technical expertise in travel modeling and transportation data analysis, and is willing to lead a countywide mitigation program.

### Transparency and Accountability

For a mitigation program to provide value, project applicants, lead agency staff, and the public should have confidence that program funds are being spent effectively and that investments are consistent with



the program goals. The program should include measures to ensure transparency and accountability, through regular reporting requirements and a mechanism for regular oversight from stakeholders.

### Funding Source

The costs of administering a mitigation program could act as a barrier to launching and maintaining the program, underscoring the need for a dedicated funding source built into the program's design.[2] The cost for a project applicant to participate in the program should be set to accommodate the direct cost of providing the VMT mitigation strategies plus an additional cost element for program administration. The administrative cost should be periodically reviewed and refined to ensure that the administrative burden is sustainable and being adequately accommodated.

## 3.3 Geography & Scale

Geography and scale of a mitigation program refers to its geographic boundaries and the scalability of the program as interest in participation increases. The key questions explored in this study included the following:

- **Scalability:** Can the program be scaled up from a smaller to larger geographic area as additional jurisdictions express interest in participation?
- **Geography:** Would the program fund mitigations countywide?

### Scalability

A mitigation program could be designed to scale over time as more local jurisdictions become interested in establishing mitigation options for projects in their jurisdiction. The PAC recommended that the initial program be open on a voluntary basis to public agencies in Contra Costa County, and each agency could choose whether to participate. In addition, the program administrator should stay abreast of any new VMT mitigation programs that may be implemented at the regional or state level and should periodically consider whether there should be any changes to the Contra Costa program so that it can coordinate with other similar programs.

### Geography

One of the benefits of a countywide VMT mitigation program would be the ability to implement mitigation strategies at a relatively large scale and in targeted locations that have the greatest potential to significantly reduce VMT. At the same time, some stakeholders emphasized the potential benefits of establishing mitigation boundaries such that local communities closest to the project site would most directly benefit from the mitigation. Thus, the VMT benefits of a countywide solution should be balanced with a recognition that local communities may bear other burdens created by the project. The PAC

[2] As a precedent example, California's wildlife and conservation mitigation bank program was put on hold due to lack of funding. Legislation was passed in 2013 that allowed the Department of Fish and Wildlife, which administers the program, to begin collecting fees specific to administration, allowing the program to get back on track. This demonstrates the importance of recognizing the burden of administrative costs early on in program development.

recommended that, at least initially, the VMT mitigation program be open to funding mitigation strategies anywhere in the county, so as to maximize the effectiveness of the program at achieving its primary objective of reducing VMT in the most efficient way possible.

## 3.4 Applicability

The concept of applicability refers to decisions about the types of activities that should be included as potential mitigation strategies in a countywide VMT mitigation program and the criteria used to evaluate them prior to funding and implementation. Some of the major considerations explored in this study include the following:

- **Flexibility**: Is the program able to mitigate the impacts of both land development and transportation infrastructure projects? Would the program result in less-than-significant impacts for most projects? Does the program provide flexibility in the choice of mitigation actions, in terms of costs, location, co-benefits, and other factors?
- **Coordination**: Does the program support mitigation actions that are cohesive and well-coordinated, regardless of jurisdictional boundaries?
- **Equity**: Should the program include equity factors, such as in the selection of mitigation actions and/or in distribution of funds?

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

- **Capital Improvement Projects (CIPs):** These are physical improvements to the transportation network. VMT-reducing capital improvement projects may include 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.
- **Programs:** These are programmatic approaches to VMT mitigation, which would likely include transportation demand management (TDM) strategies such as 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.

Based on the limited existing literature that addresses VMT mitigation programs (including white papers, case law, and exploratory efforts), each type of mitigation action may be subject to constraints depending on the program design choices. For example, transportation impact fee programs that operate under the Mitigation Fee Act are required to focus on capital improvement projects, while exchanges, banks, or in-lieu fee programs can also address programmatic or operational mitigation actions. **Table 4** describes the potential to include each mitigation action type under each mitigation program structure.



**Table 4: Mitigation Strategy Eligibility by Program Type**

| Action Type | Impact Fee | Exchange | Bank | In-Lieu Fee |
|---|---|---|---|---|
| ***CIPs*** | **Straightforward:** Implementing CIP lists through transportation impact 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 as CIPs are typically funded through multiple project applicants. | **Doable (with caveats):** Exchange programs require project applicants to pay the full cost of mitigation actions to mitigate their projects. It may be difficult to match a project's mitigation obligation to a CIP'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 CIP, the mitigation action can then be implemented. Like impact fee programs, CIPs would likely be funded through multiple project applicants and are likely to experience a lag between project approval and mitigation action implementation. | **Straightforward:** Implementing CIP lists through an in-lieu fee is doable; however, the implementation of projects may lag behind project approval. |
| ***Programs*** | **Potential (with caveats):** Some transportation impact fees have started including programmatic actions in their project lists; however, the inclusion of programmatic actions 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 allocated to programmatic actions. | **Straightforward:** In-lieu fees can be applied to programmatic actions. |
| ***Operational*** | **Challenging:** The Mitigation Fee Act (Government Code §65913.8) excludes operating and maintenance costs from being funded through fees. | **Straightforward:** Like programmatic actions, O&M actions can also be right-sized to meet project applicant needs. | **Straightforward:** Purchased VMT reduction credits could be allocated to O&M actions. | **Straightforward:** In-lieu fee revenue could be allocated to O&M actions. |

Source: Fehr & Peers, 2023.

CEQA requires that proposed mitigation actions be effective at lessening the impact and be enforceable. In responses to the PAC member survey and in small group discussions, PAC members felt that a countywide program should fund a wide range of mitigation strategies, ideally including capital, operational and programmatic strategies related to transportation.

*Land Use Strategies*

PAC members diverged on whether the mitigation program should consider funding non-transportation strategies, such as land use strategies. Members who supported inclusion of land use strategies noted that vehicle travel is heavily influenced by land use decisions, and that reducing the distances between housing, jobs, and services and allowing denser development can result in lower VMT per capita. They also noted that incentivizing the construction of dense housing in mixed-use neighborhoods could help to address existing needs for housing. Other members felt that incorporating land use strategies in the mitigation action menu could present technical and legal challenges and would add complexity to a program that is new and untested.

*Equity*

PAC members diverged on whether equity should be a major consideration when identifying mitigation actions to include in the program. Some members felt that equity considerations should be a high priority, given the history of public disinvestment in low-income communities and communities of color paired with the undue burden of the climate crisis on these same communities. Other members expressed concern that incorporating equity considerations into mitigation actions may result in less effective mitigation overall, and that the highest priority should be to identify actions that reduce the most VMT at the least cost.

## 3.5 Data Analysis & Monitoring

This topic addresses the data collection, methodology, and analysis necessary to establish and monitor a VMT mitigation program. This includes two areas of consideration:

- **Standardized Analysis:** Does the program establish a standardized approach to evaluating VMT impacts and VMT reductions?
- **Program Monitoring:** Does the program have clearly defined methods for ongoing data collection and monitoring to evaluate its long-term success in reducing VMT?

### Standardized Analysis

The Mitigation Fee Act [California Government Code §66000-66001] is the primary legal framework for imposing fees through an impact fee program. It requires that a nexus be completed to demonstrate that the imposed fee is directly related to the impacts of the project, and to ensure the amount of the fee is roughly proportional to the impacts of the project. The nexus requirements for a VMT bank or exchange program have not yet been formally established or tested through legal precedent. Court decisions have indicated that an in-lieu fee program may not be subject to strict nexus requirements; payment of an in-lieu fee must be linked to an outcome that the jurisdiction has determined advances public health and welfare. Regardless of the type of mitigation program, the connection between a land use project's entitlement and any CEQA mitigation action must comply with the expectations outlined in *Nollan v. California Coastal Commission* (483, U.S. 825 (1987) and *Dolan v. City of Tigard*, 512 U.S. 374 (1994) (discussed in more detail in the **Legal Foundation** section above).

In addition, analysis will be needed to demonstrate the effectiveness of each mitigation action at reducing VMT and to quantify the benefits and costs of the actions. When evaluating the VMT reduction potential of individual mitigation actions, care should be taken to avoid double-counting reductions from future changes in land use, policy, travel behavior, and/or demographics that have already been assumed in the development of future VMT forecasts.

If the mitigation program is structured as a VMT bank, the program must also establish the cost to reduce one VMT. This cost would be based on a variety of factors, including economic conditions, development potential, full mitigation program reduction potential, and cost of implementing the full mitigation program. This is a much more complex metric to quantify and would require extensive research, economic analysis, and discussion on the best approach to valuation. The methodology would also need to include the ability for annual or more frequent adjustments to capture the varying market value on VMT reduction. This process is comparable to the valuation of cap-and-trade program carbon credits.

**Table 5** summarizes analysis requirements based on the four alternative VMT mitigation program structures.

### Table 5: VMT Mitigation Program Analysis Requirements

| Analysis | Impact Fee | Exchange | Bank | In-Lieu Fee |
|---|---|---|---|---|
| ***Nexus*** | **Required.** Impact Fee Programs are governed by the Mitigation Fee Act, which requires a detailed nexus analysis. | **Required.** At a minimum, Nollan/Dolan expectations will apply. It is still unknown whether exchanges and banks would also fall under the expectations of the Mitigation Fee Act. | | **May not be required.** California courts[1] have ruled that in-lieu fees are not subject to strict nexus requirements, beyond linking the payment of fees to an outcome that enhances public welfare and is furthered by the use of the land. |
| ***Analysis Metric*** | VMT reduction potential and the cost to implement the mitigation actions contained within the program. | | VMT reduction potential and the cost to implement the mitigation actions, and the dollar cost of reducing one VMT (evaluated on an ongoing basis). | VMT reduction potential and the cost to implement the mitigation actions. |

1. *California Building Industry Assn. v. City of San Jose* (2015) 61 Cal.4th 435.

Source: Fehr & Peers, 2023.

There are a variety of analytical tools and approaches to calculate the VMT reduction potential of mitigation actions. Several key considerations related to analysis methodology were identified through the literature review and conversations with stakeholders:

- **Standardized analysis:** With the adoption of SB 743 implementation guidelines, many jurisdictions have developed VMT calculation methodologies for project applicants to employ in their CEQA transportation impact analyses. While most of these tools have similar inputs, slight variations in methodologies may lead to different outcomes and therefore differing mitigation obligations. Adopting a standardized approach both for analyzing VMT impacts of projects and VMT benefits of mitigation actions could ensure consistency across the county and minimize confusion among jurisdictions and project applicants. The desire for consistency, however, should be balanced against accuracy, especially considering the expectations of the CEQA Guidelines and past court decisions regarding technical adequacy and substantial evidence.
- **Analyzing the VMT reduction potential of mitigation actions:** Since the adoption of SB 743 and release of Quantifying Greenhouse Gas Mitigation Measures (CAPCOA, 2010), CAPCOA's research on VMT/GHG reduction strategies has become the industry standard for quantifying VMT reduction potential at the project- and community-scale. This document was comprehensively updated in 2021 to incorporate new research and to better reflect the known effects of VMT reduction strategies.[3] This or similar substantial evidence is necessary to support CEQA conclusions about the effectiveness of VMT mitigation strategies.
    - Programs that rely on this type of research should carefully review the available evidence supporting potential reductions and their applicability within the specific land use context where they will be applied. Common limitations with current research include reduction values that do not reflect statistically significant findings, uncertain transferability across land use contexts, performance of TDM strategies being dependent on unknown future building tenants, and limited sample sizes or case studies. VMT reduction has also been shown to vary widely based on how a program has been designed and promoted.

## Program Monitoring

Lessons learned from past research and conversations with the PAC demonstrate the importance of a robust foundation of data collection and monitoring of a VMT mitigation program to demonstrate the program's long-term effectiveness. For a mitigation bank, the monitoring is even more essential since the monitoring data would be used to routinely update the monetary value of VMT reduction. There was consensus among the PAC that the mitigation program's performance should be monitored, even if data are difficult to collect. Monitoring is needed to ensure that program participants and the public can have confidence in the program, as well as to ensure that the program invests in effective mitigation actions.

- **Program monitoring:** CEQA requires mitigation monitoring as noted in CEQA Guidelines §15097. Monitoring is also essential for the long-term success of a VMT mitigation program, as it ensures that the program is effective and encourages the support of participants.

[3] Sac Metro Air District and California Air Pollution Control Officers Association. 2021. *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (GHG Handbook). Retrieved from: https://www.airquality.org/businesses/ceqa-land-use-planning/ghg-handbook-caleemod



- **Data collection:** A data collection framework should be established at the outset of the program to ensure consistency and accuracy across all mitigation actions and address data privacy, availability, and ownership concerns early on.

## 3.6 Program Risk Management

This topic refers to ways in which a mitigation program could be structured to minimize risks associated with project development, program implementation, and costs. There are several areas of consideration here, including the following:

- **Program legibility:** Is the program intelligible and intuitive to public agency staff, developers, advocates, and other concerned stakeholders?
- **Cost Certainty:** Does the program offer certainty in costs to project applicants? Does the program offer certainty in revenue to ensure mitigation actions can be implemented?
- **Cost of Mitigation:** Does the program result in mitigation costs that are financially viable for project applicants? Could the cost of mitigations achieved through the program be accommodated without compromising the viability of new housing development?

### Program Legibility

For credibility and ease of use, the mitigation program should provide a clear description of the VMT mitigation strategies eligible for funding, the costs associated with those strategies, and how the funds collected by the program will be used. The analysis of VMT impacts and reductions should be standardized to the extent possible without compromising accuracy.

### Cost Certainty

Stakeholders who are active in land use and development projects emphasized the value of certainty in project mitigation costs as being a key concern for project applicants. For each of the program structure options, **Table 6** summarizes what amount would be paid, the certainty associated with that amount, and the frequency of adjustments in that amount.

**Table 6: Cost Certainty by VMT Mitigation Program Type**

| | Impact Fee Program | VMT Exchange Program | VMT Bank Program | In-Lieu Fee Program |
|---|---|---|---|---|
| ***What is the amount being paid?*** | Adopted fee per unit | Full cost of implementation of the selected mitigation strategy(ies) | The amount required to purchase sufficient VMT reduction credits to mitigate the project's VMT impacts | Adopted fee per unit |
| ***Level of certainty about amount to be paid*** | **Certain.** Fee schedules are relatively simple and are published each year, giving project applicants a clear understanding of project costs by land use type. | **Uncertain.** Project applicants will not know which mitigation strategies are available for their project and the related cost of implementation until the impact analysis is complete. There may not be an exact match between the project's VMT mitigation obligation and the available mitigation strategies. Further, because project applicants are required to pay the full cost to implement a strategy, constant variations in construction, labor, and material costs will add uncertainty to total mitigation costs. | **Somewhat certain.** Although it requires substantial effort up front, once VMT credits are valued the credits function as a known, standardized cost. However, because the value of VMT reduction will vary based on macro-level market conditions (fuel costs, emissions reduction technology, etc.), the cost of VMT credits may also vary over time. | **Certain.** Fee schedules are relatively simple and are published each year, giving project applicants a clear understanding of project costs by land use type. |
| ***Frequency of cost fluctuations*** | Fees typically adjusted annually for inflation; nexus study updated every five years. | Cost can fluctuate constantly as availability of mitigation strategies changes | Cost of VMT credit could be updated annually, dependent on data availability | Fees may be adjusted annually or less often, at discretion of program administrator |

Source: Fehr & Peers, 2023.



### Cost of Mitigation

Some stakeholders expressed concerns about the cost of VMT mitigations and the effect that additional cost could have on the viability of new development. Several voiced particular concerns about not adversely affecting the viability of new housing developments that could be part of addressing the regional housing crisis. This is a complicated and dynamic subject, as development costs can fluctuate widely depending on macro-scale factors such as interest rates and inflation expectations, as well as on very localized factors such as site conditions and the regulatory procedures applied by the local jurisdiction. To address this concern, the consultant team conducted a development cost analysis for prototypical development projects in specific locations around Contra Costa; the findings are discussed in Chapter 6.

# 4. Countywide VMT Context

When considering a potential countywide VMT mitigation program, it is important to understand the magnitude of the VMT impacts that could occur within Contra Costa over a given time period, and thus the magnitude of VMT reductions that could be needed to mitigate those impacts. This is a complex question that relies upon assumptions regarding the number of new land use and transportation projects that may occur over that time period, how much VMT is likely to be generated by each of those projects, and how each lead agency will apply its CEQA thresholds to those projects to determine the level of significant VMT impacts and the associated mitigation requirements.

CEQA requires lead agencies to evaluate projects in their jurisdictions for potential VMT impacts on the transportation system. The types of projects that a lead agency will evaluate generally fall into two categories: transportation projects that add lane miles to the state highway system, and land use projects (that is, new residential and commercial developments) that will add to the jurisdiction's population and economic activity. Both types of projects can generate new VMT and thus must be evaluated for the potential to cause a significant VMT impact that requires mitigation.

Over a planning horizon of ten years, we estimate that future land use and transportation projects in Contra Costa may generate *about 584,000 daily VMT that would require mitigation*. The sources of those estimates are described further below.

## 4.1 Land Use Projects

Most of the added VMT in Contra Costa 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 Contra Costa 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 in order to avoid a significant impact. To allow for a countywide calculation of potential VMT impacts, we assumed this 15% threshold would apply countywide.

It is challenging to predict how much development will actually occur in Contra Costa County over the next ten years, and it is not possible at this point to know with certainty what proportion of that new development will trigger a significant VMT impact. The VMT effects of an individual development project vary greatly depending on many factors, such as the size of the project, its individual characteristics, and its location and surrounding neighborhood features. Thus, for the purposes of this estimation, we have used the Contra Costa Countywide Travel Model to produce forecasts about the transportation effects of projected future development. The model's base year is 2020 and the future year is 2040; these scenarios were used for the initial calculations, and then the results were scaled down to represent a ten-year planning period.  Some of the uncertainties inherent in using a travel model calibrated prior to COVID are discussed in Section 5.2 of this report.



**Table 7: Contra Costa VMT Per Resident**

| | Total Daily VMT Generated within Contra Costa | Contra Costa Resident Population | Total Daily VMT per Resident Population |
|---|---|---|---|
| ***Base Year (2020)*** | 46,913,500 | 1,174,000 | 40.0 |
| ***Future Year (2040)*** | 55,112,700 | 1,381,000 | 39.9 |

Source: Fehr & Peers, 2023.

Using these results, we calculated what level of countywide VMT reduction would be needed to conclude that future residents had generated VMT per capita at a rate that is at least 15% lower than the existing rate.

**2020-2040 Projections from Countywide Travel Model**

Current Rate of Daily VMT per Resident:
*40.0*
Desired Rate of Daily VMT per Resident for all future residents:
*40.0 * (1 – 0.15) = 34.0*
Projected growth in residents:
*1,381,000 – 1,174,000 = 207,000*
"Allowable" growth in VMT if the desired future VMT per resident rate were achieved:
*207,000 new residents * 34.0 VMT per resident = 7,031,000 allowable new daily VMT*
Actual projected growth in VMT:
*55,112,700 – 46,913,500 = 8,199,200 actual new daily VMT*
VMT to be mitigated, over 20 years:
*8,199,200 – 7,031,000 = 1,168,200 daily VMT*

**Ten-year projection of VMT to be mitigated:**

VMT to be mitigated, over ten years: *One-half of 1,168,200, or* ***584,100 daily VMT***

Therefore, based on the land use growth projections contained in the countywide travel model and assuming all agencies set a threshold that new development should achieve a 15% reduction in VMT per capita, over the next ten years there would be approximately 584,000 daily VMT that would need to be mitigated. To put this in perspective, this amount of daily VMT is about 1.2% of the total amount of daily VMT that is currently generated within Contra Costa County.

## 4.2 Transportation Projects

The primary source of VMT impacts through transportation projects will be the addition of more than one mile of through lane capacity to facilities on the state highway system or principal arterials on local roadways. Caltrans is the lead agency for projects on the state highway system and considers every through lane-mile added as a potential source of induced VMT. Further, Caltrans has set a CEQA threshold of zero VMT increases on the state highway system. Thus, because any project that adds through lane-miles is considered to cause some increase in VMT, and because the agency considers any increase in VMT to be a significant impact, that means all projects that add through lane-miles will cause a significant VMT impact requiring mitigation.

Within Contra Costa County, CCTA is typically the sponsor for projects on the state highway system. Over the next ten years, CCTA is sponsoring one project, the I-680 Northbound Express Lane project, that will add through lane-miles to the state highway system. There are other state highway-related projects in the Countywide Transportation Plan, although those projects are either expected to occur beyond the ten-year timeframe or are the types of projects that will not add more than one mile of through lane capacity to the system (such as projects to add auxiliary lanes or projects that reconstruct existing interchanges).

The I-680 Northbound Express Lane project has recently undergone extensive evaluation of its VMT impacts and identification of mitigation strategies to address those impacts. For context, that project would add a new express lane along about 7 miles of I-680 and was projected to generate roughly 100,000 daily VMT that would need to be mitigated. At this point, it is anticipated that the Express Lane project is likely to have a project-specific VMT mitigation strategy, and so would not be likely to participate in a potential future countywide VMT mitigation program.

It is likely that some local agencies in Contra Costa will 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. It is challenging to predict which local street projects might occur over the next ten years or to predict what VMT threshold each agency will set for its local street projects. For simplicity, we have assumed there will be relatively few local street projects that would be found to cause significant VMT impacts over the next ten years, and those projects that are found to cause impacts would create relatively small amounts of VMT requiring mitigation. As described above, even the VMT impact from the I-680 NB Express Lane project, at a large value of 100,000 daily VMT, represents a relatively small portion of the VMT impacts anticipated to be caused by new land use development, and the contribution to VMT impacts from local street projects is likely to be much smaller than that.



# 5. Potential VMT Reduction Strategies

The purpose of a VMT mitigation program is to fund a set of off-site VMT reduction strategies (meaning strategies that occur on a broader scale than a single development site) that can be demonstrated to lessen the VMT impacts of projects that participate in the program. This study investigated a wide range of off-site VMT reduction strategies that might be suitable for inclusion in the Contra Costa VMT mitigation program. This section provides a description of the strategies, an estimate of the VMT reduction effects resulting from each one, the estimated costs of implementation, and a calculation of cost effectiveness.

CEQA requires that substantial evidence be provided to support the findings in environmental impact assessment. Substantial evidence is defined as "facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts."[4] In practice, this means an analyst should present facts and evidence to support conclusions about the effectiveness of actions that are proposed as mitigations for environmental impacts. The body of research supporting the effectiveness of VMT reduction actions is currently limited but is anticipated to grow over time as public agencies in California implement and monitor the effectiveness of a wide range of VMT mitigation actions. Additionally, it should be noted that "substantial evidence" does not equate to an absolute guarantee. CEQA confirms that an agency's fact-based determination regarding the effectiveness of mitigation should be sufficient, even if other conclusions may also be reached based upon the same facts. (State CEQA Guidelines 15384(a).)

To better illuminate the range of VMT reduction strategies investigated in this study, the strategies are presented in two categories: Mitigation Menu #1 contains established transportation strategies already supported by substantial evidence in the literature; and Mitigation Menu #2 contains emerging land use strategies that indicate promise toward VMT reduction but for which there is currently limited data available.

## 5.1 General Categories of VMT Reduction Strategies

### Mitigation Menu #1: Established Transportation Strategies

Substantial evidence is available to support the VMT reduction effectiveness of a range of actions, including infrastructure investments, transit services, programs aimed toward changing travel behavior, and others, that can be taken at a relatively broad geographic scale (that is, beyond an individual project site). The primary source of data for the effects of VMT reduction strategies is the *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*

[4] California Code of Regulations, Title 14: Natural Resources. Section 15384 - Substantial Evidence. Current through Register 2022 Notice Reg. No. 50, December 16, 2022.

(2021, California Air Pollution Control Officers Association). The CAPCOA Handbook contains strategies that are supported by research, and the methods contained in the Handbook were developed to provide the best balance between accuracy and reliability, following the good practices defined by the Intergovernmental Panel on Climate Change (IPCC). The quantification methods included in the Handbook will be accurate to the degree that a project adheres to the assumptions, limitations, and other criteria specified for a given measure. The Handbook recommends that project-specific data be used whenever possible. New strategies will likely be added over time as the body of evidence for community-scale VMT reduction grows.

For each of the categories presented in this section, a table shows the general strategies identified in the 2021 CAPCOA handbook and the maximum possible effect on VMT found in the CAPCOA data, followed by examples of how those strategies could be implemented countywide in Contra Costa and estimates of the VMT reductions that could occur specifically in Contra Costa.

Estimates of VMT reductions for the Contra Costa countywide examples have been calculated using the TDM+ spreadsheet tool, which applies the methods from the 2021 CAPCOA report to specific implementation locations. Each location has unique characteristics, such as current mode share, population density, and other factors that are accounted for in the TDM+ tool. The CAPCOA report presents a maximum VMT reduction associated with each strategy; by definition, almost all implementations of that strategy will result in VMT reductions that are less than the maximum. The VMT reductions estimated for any local example should reflect the local characteristics of that situation. For the Contra Costa countywide examples described here, data about local conditions has been drawn from a variety of sources, including the Countywide Travel Model, the US Census, and regional travel surveys.

### *VMT-Reducing Infrastructure Investments*

VMT-reducing infrastructure supports bicycling and walking and improves access to transit in lieu of driving. Bike and pedestrian infrastructure could include new or expanded sidewalks, pedestrian crossing improvements, bike lanes and cycle tracks, multi-use trails, and other infrastructure that makes walking, bicycling, and accessing transit easier, more comfortable, and more useful.

**Table 8** presents several types of infrastructure strategies that could be included in a VMT mitigation program. The table describes the general strategies identified in the 2021 CAPCOA handbook and the maximum possible effect on VMT found in the CAPCOA data, followed by examples of how those strategies could be implemented countywide in Contra Costa and estimates of the VMT reductions that could occur specifically in Contra Costa given the local conditions.



**Table 8: Infrastructure Strategies**

| Strategy Name | Description | Potential VMT reductions |
|---|---|---|
| **T-18. Provide Pedestrian Network Improvement** | GENERAL DESCRIPTION: Increase sidewalk coverage to improve pedestrian access. Providing sidewalks and an enhanced pedestrian network encourages people to walk instead of drive, resulting in a reduction in VMT. | MAXIMUM POSSIBLE EFFECT: 6.4% VMT reduction within area served by network |
| | ***Countywide example:*** | |
| | ***Construct all pedestrian improvements in the 2018 Countywide Bike/Ped Plan, resulting in a 5-15% increase in sidewalk coverage countywide.*** | ***Reduction of 0.25% - 0.75% in VMT from all household trips within Contra Costa*** |
| **T-20. Expand Bikeway Network** | GENERAL DESCRIPTION: Increase the length of a city or community bikeway network to expand the interconnected system of bike lanes, paths, routes, and cycle tracks. Improving infrastructure for bicycling encourages a mode shift from vehicles to bicycles, reducing VMT. | MAXIMUM POSSIBLE EFFECT: 0.5% VMT reduction within area served by network |
| | ***Countywide example:*** | |
| | ***Fully construct the bike network defined in the 2018 Countywide Bike/Ped Plan, creating a countywide low-stress bike network and increasing total bikeway miles by 50% to 100% countywide.*** | ***Up to 0.15% reduction in all VMT generated within Contra Costa*** |

Sources: California Air Pollution Control Officers Association, *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*, 2021; Fehr & Peers, 2022.

### *VMT-Reducing Programs*

VMT-reducing programs are designed to reduce vehicular travel through promotion of walking, bicycling, transit, and/or ridesharing. These programs could include car share and bike share systems, tools and incentives to make carpooling and vanpooling easier and more attractive, and education and information campaigns that focus on reducing single-occupant vehicle trips.

**Table 9** presents programmatic strategies that could be included in a VMT mitigation program. The table describes the conceptual strategies identified in the 2021 CAPCOA report and identifies specific examples of how they could be implemented in Contra Costa County and estimates of the VMT reductions that could occur specifically in Contra Costa given the local conditions. It is important to note that programs designed to market and encourage low-VMT travel options (such as Strategies T-7 and T-23) can only be effective if those travel options are convenient and readily available.

## Table 9: Programmatic Strategies

| CAPCOA Strategy Name | Description | Potential VMT reductions |
|---|---|---|
| **T-7. Implement Commute Trip Reduction Marketing** | GENERAL DESCRIPTION: Implement a marketing strategy to promote existing commute trip reduction programs, including sharing information and promoting transportation options such as carpooling, taking transit, walking, and biking, thereby reducing VMT. | MAXIMUM POSSIBLE EFFECT: 4% reduction of employee commute VMT in area served by program |
| | ***Countywide example:*** | |
| | ***Develop and promote a Mobility On Demand (MOD) application to provide real-time, multimodal trip planning, enable uniform payment across modes, and provide incentives to reward low-VMT travel, reaching up to one-quarter of commuters within Contra Costa.*** | ***Reduction of up to 1% of employee commute VMT within Contra Costa*** |
| **T-21-A. Implement Carshare Program** | GENERAL DESCRIPTION: Provide carshare vehicles. Carsharing offers people convenient access to a vehicle for personal or commuting purposes, allowing them to rely on alternative modes for most of their trips and reducing vehicle ownership, thereby reducing VMT. | MAXIMUM POSSIBLE EFFECT: 0.15% reduction of VMT in area served by program |
| | ***Countywide example:*** | |
| | ***Offer a countywide carshare program that increases available carshare within Contra Costa by 500-1,500 vehicles.*** | ***Reduction of 0.07% - 0.15% in VMT from all trips within Contra Costa*** |
| **T-22-B. Implement Electric Bikeshare Program** | GENERAL DESCRIPTION: Provide an electric bikeshare system, providing users with on-demand access to electric pedal assist bikes for short-term rentals. Electric bikes are more effective at reducing VMT than conventional bicycles because an e-bike can make it feasible for the cyclist to take longer trips. | MAXIMUM POSSIBLE EFFECT: 0.06% reduction of VMT in area served by program |
| | ***Countywide example:*** | |
| | ***Create an e-bikeshare system that provides bikeshare access for up to 50% of county residents.*** | ***Reduction of 0.02% of VMT within Contra Costa*** |
| **T-23. Provide Community-Based Travel Planning** | GENERAL DESCRIPTION: Provide information and encouragement to local residents with a community-based travel planning (CBTP) program. CBTP is a residential-based approach to outreach that provides households with customized information, incentives, and support to encourage the use of transportation alternatives in place of single occupancy vehicles, thereby reducing household VMT. | MAXIMUM POSSIBLE EFFECT: 2.3% reduction of household VMT in area served by program |
| | ***Countywide example:*** | |
| | ***Promote non-SOV travel options to households within Contra Costa County, targeting 2% to 10% of households per year.*** | ***Reduction of .05% - .23% in household VMT over ten years*** |

Sources: California Air Pollution Control Officers Association, *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*, 2021; Fehr & Peers, 2022.



### *Transit Infrastructure and Service Strategies*

Investments in transit infrastructure and services can enable increased transit use as a substitute for driving. Transit infrastructure investments could include capital funding to purchase transit vehicles or to construct infrastructure that enables increased transit service, such as dedicated bus lanes. Transit service investments could include increased funding for transit operations (staffing, fuel, and maintenance) that allow for adding new transit routes, expanding the hours and/or frequency of existing routes, or expanding the existing transit network.

**Table 10** presents transit strategies that could be included in a VMT mitigation program. The table describes the conceptual strategies from the 2021 CAPCOA report and identifies specific examples of how they could be implemented in Contra Costa County and estimates of the VMT reductions that could occur specifically in Contra Costa given the local conditions. Potential VMT reductions from the countywide implementation examples were calculated using the Countywide Travel Model and the TDM+ spreadsheet tool. These potential reductions represent the high end of potential effectiveness since the CAPCOA methods and travel model are not fully sensitive to induced VMT effects that may occur as a result of transit improvements.

**Table 10: Transit Infrastructure and Service Strategies**

| CAPCOA Strategy Name | Description | Potential VMT reductions |
|---|---|---|
| **T-25. Extend Transit Network Coverage or Hours** | GENERAL DESCRIPTION: Expand the service area, number of routes, or operating hours of existing transit service. Increasing the places and times served by transit encourages the use of transit, thereby reducing VMT. | MAXIMUM POSSIBLE EFFECT: 4.6% reduction in VMT in area served |
| | ***Countywide example:*** | |
| | ***Extend service to off-peak period for all bus routes serving Contra Costa County, resulting in an increase of 15%-25% in total service hours.*** | ***Reduction of up to 1.15% of all VMT within Contra Costa*** |
| **T-26. Increase Transit Service Frequency** | GENERAL DESCRIPTION: Increase transit frequency on one or more transit lines, reducing waiting and overall travel times. Improving the user experience makes transit a more attractive option, resulting in a mode shift from single occupancy vehicles to transit and reducing VMT. | MAXIMUM POSSIBLE EFFECT: 11.3% reduction in VMT in area served |
| | ***Countywide examples:*** | |
| | ***Provide 15-minute headways on all bus routes countywide, increasing transit frequency by 125% within Contra Costa County.*** | ***Reduction of 3.2% - 4.3% in VMT from all trips within Contra Costa*** |

**Table 10: Transit Infrastructure and Service Strategies**

| CAPCOA Strategy Name | Description | Potential VMT reductions |
|---|---|---|
| **T-28. Provide Bus Rapid Transit** | GENERAL DESCRIPTION: Convert existing bus routes to a bus rapid transit (BRT) system, including exclusive right-of-way (e.g., busways, queue jumping lanes) at congested intersections, limited-stop service, technological improvements such as transit signal priority, increased vehicle capacity, enhanced station design, efficient fare-payment smart cards or smartphone apps, branding of the system, and use of vehicle guidance systems. BRT can increase the transit mode share in a community by improving travel times and service frequencies, thereby reducing VMT. | MAXIMUM POSSIBLE EFFECT: 13.8% reduction in VMT in area served by BRT |
| | ***Potential local example:*** | |
| | ***Provide Bus Rapid Transit on San Pablo Ave. and Macdonald (Phase 2), connecting downtown Oakland to the Richmond Parkway Transit Center and extending north to the Hercules Transit Center. Includes bus-only lanes on San Pablo Avenue and Macdonald and expanded parking at transit centers.*** | ***Reduction of up to 0.55% in VMT from all trips within Contra Costa*** |

Sources: California Air Pollution Control Officers Association, *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*, 2021; MTC PBA 2050 Project List; Fehr & Peers, 2022.

### *Pricing Strategies*

Pricing strategies affect the costs and benefits of transportation options. The use of low-VMT modes can be incentivized either by decreasing the costs of those modes and/or increasing the cost of driving. Pricing strategies that could be enabled by a countywide mitigation program include supporting the expansion of market-rate on-street parking pricing in dense commercial areas, or subsidizing transit fares.

**Table 11** presents pricing strategies that could be included in a Countywide VMT mitigation program. The table describes the conceptual strategies from the 2021 CAPCOA report and identifies specific examples of how they could be implemented in Contra Costa County and estimates of the VMT reductions that could occur specifically in Contra Costa given the local conditions.



**Table 11: Pricing Strategies**

| CAPCOA Strategy Name | Description | Potential VMT reductions |
|---|---|---|
| **T-24. Implement Market Price Public Parking (On-Street)** | GENERAL DESCRIPTION: Implement market-rate pricing for on-street parking with a focus on parking near central business districts, employment centers, and retail centers. Increasing the cost of parking increases the total cost of driving to a location, incentivizing shifts to other modes and thus decreasing total VMT. | MAXIMUM POSSIBLE EFFECT: 30% reduction in VMT within area affected by pricing |
| | ***Countywide example:*** | |
| | ***Implement demand-responsive, market-rate pricing of on-street parking in commercial areas across Contra Costa County, resulting in an increase of 25%-100% in the price to park in 10% of the area in the county.*** | ***Reduction of 0.25%-1% of all VMT within Contra Costa*** |
| **T-26. Reduce Transit Fares** | GENERAL DESCRIPTION: Reduce transit fares on the transit lines serving the plan/community area. A reduction in transit fares makes transit use less costly, thereby encouraging a shift from driving to transit and reducing VMT. | MAXIMUM POSSIBLE EFFECT: 1.2% reduction in VMT in area affected by change |
| | ***Countywide example:*** | |
| | ***Reduce transit fares on all bus routes serving Contra Costa County by 50-100%.*** | ***Reduction of 0.68% - 0.91% in VMT from all trips within Contra Costa*** |

Sources: California Air Pollution Control Officers Association, *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*, 2021; MTC PBA 2050 Project List; Fehr & Peers, 2022.

## Mitigation Menu #2: Emerging land use strategies

The transportation strategies presented in Mitigation Menu #1 are based on data from strategies that have been implemented in other locations and for which a body of research and evidence exists on the effect of those strategies on VMT. The depth and breadth of the research may vary, but for all the strategies a minimum threshold level of evidence exists that should constitute substantial evidence for CEQA purposes. The strategies presented in Menu #2 are innovative and will need more work to specify projects to implement the strategy and to confirm feasibility.

Using VMT as a measure of environmental impact and identifying methods for mitigating VMT impacts are very new areas of planning practice, and a thorough understanding of the best methods to reduce VMT may still be ahead of us, with creative approaches still needing to be developed and implemented. Compounding the novelty of this approach to CEQA transportation impacts are the dramatic changes in how and why people travel that have been unfolding over the last several years. It is possible that tried-and-true strategies from the past may not be as effective in tomorrow's world of transportation. For all these reasons, it is important to look ahead, think outside the box, and identify potential strategies that

merit consideration, even without the body of research and experience that accompany more conventional strategies.

There are several considerations involved in incorporating innovative and emerging strategies into a VMT mitigation program:

- Innovative strategies will need additional time to design and prepare for implementation. Some are complex and involve skills in topic areas outside the expertise of most transportation funding agencies, and thus may require new partners to help in design, funding, or implementation. Given the novelty of these strategies, additional authorizing actions by CCTA and relevant partner agencies would be required prior to implementing even a pilot test.
- Recognizing the higher level of risk associated with innovative strategies, pilot testing should be considered as a way of implementing a small-scale version of an innovative strategy and generating information about effectiveness, costs, and administrative challenges.
- Ideally, the risk associated with developing, testing, and implementing new strategies could be shared across multiple organizations by developing partnerships with other organizations that have a strong interest in achieving objectives around housing affordability, workforce development, and other issues beyond measurable VMT reductions.
- Given that CEQA requires substantial evidence of a strategy's effectiveness, the deployment of any emerging strategy should be accompanied by a plan for ongoing VMT monitoring and evaluation.

### *Land Use Strategies*

There is increasing interest in using land use strategies as a means of reducing VMT. Strategies that allow people to live closer to their jobs or that put more residential units close to personal services, retail, and transit opportunities should result in lower VMT when compared to a scenario of increased housing availability in low-density, high-VMT locations. While there are many possible variations on these themes, two potential strategies would involve incentives for infill development or direct assistance to people who want to live closer to their jobs, as described in **Table 12**. Because these are emerging strategies that have not been fully fleshed out, the consultant team has prepared a white paper about each strategy, describing the concept in more detail and laying out some of the data collection and programmatic considerations involved; these are provided in **Appendix F**. Some of the considerations related to use of impact fees for VMT reduction programs may apply to the housing relocation assistance program, and a bank or exchange may be a more straightforward option for funding.



**Table 12: Emerging Land Use Strategies**

| Strategy Name | Description | Potential VMT reductions |
|---|---|---|
| **Programmatic Infill Development Incentives** | Local agencies often cite the lack of adequate infrastructure and the scale/size of developable parcels as major barriers to achieving desired levels of infill development. Some agencies are developing programs to overcome some of these obstacles and accelerate the rate of infill development relative to greenfield. The challenge would be to set up such programs so that they could serve as CEQA VMT mitigation. | Unknown, but would be based on the acceleration of rate of infill development, and the difference in household VMT relative to residents of greenfield developments. For Transit Oriented Developments, CAPCOA estimates up to 30% VMT reduction compared to similar development in non-TOD location. |
| | ***Implementation example*** | |
| | Infill acceleration programs exist (e.g., SACOG's "Green Means Go" program, some elements of the One Bay Area Grant (OBAG) program through MTC). Their application as CEQA mitigation is untested. | |
| **Housing Relocation/ Affordability Assistance** | Solve the "drive 'til you qualify" dilemma for people with jobs in Contra Costa who live far outside the county, by providing financial assistance to offset the higher cost of housing and allow them to move to a low-VMT area in Contra Costa. VMT savings would be generated by reduced commuting of workers into Contra Costa, and by allowing people to live in lower-VMT areas. Similar programs exist as "employer-assisted housing" with incentives to allow workers to live within a targeted community—the innovative twist here would be to explicitly monitor VMT savings associated with the program. | Up to 40% reduction in VMT for individual households; total effects would depend on number of households participating |
| | ***Implementation example*** | |
| | Enable a healthcare worker whose job is in Martinez to relocate their residence from Stockton to a lower-VMT area of Pleasant Hill by providing a $400 monthly rent subsidy. | |

Source: Fehr & Peers, 2023.

## 5.2 Specific Potential VMT Reduction Strategies for Contra Costa

Designing a potential Contra Costa countywide VMT mitigation program requires identification of specific VMT reduction strategies that could be undertaken within Contra Costa, combined with an understanding of the costs and VMT effects that each strategy would entail. For this study, a thorough review of recent planning documents was undertaken to create a list of planned projects and programs located in Contra Costa that could have VMT reducing effects. Some of the documents reviewed included the most recent Contra Costa Countywide Transportation Plan, the MTC Plan Bay Area 2050, the MTC Regional Active

Transportation Program, short-range transit plans from local bus operators (such as County Connection, Tri Delta Transit, and WestCAT), and others.

From the list of planned projects and programs, several were selected to create a short list of representative strategies to test how each might fit within a countywide mitigation program. The strategies were selected to represent a range of the strategy categories described above, located across all geographic locations in Contra Costa, and operating at a range of different scales, from targeted projects at a specific location to areawide improvements. It should be emphasized that these representative strategies are intended to serve as examples of how the more generic categories of strategies outlined in the CAPCOA Handbook might be applied in Contra Costa. It is not intended to imply that any or all of these strategies are actually going to be implemented, nor that these are the only strategies that could be considered.

## Defining a Cost Effectiveness Metric

For each representative strategy, the analysis requires an estimate of the costs to implement the strategy and the VMT reduction that the strategy could generate if implemented. For the purposes of this study, both the costs and the effects are presented for a ten-year timeframe.

Evaluating costs over time allows for a more realistic comparison between different types of strategies. Some strategies have large start-up or construction costs but require limited funding to operate over time, while other strategies have limited start-up costs but require substantial ongoing investments every year. To put all strategies on an even playing field, costs have been calculated as the sum of the start-up or construction costs plus ten years of operating costs.

Similarly, the amount of VMT reduction achieved should be commensurate with the timeframe represented in the cost estimates and should accurately reflect the relative effects of each strategy. Some strategies primarily affect certain types of VMT (for example, commute-focused strategies have the greatest effect on home-based work trips and more limited effects on other types of trips), while other strategies affect all travel (such as land use strategies that involve residential relocations from high-VMT to low-VMT neighborhoods). For the purposes of creating a balanced metric, this study presents the effects of each strategy as the cumulative total VMT reduced over a ten-year period.

Therefore, the cost effectiveness of each strategy is calculated as the total cost to implement the strategy for ten years divided by the total VMT reduced over ten years.

## Cost Effectiveness of Representative Strategies

**Table 13** presents the results of the cost effectiveness calculations for the representative strategies. Cost estimates have been developed based on available data, such as cost estimates from recent planning documents and cost data from implementations of similar strategies in other locations. The VMT reductions have been estimated using the TDM+ tool, which reflects the equations from the CAPCOA handbook applied with data representing local conditions in Contra Costa. A more detailed description of how the costs and VMT reduction values were estimated is presented in **Appendix G**. The listings in



Table 13 should not be taken as either limiting or exhaustive: additional strategies with VMT reduction potential will undoubtedly be developed over time, and strategies that either are already implemented or are no longer priorities for the sponsoring agencies will be removed.

## Table 13: Cost Effectiveness of Representative Strategies

| | Strategy Name | Strategy Description | Category | Source | Costs (millions) | | | Total VMT Reduced (10 Years) | 10-year Cost per VMT Reduced |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Capital | Operating (Annual) | Total (10 Years) | | |
| Menu #1 Strategies | | | | | | | | | |
| ***1.*** | ***San Pablo Ave Bay Trail Gap Closure*** | Reconfigure San Pablo Ave with three travel lanes and a separate Class 1 shared-use path. Closes 3.2-mile Bay Trail Gap between Pacific Avenue in Rodeo and Carquinez Bridge Trail in Crockett. | Infrastructure | MTC-ATP | $9.48 | $0.09 | $10.43 | 132,807 | $78.54 |
| ***2.*** | ***North Bailey Road Active Transportation Corridor*** | Construct two-way cycle track, ADA-compliant curb ramps, ADA-accessible sidewalks, traffic signal, and reconfigure travel lanes on Bailey Road between Willow Pass and Canal Roads. | Infrastructure | MTC-ATP | $6.80 | $0.07 | $7.48 | 26,561 | $281.61 |
| ***3.*** | ***Martinez-Crockett Bay Trail Gap Closure*** | Construct Class 1 shared-use path from Berrellesa Street to the Nejedly Staging Area at Carquinez Strait Regional Shoreline. | Infrastructure | MTC-ATP | $2.79 | $0.03 | $3.07 | 26,561 | $115.58 |
| ***4.*** | ***Treat Blvd Ped/Bike Improvements*** | Pedestrian and bicycle improvements on Treat Blvd. | Infrastructure | MTC-PBA | $3.00 | $0.03 | $3.30 | 26,561 | $124.24 |
| ***5.*** | ***Countywide e-Bike Share Program*** | Provide an e-bike share system that results in bikeshare access for up to 50% of county residents. | Program | Consultant | $8.00 | $4.27 | $50.72 | 19,804,524 | $2.56 |
| ***6.*** | ***Downtown Concord Circulator*** | Downtown circulator/trolley service in Concord. | Transit | CC-SRTP | $1.90 | $1.70 | $18.90 | 708,953 | $26.66 |
| ***7.*** | ***Bishop Ranch Circulator*** | Circulator shuttle operating every 15 minutes throughout Bishop Ranch. | Transit | CC-SRTP | $1.90 | $1.60 | $17.90 | 124,378 | $143.92 |
| ***8.*** | ***Hercules BART Extension (Phase 3, Alternative 6)*** | Extend BART service from Richmond Station north to Hercules. Includes construction cost of guideway, 3 new stations, and a terminal yard, vehicle acquisition, and cost of added service. | Transit | CCTA-CTPL | $3,582.00 | $40.50 | $3,987.00 | 230,920,752 | $17.27 |

| | Strategy Name | Strategy Description | Category | Source | Costs (millions) | | | Total VMT Reduced (10 Years) | 10-year Cost per VMT Reduced |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Capital | Operating (Annual) | Total (10 Years) | | |
| ***9.*** | ***San Pablo/ Macdonald BRT (Phase 2)*** | Extend BRT service to the Richmond Parkway Transit Center and north to the Hercules Transit Center. Includes expanded service, expanded parking at Richmond Parkway and Hercules Transit Centers, and bus-only lanes on San Pablo Avenue and Macdonald. | Transit | CCTA-CTPL | $180.00 | $23.39 | $413.86 | 98,032,395 | $4.22 |
| ***10.*** | ***23rd St BRT (Phase 2)*** | Develop BRT route connecting planned Richmond Ford Point Ferry Terminal and Richmond Field Station via San Pablo and downtown Richmond. Includes expanded parking at Richmond Parkway and Hercules Transit Centers, new vehicle purchases, extended service to Hercules, and bus-only lanes and BRT stations on 23rd/San Pablo Avenue. | Transit | CCTA-CTPL/ MTC-PBA | $108.00 | $9.75 | $205.53 | 98,032,395 | $2.10 |
| ***11.*** | ***Concord Naval Weapon Station Routes (Phases 1-2)*** | Phase 1: Provide all-day transit service connecting CNWS to BART and downtown Concord. Phase 2: Add Los Medanos circulator route and express service between Los Medanos. BART, and downtown. | Transit | CC-SRTP | $9.32 | $9.00 | $99.32 | 5,632,816 | $17.63 |
| ***12.*** | ***15-Minute BART Feeder Network*** | Increase frequency to every 15 minutes on 10 County Connection routes serving BART stations during peak commute periods. | Transit | County Connection / MTC-PBA | $10.80 | $7.80 | $88.80 | 39,212,958 | $2.26 |
| ***13.*** | ***23rd St BRT (Phase 3)*** | Develop BRT route connecting planned Richmond Ford Point Ferry Terminal and Richmond Field Station via San Pablo and downtown Richmond. Includes bus-only lanes and BRT stations on 23rd/San Pablo Avenue and extension of Rapid Bus service. | Transit | CCTA-CTPL/ MTC-PBA | $63.00 | $11.54 | $178.36 | 98,032,395 | $1.82 |
| ***14.*** | ***Countywide Transit Fare Reductions*** | Provide fare-free transit on all bus routes operating within Contra Costa County. | Pricing | Consultant Research | n/a | $16.20 | $161.95 | 673,353,824 | $0.24 |

| Strategy Name | | Strategy Description | Category | Source | Costs (millions) | | | Total VMT Reduced (10 Years) | 10-year Cost per VMT Reduced |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Capital | Operating (Annual) | Total (10 Years) | | |
| ***15.*** | ***Countywide Carshare Program*** | Offer a countywide carshare program, subsidizing memberships by up to $50/year for all members, up to 80,000 members, and 10% administrative costs. | Program | Consultant Research | n/a | $ 4.46 | $44.55 | 148,533,932 | $0.30 |
| ***16.*** | ***Mobility As A Service (MAAS)*** | Develop a Mobility On-Demand (MOD) app to provide real-time, multimodal trip planning, streamline transit and shared mobility payments, and incentivize more efficient modes based on time of day. | Program | CCTA-680 | $6.90 | $0.33 | $10.15 | 132,806,805 | $0.08 |
| Menu #2 Strategies | | | | | | | | | |
| ***17.*** | ***Homeowner Relocation Subsidy*** | Program would fund grants or zero-interest loans to offset home purchase costs for residents who commit to a minimum residence term in a low VMT area and to completing regular travel surveys. | Land Use | Consultant Research | Ten-year cost estimated at $125,000 per unit subsidized; assume 1,000 units participate. | | $125 | 131,250,000 | $0.95 |
| ***18.*** | ***Renter Relocation Subsidy*** | Program would fund monthly rental subsidies to offset housing costs for residents who commit to a minimum residence term in a low VMT area and to completing regular travel surveys. | Land Use | Consultant Research | Ten-year cost estimated at $90,000 per unit subsidized; assume 1,000 units participate. | | $90 | 104,400,000 | $0.86 |

Sources: Fehr & Peers, 2023, also:
1. MTC-ATP: Metropolitan Transportation Commission, 2021 Regional Active Transportation Program Cycle 5 Project Applications Received List
2. MTC-PBA: MTC, Plan Bay Area 2050, Plan Bay Area 2050 Transportation Project List, https://www.planbayarea.org/2050-plan/final-plan-bay-area-2050/final-supplemental-reports/interactive-transportation-project-list
3. CC-SRTP: County Connection, 2016-2025 Short Range Transit Plan
4. CCTA-CTPL: Contra Costa Transportation Authority, Comprehensive Transportation Project List
5. CCTA-680: Draft Innovate 680 Project List, provided by CCTA
6. Consultant Research: Analysis developed by consultant team.

As shown in **Table 13**, the representative strategies exhibit a wide range of cost effectiveness. In general, infrastructure strategies such as building bicycle paths or sidewalks tend to be the least cost effective (that is, those strategies have high values for cost per VMT reduced). This is because infrastructure investments can be relatively expensive, and because walking and cycling trips tend to be relatively short and do not tend to substitute for the long car trips that contribute much of a region's VMT. This is not to say that investing in bicycle and pedestrian infrastructure is not valuable; there are many co-benefits of walking and cycling, such as personal health and community safety. For the purposes of a VMT mitigation program, which is typically aimed at achieving the greatest amount of VMT reductions at the lowest cost, the cost effectiveness of each strategy is an important consideration.

Some of the transit-related strategies have relatively weak cost effectiveness, while others exhibit a mid-range of cost effectiveness results; all the results for transit-related strategies should be viewed with caution for the reasons outlined below. The housing subsidy programs have relatively good cost effectiveness compared to many of the other strategies; housing programs could benefit from monitored pilot projects to determine what magnitude of VMT reductions might be achievable if such programs were attempted at a large scale. The most cost-effective strategies tend to be those related to changing the price of travel or that involve educating and incentivizing the public to use modes other than single-occupant vehicles.

The total amount of VMT estimated to be reduced over a 10-year period from the combined effects of all the CAPCOA-supported strategies (that is, the summation of strategies 1 through 17 in Table 13 above) would be about 1.54 billion VMT. For context, the total amount of VMT that would need to be mitigated over the next ten years in Contra Costa is estimated to be about 2 billion (calculated as the 584,100 daily VMT presented in Chapter 4, extrapolated out to ten years).

### Acknowledging Uncertainties

It is important to recognize the uncertainty of VMT effects for any particular strategy when implemented in a specific location. Adding to that general uncertainty is the fact that personal travel behavior has changed dramatically over the past several years, as the COVID-19 pandemic and evolutions in technology have triggered major shifts in when, where, and how people choose to travel and work. As a result, the historical research on which the CAPCOA handbook estimates are based may no longer fully reflect current conditions.

This may particularly be true when considering transit-related strategies. The CAPCOA research largely presumes that increases in transit ridership equate to declines in VMT without actually measuring VMT effects. Other research has shown that expansion of regional transit does not necessarily reduce overall VMT, although this conclusion was only measured at a large area scale. To complicate matters, many public transit services were experiencing declines in ridership leading up to the pandemic, and those trends have been further exacerbated since 2020. It is not yet clear what kinds of long-term changes in transit ridership and service patterns may emerge in the post-COVID era, but it is possible that the historical relationship between transit investment and ridership will be permanently altered. Thus, the CAPCOA estimates of VMT reductions associated with transit investments should be used with caution.

Another important caveat is that some of the strategies, particularly those involving the construction of infrastructure or other major capital investments such as acquiring transit vehicles, require a critical mass of funds to even begin implementation and may require a CEQA review process as well. If those types of strategies are the focus of a VMT mitigation program, the program administrator should recognize that there is likely to be a delay of at least several years between the collection of mitigation funds and the implementation of the strategies.

## 5.3 VMT and Equity Considerations in Contra Costa

This section examines how the rates of VMT vary geographically across Contra Costa and may be associated with under-resourced communities, and how the VMT mitigation actions described above might affect these communities.

**Figure 1** shows low-, medium-, and high-VMT areas within Contra Costa for each traffic analysis zone (TAZ) in the base year of 2020. Low-VMT areas are defined as TAZs with home-based VMT per resident more than 15% below countywide average (17.3), high-VMT area are those with home-based VMT per resident more than 15% above countywide average, and medium-VMT areas are those in between. The home-based VMT per resident has been developed from the Contra Costa Countywide Travel Model.

The Metropolitan Transportation Commission (MTC) defined Equity Priority Communities (EPCs) for use in developing the Plan Bay Area 2050 long-range transportation plan. EPCs are areas with a high percentage of low-income households combined with a high percentage of persons of color, or areas with a high percentage of low-income households plus a combination of three or more other factors such as housing cost burden, linguistic isolation, a high percentage of elderly or disabled residents, and other social factors. EPCs have been used here to represent under-served or under-resourced areas within Contra Costa. **Figure 1** displays the location of EPCs in Contra Costa County.

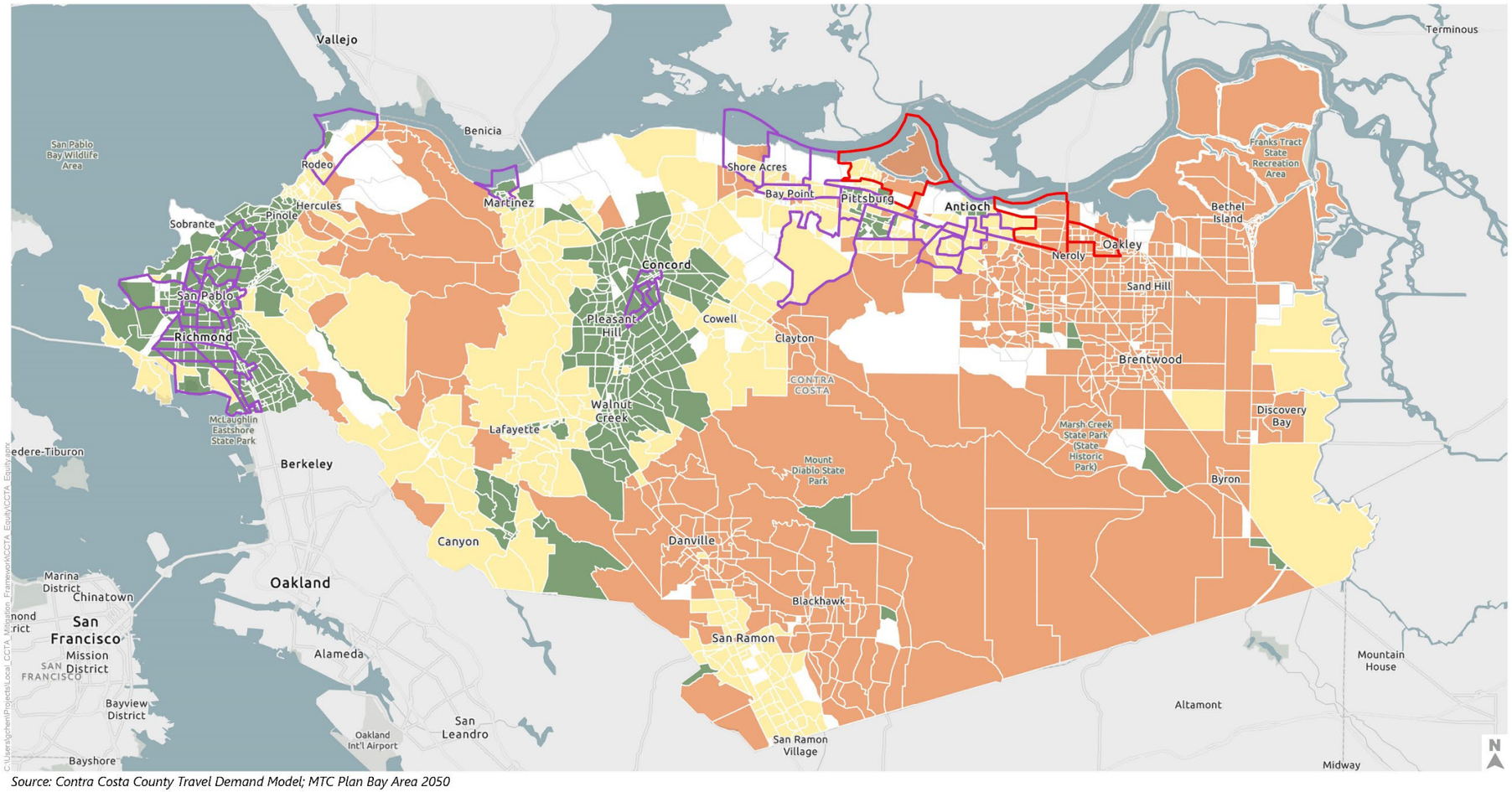
As shown in the figure, the relationship between EPC locations and areas of particularly high or low VMT is somewhat mixed. There are several areas where EPC communities have low-VMT characteristics, such as in parts of West County, Martinez, and the Monument Boulevard Corridor area in Concord. Many of these areas tend to be more urbanized, with relatively higher densities of development and a combination of travel options available including nearby transit services and bicycle and pedestrian facilities. At the same time, there are some EPC areas with high-VMT characteristics, such as in parts of Oakley, Antioch, and Pittsburg. These tend to be lower density areas with limited travel options and relatively long distances separating most activities.

Because of the variety in development patterns and VMT characteristics, it will take a variety of VMT reduction strategies to address the needs in each EPC. Many of the VMT reduction strategies listed earlier in this chapter tend to be more effective in places that have higher densities of development, shorter travel distances, and more travel options available, and thus could be more appropriate for the EPC areas that already generate VMT at lower rates. At the same time, questions should be considered about whether an EPC area that already exhibits low-VMT characteristics should be expected to implement strategies to further lower its VMT generation rate. It will also be important to consider the needs of the



EPC areas that generate high levels of VMT and acknowledge that they may need unusual or emerging strategies to address the unique circumstances of their communities. In all cases, it may be beneficial to evaluate whether a particular VMT reduction strategy could contribute to improvement of the communities' economic outcomes, and to use that as one of the criteria for deciding which strategies to prioritize within each EPC area.

*Figure 1: VMT and Equity Priority Communities within Contra Costa County*




*Source: Contra Costa County Travel Demand Model; MTC Plan Bay Area 2050*

Countywide Average Home-Based VMT per Resident (2020): 17.3

- High VMT Area (home based VMT per resident 15%+ higher than countywide average)
- Medium VMT Area (home based VMT per resident in between)
- Low VMT Area (home based VMT per resident 15%+ lower than countywide average)
- VMT Data Unavailable
- Plan Bay Area 2050 Equity Priority Communities
- Equity Priority Communities & High VMT

Figure 1

VMT and Equity Priority Communities within Contra Costa County

# 6. Development Costs and Test Cases

One of the evaluation criteria for this program is that it should result in mitigation costs that are viable for most project applicants. Developers of new residential and commercial projects in California have raised concerns about the concept of VMT mitigation programs adding substantial costs to a development process that is already lengthy and expensive. From a developer perspective, the costs of a mitigation program would ideally be offset by savings elsewhere, either by reducing other direct costs in the development process (such as other impact fees or permitting fees) or by reducing the time required to complete the development approval process. Developers have also shown an interest in mitigation programs that provide direct benefits to project users (that is, where the mitigation action takes place in close proximity to the development that paid the mitigation payments). To explore these questions further, the consultant team has investigated the cost of development in Contra Costa and evaluated the viability of adding different levels of new mitigation costs.

## 6.1 Development Costs and Potential VMT Mitigation Payments

To evaluate the implications of a potential introduction of a VMT mitigation program on the viability of new development in Contra Costa, the consultant team conducted a planning-level analysis of the development prospects of four prototype developments in different locations throughout Contra Costa. The prototypes included a single-family residential development in Antioch, a multi-family residential development in Concord, an office development in San Ramon, and an industrial development in North Richmond. It should be emphasized that these are illustrative prototypes and are not intended to represent specific development projects.

For each of the prototypes, a basic pro forma was developed to reflect the direct and indirect costs, as well as the land acquisition costs, associated with development of that type. For the single-family example, the analysis identified the sales price required to be able to cover the development costs and provide a typical level of profit. For the other examples, development feasibility was assessed based on the lease rate that would be required to provide a typical return on the development costs. For illustrative purposes, the analysis looked at potential VMT mitigation payments of $1,000, $3,000, or $5,000 per dwelling unit equivalent, and drew conclusions about what the ramifications of those levels might be on the feasibility of each development prototype. The analysis and results are described in detail in **Appendix H**.

The major findings can be summarized as follows; please see **Appendix H** for more detail.

1. A new VMT mitigation program would add costs to all private land use types and developments. Even with the relatively modest payment levels evaluated here (up to a maximum of $5,000 per dwelling unit equivalent), it could be challenging for some land use types to accommodate those additional costs under current market conditions.

2. Single-family detached development, especially in eastern Contra Costa, has been economically robust and viable in recent years. A theoretical VMT mitigation payment of $5,000 per single-family unit would represent an increase of about 0.76% in total development cost for this prototype and would require a similar increase in home price to cover that additional cost. This is a relatively modest change in overall costs, although with recent increases in interest rates and the already high costs of development, the development community is concerned about any additional cost burdens.
3. While new multi-family development projects have been occurring in some parts of Contra Costa, and many cities are encouraging such developments near transit stations, this prototype is already subject to very high development costs and must be able to achieve high lease rates to be feasible, even before the potential addition of VMT mitigation payments. To achieve the necessary return on investment, the illustrative prototype would require a lease rate of $3,800 per month for a 900 square-foot unit, which is higher than current apartment lease rates in most Contra Costa cities. A theoretical VMT mitigation payment of $5,000 per single-family dwelling unit equivalent (or $2,500 per apartment unit) would represent an increase of 0.4% in total development costs. This is relatively modest, but any cost increase should be considered in the context of the challenging development economics that already exist for multi-family projects.
4. Office development activity has been modest in recent years in Contra Costa, and the pandemic and work-from-home trends have created challenges for the office market. The illustrative prototype would require a monthly lease rate of about $5.61 per square foot to cover costs and provide a necessary return on investment; this is well above the typical lease rates for Contra Costa's larger office buildings. The combination of high development costs and contracting demand makes office development challenging. A theoretical VMT mitigation payment of $5,000 per dwelling unit equivalent would be the equivalent of $7 per gross square foot for a new office building and would represent an increase of approximately 1% in total development costs for the office prototype.
5. Industrial development, and specifically warehouse and distribution developments, have been performing strongly, and likely have some capacity to absorb additional costs. The illustrative prototype would require a monthly lease rate of $0.86 per square foot to cover costs and provide a necessary return on investment; this is well within the current range of lease rates seen for these types of buildings in Contra Costa. A theoretical VMT mitigation payment of $5,000 per dwelling unit equivalent would be the equivalent of $4.25 per gross square foot for a new industrial building and would represent an increase of about 2.5% in total development costs for this prototype; this is a more substantial increase than for the other prototypes, but it may still be absorbable given the current strong market conditions.

## 6.2 Test Cases

To better understand the ramifications of a VMT mitigation program, the consultant team looked at two specific test cases. These test cases have a mix of characteristics of actual projects that have been developed recently in Contra Costa and are not intended to represent any specific individual project. Based on the development cost analysis described above, the two development prototypes that exhibit



the highest likelihood of absorbing the costs of a new VMT mitigation program are single-family residential and industrial. These are represented in the two test cases.

- The first test case is a residential development of 150 single-family dwelling units in a suburban neighborhood where the current VMT per capita is 20% above the local threshold.
- The second test case is a 500,000 square-foot light industrial/warehouse development in a predominantly industrial/commercial area where the current VMT per worker is 50% above the local threshold.

It is assumed that each test case project would be subject to local TDM requirements that would require some on-site VMT mitigation strategies that would encourage reduced vehicle usage by the project's residents or employees. The on-site mitigation requirements would reduce but not eliminate the project's VMT impact, and the remaining VMT could then be addressed by participating in a countywide VMT mitigation program.

For illustrative purposes, these test cases look at an option where the VMT mitigation program sets a payment of $0.10 per VMT reduced. This level of payment would represent the low end of the costs of possible VMT reduction strategies; another way of stating this is that by setting the payment at $0.10 per VMT reduced, the mitigation program would focus only on strategies that are most cost effective. At the same time, it is important to recognize that setting a payment at this level would result in total VMT reductions that would be only a small portion of the total estimated ten-year countywide VMT impact described in Chapter 4.

Outcomes for each test case are outlined in **Table 14** and **Table 15** below.

**Table 14: Estimated Mitigation Costs for Residential Test Case**

| | Residential Project |
|---|---|
| ***Description*** | 150 single-family units in suburban location |
| ***VMT Impact*** | VMT per capita is 20% above threshold |
| ***On-site Mitigation*** | Assumed to be required, will partially mitigate |
| ***Remaining Impact*** | 2,950,000 total VMT over 10-year period |
| ***Mitigation Option*** | Participate in countywide VMT mitigation program at cost of $0.10 per VMT |
| ***Cost to Mitigate*** | $295,000 total, or $2,000 per house |

Source: Fehr & Peers, 2023.

The residential test case project indicates that a VMT mitigation program with a payment of $0.10 per VMT reduced would lead to a VMT mitigation cost of about $2,000 per house. Based on the pro forma analysis described above, this magnitude of additional cost could likely be accommodated without compromising the viability of the development. Note that if the VMT payment were set at a higher level,

the cost per house would scale accordingly; for example, if the VMT payment were doubled to $0.20 per VMT, the mitigation cost would also double to $4,000 per house.

**Table 15: Estimated Mitigation Costs for Industrial Test Case**

| | Industrial/Commercial Project |
|---|---|
| ***Description*** | 500,000 sq ft warehouse/office in light industrial location |
| ***VMT Impact*** | VMT per capita is 50% above threshold |
| ***On-site Mitigation*** | Assumed to be required, will partially mitigate |
| ***Remaining Impact*** | 25.8 million total VMT over 10-year period |
| ***Mitigation Option*** | Participate in countywide VMT mitigation program at cost of $0.10 per VMT |
| ***Cost to Mitigate*** | $2.58 million total, or $5 per square foot |

The industrial test case project indicates that a VMT mitigation program with a payment of $0.10 per VMT reduced would lead to a VMT mitigation cost of about $5 per square foot. This magnitude of additional cost is somewhat higher than was studied in the pro forma analysis described above, but if market conditions continue to be strong then this cost could likely be accommodated without compromising the viability of the development. Note that if the VMT payment were set at a higher level, the cost per square foot would scale accordingly; for example, if the VMT payment were doubled to $0.20 per VMT, the mitigation cost would also double to $10 per square foot.

# 7. Considerations for Program Design

## 7.1 Legal Considerations

The main legal considerations identified for a VMT mitigation program start with the CEQA statute and associated CEQA Guidelines since they govern expectations for effective and enforceable mitigation actions.[5] These are highlighted below in **Table 16** and are built upon research by Berkeley Law and ITS Berkeley.[6] Since specific statutes do not exist for VMT exchanges and banks, conservation programs established under the California Fish & Game code §1852(c) were used to set potential expectations.[7] This is a reasonable proxy given that the intent behind VMT exchanges and banks is a form of conservation. Instead of habitat, VMT exchanges and banks are trying to conserve vehicle trip making and the VMT generated through this activity. VMT mitigation banks or exchanges do not appear to require new legislative authority, but having statewide templates for their development could help establish clear standards and expectations for program designs.

[5] Association of Environmental Professionals. 2019 California Environmental Quality Act (CEQA) Statute & Guidelines, 2019.

[6] Elkind E. N., Lamm T., Prather E. Implementing SB 743 An Analysis of Vehicles Miles Traveled Banking and Exchange Frameworks, October 2018.

[7] California Legislative Information. Fish and Game Code. https://leginfo.legislature.ca.gov/faces/codesTOCSelected.xhtml?tocCode=FGC&tocTitle=+Fish+and+Game+Code+-+FGC

**Table 16: Potential VMT Mitigation Exchange/Bank Legal Requirements**

| Program Structure | Legal Requirements & Statutory Reference |
|---|---|
| Impact Fee | • Mitigation Fee Act requires individual development projects to pay for all or portion of the cost to implement public facilities necessary to support the project.[1] Public facilities are generally limited to capital projects.<br>• Court decisions have placed limits and requirements for a nexus between the mitigation and a legitimate government interest plus a rough proportionality between the mitigation and the adverse impact caused by the project.[2] This burden is lessened when mitigation is delivered through a legislated impact fee program especially for in-lieu fee programs.[3] However, Assembly Bill (AB) 602 that went into effect on July 1, 2022 does require large jurisdictions with a population of over 250,00 to adopt a CIP.<br>• CEQA Statute and Guidelines require that for mitigation to be imposed, a potentially significant impact must occur.[4] The significance of those impacts is determined by the lead agency's choice of thresholds. This limits mitigation to what is roughly proportional to the increment of VMT change that occurs above the threshold. |
| VMT Exchange or Bank | While Impact fees are well established by laws and regulation, VMT exchanges and banks are not governed by any such legal requirements. Using California Fish & Game code conversion programs the following are identified as requirements:<br>• An explanation of the VMT mitigation purpose of and need for the bank or exchange.<br>• The geographic area covered by the bank or exchange and rationale for the selection of the area, in conjunction with a description of the existing transportation and land use dynamics.<br>• A summary of historic, current, and projected future transportation stressors and pressures in the area, including economic, population growth and development trends.<br>• Provisions ensuring that the bank or exchange will comply with all applicable state and local legal and other requirements and plans and does not preempt the authority of local agencies to implement infrastructure and urban development in local general plans.<br>• VMT mitigation goals and measurable objectives.<br>• VMT mitigation projects along with a description of how to achieve the mitigation goals and objectives, and a description of project prioritization. |

Notes:

1. Government Code section 66001
2. Nollan v. California Coastal Commission, 483 U.S. 825 (1987) https://supreme.justia.com/cases/federal/us/483/825/
   Dolan v. City of Tigard, 512 U.S. 374 (1994) https://supreme.justia.com/cases/federal/us/512/374/
3. California Building Industry Assn. v. City of San Jose (2015) 61 Cal.4th 435 (CBIA). Use of an in-lieu approach has already been established by the City of San Diego for VMT mitigation. For this type of program to be effective and accepted, we would recommend that the local agencies and development community participate in the selection of the CIP projects and the setting of fee levels. Ideally, CIP projects would be viewed as improvements in the communities where the development is occurring.
4. CEQA Statute. CA Public Resources Code 21000-21189 and CEQA Guidelines. CA Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387

A review of these potential legal requirements suggests that the creation of an exchange or a bank may not be less rigorous than that of a conventional transportation impact fee program. These legal requirements, combined with the need to demonstrate additionality and provide verification, could create implementation costs beyond those of a conventional transportation impact fee program.

## 7.2 Administrative Framework

The creation and administration of the program options will differ depending on the specific mitigation actions being funded, if the program is local or countywide, and if on-going monitoring and verification of VMT reductions are required. To understand key differences, specific implementation steps for creating and administering each program type are outlined in **Figure 2**, **Figure 3,** and **Figure 4**. .

All of the program options could be operated at a local or countywide level. VMT mitigation exchanges or banks may also be possible at the regional or state level. Based on stakeholder input, CCTA was identified as a trusted agency for a countywide program. If local programs were developed, the steps in **Figure 2**, **Figure 3,** and **Figure 4** would be similar.

As programs begin to operate at larger scales, a challenge may arise in that mitigation benefits are likely to occur some distance away from the development projects that generate the funds. For some stakeholders, this can be a significant disadvantage of scaling up the program size.

The cost of administration for a VMT impact fee program is expected to be like other fee programs with a similar scale. This is commonly expressed as a percentage of the CIP, usually ranging anywhere from 1% to 4%.



*Figure 2: VMT Impact Fee – Implementation Steps*

# VMT Impact Fee

## Implementation Steps

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

### Procedural Flowchart

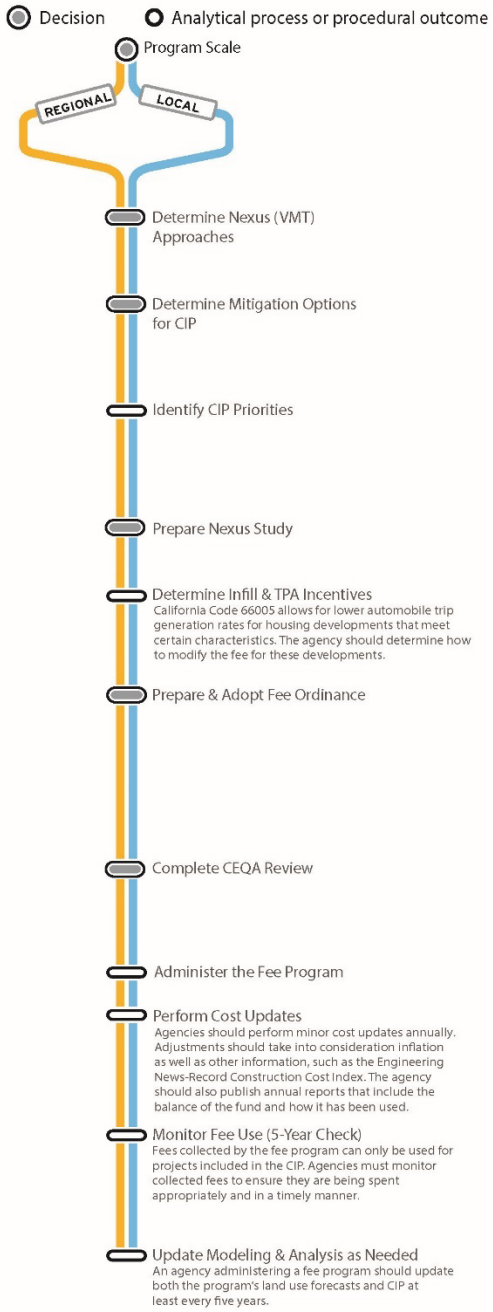


*Figure 3: VMT Bank – Implementation Steps*

## VMT Bank

## Implementation Steps

| Implementation | Considerations |
|---|---|
| Step 1<br>Determine Scale/Scope | There are advantages and disadvantages to creating a Bank with a larger scale/scope. However, multiple agencies must be willing to accept the Bank's mitigation options for a state or regional Bank to be feasible. Larger regions can:<br>• Decrease costs associated with running the Bank<br>• Decrease local authority over mitigation options<br>• Increase efficiency and effectiveness of the program |
| Step 2<br>Determine Sponsor | There are a few organizational components to consider when creating a mitigation Bank. These elements include:<br>• Administrative - The Bank must perform several administrative functions such as collecting fees, managing information, answering questions, and performing other business operations.<br>• Technical - There is a significant amount of technical work needed to initially and continually prove the mitigation options reduce VMT and that the reductions would not have occurred without the programs. The Bank also needs to show the fees it receives are related and proportional to new development.<br>• Accounting - The Bank requires a thorough accounting system to track collected fees and to ensure fees are being handled according to legal requirements. This includes payments for implementing VMT reduction projects.<br><br>Agencies should consider their ability to perform these roles when deciding whether the Bank should be run internally or by a third party. |
| Step 3<br>Formally Establish Bank & Review Team | The entity creating the Bank must legally formalize its creation. If the intent is for the Bank to be used by multiple agencies, this may require a joint powers authority or equivalent.<br><br>A review team should be used to verify the effectiveness of mitigation options based on substantial evidence. This team could be internal to the entity creating the Bank or an independent third party. |
| Step 4<br>Determine & Prioritize Mitigation Options | The Bank sponsor creates a list of mitigation options. The review team evaluates the list to ensure it complies with relevant requirements. The sponsor should consider the following elements when prioritizing options:<br>• Equity<br>• Timeliness of Implementation<br>• Cost<br><br>Mitigation options can include:<br>• Infrastructure projects<br>• Programs/incentives (Unlike infrastructure projects, programs/incentives are ongoing activities.) Because programs/incentives must be continually maintained to be effective, agencies should consider if developers must pay for them indefinitely. |
| Step 5<br>Administer Bank | The public agency or entity sponsoring a Bank may not always be the agency reviewing the land use project for approval. In this situation, the sponsor should develop an agreement with the agency that allows the Bank's mitigation options to be considered an acceptable mitigation measure.<br><br>Banks must continue to prove that their mitigation options reduce VMT and that the reduction would not have occurred without the projects/programs.<br><br>Separate environmental review of the Bank creation may be required to be considered as a formal mitigation program. |

### Procedural Flowchart

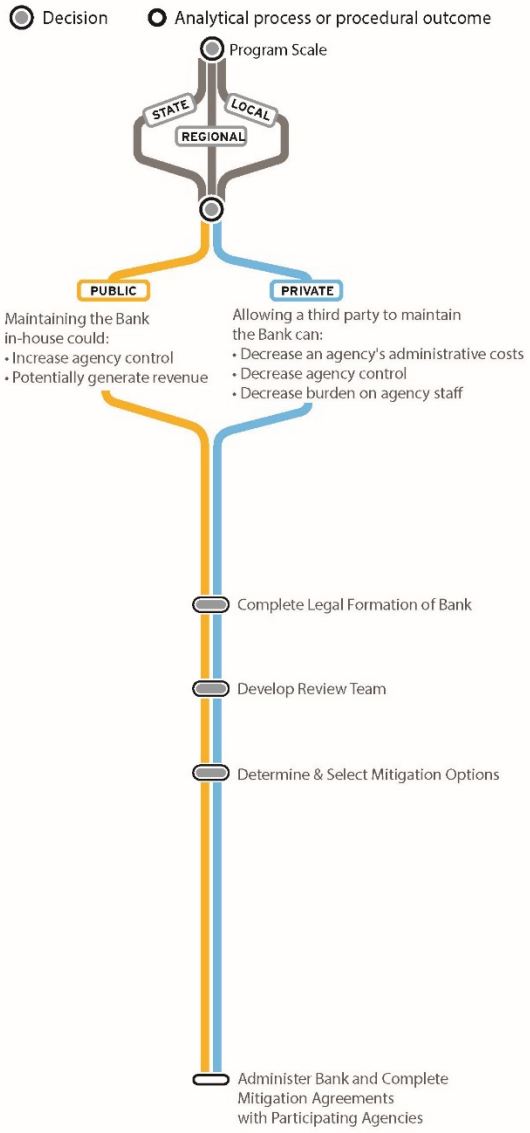


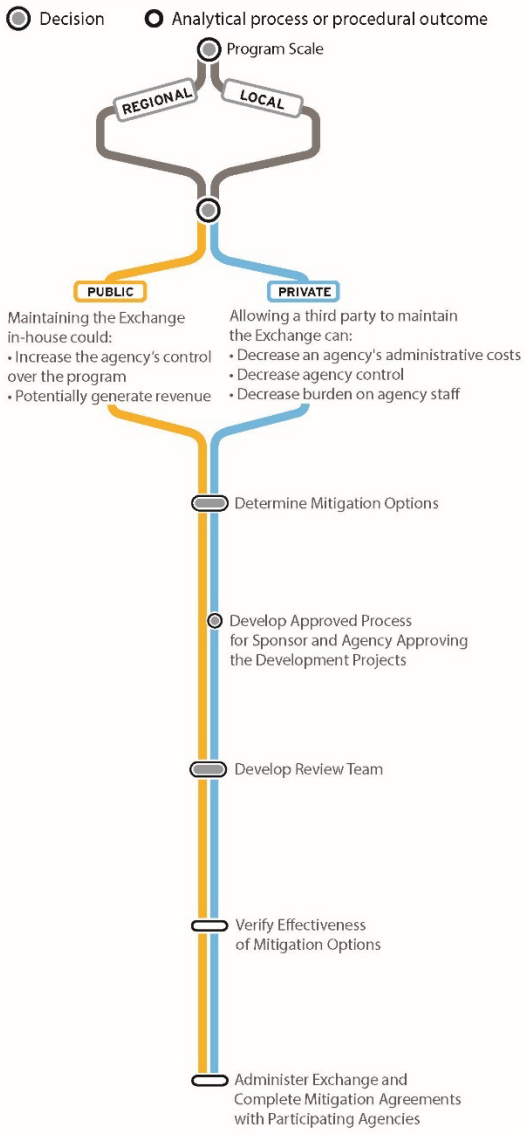
*Figure 4: VMT Exchange – Implementation Steps*

# VMT Exchange

## Implementation Steps

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

### Procedural Flowchart



## 7.3 Monitoring

### Monitoring Requirements for Different Program Types

Monitoring the effectiveness of a VMT mitigation program may be necessary for determining the CEQA VMT impact significance associated with participation in the program and could be an important element for maintaining support for the program's long-term operation. For the program to offer participants the certainty that their VMT impacts could be reduced to a less-than-significant level, substantial evidence must be generated to demonstrate the program's ability to achieve effective VMT reductions over time. Instead, if the program relies solely on currently available evidence about how the VMT strategies have worked in other places in the past, then it may only be able to demonstrate that VMT impacts would be lessened but not to a specific level of less-than-significant.

As to legal requirements, the type and extent of monitoring will vary by program option. For example, impact fee programs are simply required to demonstrate that fee revenue is being used to implement the program's CIP, with financial reports completed annually and a verification process required every five years. This level of monitoring and documentation satisfies the requirements of the Mitigation Fee Act, but would not produce the level of evidence required by CEQA to support a conclusion that the program reduces VMT to a specific level.

For a bank program, VMT performance monitoring would be essential since it is the method that would establish the annual cost for each VMT reduction credit. VMT is heavily influenced by external market conditions beyond the control of local and regional agencies so the bank would need a continual and consistent flow of VMT performance data to gauge the program's effectiveness and determine whether the cost of credits would need to be adjusted.

An exchange program could largely follow the same expectations for monitoring associated with an impact fee program. The basic form of monitoring would be verification that the funds were being used to implement the intended VMT reduction strategies; as described above, this would demonstrate that VMT impacts are being lessened, but would not provide sufficient data to support a conclusion of reducing VMT to a specific less-than-significant level.

### Sources of VMT Monitoring Data

There exists no one perfect source of ongoing VMT monitoring data that can meet all the requirements of a mitigation program with a high degree of certainty and granularity. Multiple sources will need to be used to ensure that the measurements of overall VMT context in the county (e.g., an estimate of total VMT and its change over time), and of the VMT effects of strategies funded through VMT mitigation payments are reasonable.

Some data vendors produce VMT estimates through mobile device, connected vehicle, or activity-based models (e.g., StreetLight and Replica). These could potentially serve as a source of data about locally-generated VMT and how it changes over time. However, it is important to note that these companies have



had to refine their models over time to accommodate evolving raw data sources, so variations may occur in their VMT estimates simply due to changes in data sources and not due to actual program effects.

These limitations highlight the potential opportunity to create a local data source tied directly to the travel behavior of Contra Costa residents or workers. This type of data could be obtained through direct travel surveys or anonymized mobile device data that would occur regularly over time. This monitoring could be designed into the VMT mitigation program.

# 8. Next Steps

Advancing VMT mitigation programs in Contra Costa County could occur at the countywide or local jurisdiction level. Based on stakeholder input, there is interest in a countywide program and a consensus that CCTA would be the right entity to lead it. The main goals of this type of program would be to identify, fund, and implement effective VMT reduction strategies that benefit the projects funding the mitigation and their associated communities.

## 8.1 Potential Future Pilot Program

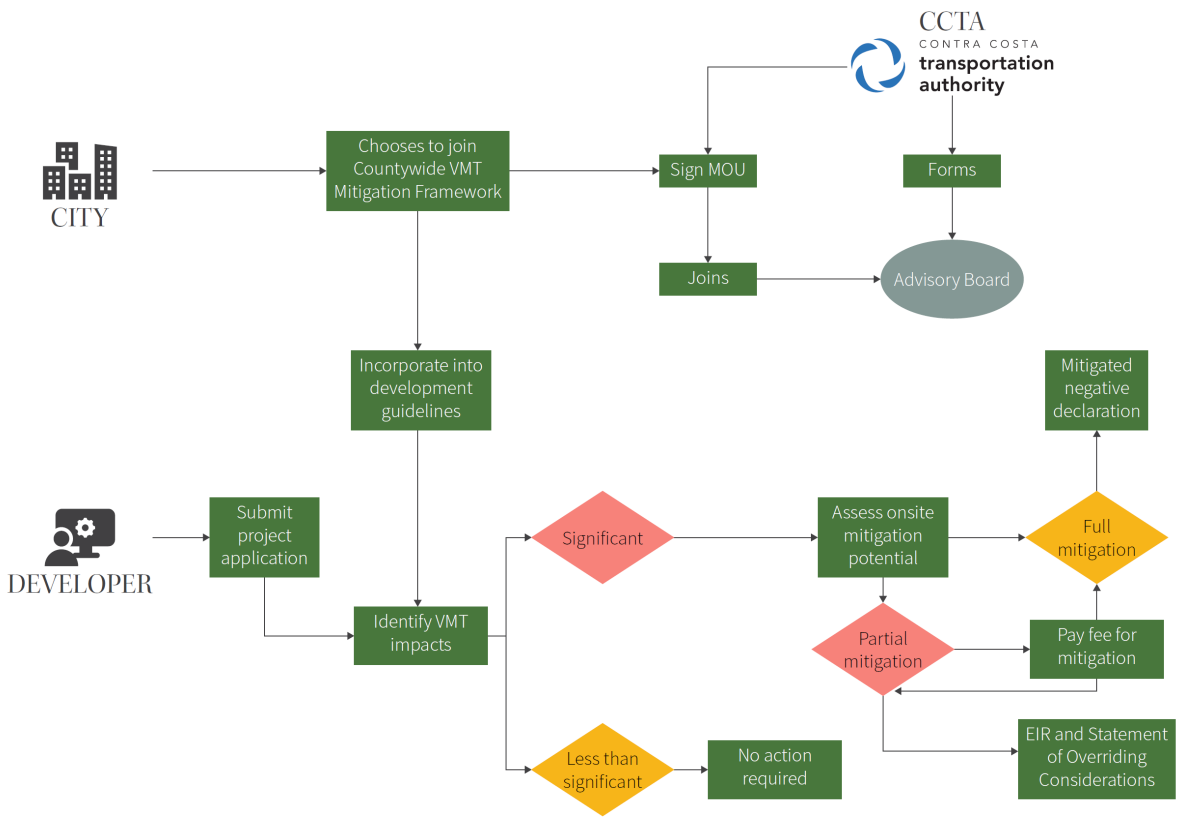
As a first step toward a countywide VMT program, CCTA could establish a targeted pilot program, whether structured as a bank, exchange, or fee program, with a focus on VMT monitoring, testing, and refinement over time. Based on stakeholder feedback, a future pilot program should be voluntary, where local lead agencies and/or individual project sponsors could choose to participate as a means of lessening the project's VMT impacts. The program should be administered by CCTA and be overseen by an Advisory Committee, made up of representatives from participating jurisdictions and interested stakeholders, which would serve as the oversight body for the pilot program. Advisory Committee responsibilities would include:

1. Review and evaluate progress made in implementing the selected mitigation strategies.
2. Review Pilot Program budget and financial records, including all incoming funds from project sponsors and all outgoing funds allocated to mitigation actions.
3. Discuss progress and evaluate the Pilot Program.
4. Recommend adjustments to the Pilot Program.

**Figure 5** presents a summary of the actions that cities and land developers could take if a city chooses to participate in a future CCTA-led pilot program.

To pursue this idea further, CCTA could conduct a subsequent study to develop a more detailed pilot program implementation plan, building upon the findings and framework from this initial study to define the types of strategies that would be considered eligible for the program and the structure for mitigation payments from project sponsors.

*Figure 5: City and Developer Participation in Future CCTA-led Pilot Program*

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## 8.2 Options for Local Agencies

Cities and counties, in their role as lead agencies under CEQA, have the discretion to pursue any type of VMT mitigation strategy that can be demonstrated to be effective and enforceable, and that their agency considers feasible. If desired, a local agency could use the information prepared through this study to develop a local VMT mitigation program that could incorporate one or more of the VMT reduction strategies described in Chapter 5.

Cities and counties also have a unique programmatic mitigation strategy under CEQA associated with tiering under CEQA Guidelines Section 15183.[8] This section of the Guidelines relieves a project of additional environmental review if the environmental impact was adequately addressed in the General Plan 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*
>
> *(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 Contra Costa 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 the General Plan's growth would be identified. VMT mitigation deemed feasible by the jurisdiction would be identified that could be implemented through standard conditions of approval for subsequent projects or through a mandatory local or regional VMT mitigation program. The VMT impact may remain significant after mitigation. Subsequent projects consistent with the General Plan would simply tier from this finding, and no new VMT impact analysis would be required for these subsequent projects. These projects would contribute to the General Plan's VMT mitigation by implementing mitigation actions through standard conditions of approval or possibly through VMT mitigation payments if the jurisdiction chose to implement such a program.

[8] 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).

Using standard conditions of approval could take the form of a simplified VMT exchange where specific mitigation actions in the General Plan EIR (which could be drawn from the VMT reduction strategies described in this study) 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.[9]

## 8.3 Future Considerations

It has been acknowledged at various points in this report the many uncertainties related to VMT mitigation. 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 both of the COVID pandemic and the continuing evolution of transportation-related technologies. All of these uncertainties merit ongoing awareness, coordination and planning by CCTA and its partners 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 CCTA and other agencies might take to facilitate this adaptation are listed below.

- Monitoring case law on VMT as a measure of transportation impact in CEQA, and adequacy of VMT mitigations, 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. CCTA 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 mitigations have been discussed here (fees, exchanges, banks). At the time of this report, very few mitigation programs are in active operation. 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 CCTA and its partners can and should continue to learn from other agencies.
- If the CCTA Board decided to establish a VMT mitigation program, the current assumption is that the program would be voluntary, available to CCTA member agencies and partners if they chose to participate. If, after successful implementation as a voluntary program, the CCTA Board considered transitioning to a mandatory 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.
- 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, CCTA could advocate for legislative

[9] 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



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.

- One positive outcome of COVID is the live experiment it has provided in finding substitutes for physically-present work, education, healthcare, shopping and other activities. We are already observing how those forced, short-term changes are evolving into voluntary, longer-term realities: hybrid workplaces, increased use of tele-medicine, remote learning and online shopping, etc. Opportunities to programmatically harness and enhance the use of "substitutes for travel" to reduce VMT should be explored.
- All of the research on VMT reduction potential used in this report is from the "before COVID" time 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. CCTA 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.
- While land use strategies offer some intriguing possibilities for supporting people in living closer to their daily activities, more research, outreach and coordination would be needed for such strategies to become integral parts of a VMT mitigation program. This would include identifying partner organizations (e.g., housing authorities or non-profits) who could help implement such programs and developing small-scale pilots to test the magnitude of subsidies necessary to achieve varying levels of participation and results. A well-designed pilot test could help to determine key program factors like cost of subsidies to households, program overhead costs, and VMT monitoring procedures, as well as helping to evaluate co-benefits like effect on housing affordability and on the workforce in Contra Costa.

# Appendix A – VMT Mitigation Program Structures Factsheet

# Appendix B – Stakeholder Engagement Plan

# Appendix C – Presentations and Notes from Project Advisory Committee Meetings

# Appendix D – Presentation for Small Group Meeting with Residential Developers

# Appendix E – Evaluation Criteria Memorandum

# Appendix F – White Papers on Land Use Strategies

# Appendix G – Cost Effectiveness Calculations

## Introduction

This appendix provides details of how VMT reduction effectiveness and costs were developed for the VMT mitigation strategies outlined in Chapter 5, Section 2.

### Strategy Identification

There are several broad categories of VMT reduction strategies for which substantial evidence exists about their effects on vehicular travel. Over time, numerous specific projects and programs have been and will continue to be developed in Contra Costa that fit within one of the broad categories of VMT reduction. While it is not possible to predict what specific projects or programs may be developed in the future, it is possible to look at local projects and programs that have already been identified in existing plans and that could serve as examples of the types of VMT-reducing actions that local agencies might propose. This study looked at several previously adopted plans and identified a number of projects and programs that fit within the broad categories of VMT reduction and that represented a range of potential future strategies. This "short list" of strategies from adopted plans was supplemented with a few conceptual strategies to flesh out the full range of VMT reduction categories, including expanding access to shared transportation modes (#5 Countywide e-Bike Share Program, #15 Countywide Carshare Program), reducing barriers to transit (#14 Countywide Transit Fare Reductions) or encouraging Contra Costa County workers to relocate to more transportation-efficient areas (#17 and #18, Homeowner and Renter Relocation Subsidies).

### Estimating VMT Reductions

The primary source of data for the effects of VMT reduction strategies is the *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (2021, California Air Pollution Control Officers Association). The CAPCOA Handbook contains strategies that are supported by research, and the methods contained in the Handbook were developed to provide the best balance between accuracy and reliability, following the good practices defined by the Intergovernmental Panel on Climate Change (IPCC).

Estimates of VMT reductions for the strategies were calculated using the TDM+ spreadsheet tool, which applies the methods from the 2021 CAPCOA Handbook, and using location-specific information drawn from a variety of sources, including the Countywide Travel Model, the US Census, and regional travel surveys. Percentage reductions calculated in TDM+ were applied to the amount of countywide VMT estimated to be generated by land uses in Contra Costa County over the next ten years. The countywide VMT estimates came from the Countywide Travel Model; the model was applied for a 2020 base year and a 2040 forecast year, and the results were interpolated to prepare a 10-year estimate. Different strategies

affect different types of travel, and the percentage reduction from each strategy was applied to the appropriate type of countywide VMT (see **Table G-1** for the countywide VMT values).

**Table G-1: 2030 Countywide VMT**

| VMT (2030, Interpolated) | Average Daily VMT |
|---|---|
| Total Passenger VMT | 51,013,107 |
| Total Commute VMT (HBW) | 6,842,043 |
| Total Home-Based VMT | 21,092,870 |
| Total Boundary VMT | 28,198,274 |
| Employee Commute Boundary VMT | 3,781,886 |
| Home-Based Boundary VMT | 11,659,907 |

Sources: Fehr & Peers, 2023; Contra Costa Travel Model, 2023.

## Estimating Costs

The estimated cost for each strategy was drawn from published sources, with reference to recent local costs for similar projects to the extent available. The total cost of applying each strategy for ten years was calculated as the initial capital cost plus ten years of operating costs.

## Example

As an example, the Mobility as a Service (MaaS) program included in CCTA's Innovate 680 project was identified as a candidate strategy. The program would develop, distribute, and promote a Mobility On Demand (MOD) app that provides real-time, multimodal trip planning options based on origin and destination data and offers incentives based on time of day and mode to reward select travel behaviors.

- ***VMT Reduction:*** Since evidence for the effectiveness of app-based trip planning and incentive strategies is limited, the best available evidence for similar strategies was applied. Commute trip reduction marketing programs typically include information and incentives about transportation options. As documented in the CAPCOA Handbook (measure *T-7, Implement Commute Trip Reduction Marketing)*, commute trip reduction marketing programs can reduce employee commute VMT by up to 4% at sites where they are deployed, depending on the proportion of employees targeted by the marketing program. We assumed that most workers in the professional and business services sector and up to half of workers in the educational and health services sector in Contra Costa County would be able to take advantage of this program. Per Bureau of Labor Statistics data for 2022, this amounts to 25% of full-time workers in Contra Costa County. Therefore, a 1% (4% x 25%) reduction in employee commute VMT within Contra Costa County (equivalent to 132,806,805 VMT reduction over ten years) was identified as the upper limit for potential VMT reduction from this strategy.
- ***Costs:*** The Innovate 680 program provided an estimate of capital costs ($6.9M) and annual operating costs ($0.3M/year); the combined total ten-year cost was calculated as $10.2 million.
- ***Cost per VMT reduced:*** Total costs over ten years were divided by total VMT reduced over ten years, resulting in a cost per VMT reduced of $0.08.

# Appendix H – Analysis of Development Costs and Effects of VMT Fees